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FOCUS

On International Joint
 Commission Activities

International Joint Commission Recommends Comprehensive Approach to Persistent Toxic Substances

by Geoffrey Thornburn

In its *Seventh Biennial Report on Great Lakes Water Quality* (signed in 1993), released this February, the **International Joint Commission** again concludes that contamination by various persistent toxic substances is the biggest problem facing the Great Lakes ecosystem. The Governments of the United States and Canada are committed to restoring and protecting the Great Lakes and the Commission's reports assist them by identifying progress and further needs.

Despite the two governments' stated intentions in the **Great Lakes Water Quality Agreement** of 1978, no persistent toxic substance has yet been "virtually eliminated" or reduced to "zero discharge." There is, however, mounting evidence that a range of these chemicals, many of them chlorine-containing compounds, are impacting the health of life in the Great Lakes ecosystem including humans.

Intergenerational and pseudo-hormonal effects are emerging as particular concerns among those that present a risk to the integrity of the ecosystem (see sidebar). The Commission has stated that any risk of such impacts on humans should be unacceptable and that society should act accordingly in defence of its own long-term self interest.

Because the sources and impacts are wide ranging, and the consequences so potentially devastating,

Higher concentrations of many chemicals are most often found in creatures at the top of the food chain, including humans.

the Commission continues to urge adoption of a comprehensive binational, even global strategy to prevent the production and use of these persistent toxic substances. The Commission reiterates its previous recommendations in this regard and proposes a number of additional principles and recommendations.

The binational strategy should involve all sectors of society, including governments, business, labor, professional bodies, consumer and other organizations as well as individuals. All should be a part of a transition process to change the way decisions are made and to create an economy that does not rely on persistent toxic substances. The strategy must go beyond conventional concepts of economic prosperity and environmental protection to recognize and incorporate economic, environmental and social considerations as important interconnected components of decision-making. It should also place a stronger emphasis on prevention and precaution against injury rather than the regulation and remediation of pollution.



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The Commission sees the sustainable development concept as consistent with this approach and with the Great Lakes Water Quality Agreement. Indeed, Agreement implementation could serve as a global model for applying sustainable development. Together, they provide a foundation for the development of a clear, comprehensive and coordinated action plan to address the problem of persistent toxic



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substances. A specific strategic process for identifying and addressing critical aspects of this challenge, based on the work of the Commission's Virtual Elimination Task Force, is endorsed for setting priorities and taking action.

The Great Lakes are at the center of a complex and dynamic system that includes the water, atmosphere, surrounding land, a wide variety of biological species and interrelationships and, of course, human activity. Therefore, these components must all be understood and incorporated into any effective plan to protect the Great Lakes. A number of research topics are noted as requiring further effort, including linkages between environmental conditions and ecosystem (including human) health, groundwater, and the implications of economic and trade policy and of sustainable development for the Great Lakes.

The Commission's report emphasizes that scientists, educators, producers, consumers, and various professions and citizens' organizations need to learn more about these issues and become involved in community-based efforts to understand the need for ecosystem integrity and act accordingly. Integration across disciplines and sectors is essential to ecosystemic thinking.

Other aspects of what constitute "good science" and appropriate premises for decision-making are explored, including concepts of reverse onus and weight-of-evidence in assessing chemicals, risk and assimilative capacity. The report also highlights the need for improved reporting of progress in contaminant reduction and in the general state of the Great Lakes ecosystem. It emphasizes, however, that knowledge is presently not the barrier to declaring the need for action and how to proceed.

This approach is specifically encouraged for the Remedial Action Plans in the 43 Great Lakes Areas of Concern. Incorporating socioeconomic and human health aspects as well as meaning-

ful public participation are critical to successful programs to restore local ecosystems and prevent future degradation. Considerable progress is being made in some Areas of Concern, but sustained public support for implementation needs to be enhanced in all of them.

In the Agreement, virtual elimination and zero discharge of all persistent toxic substances are the most critical management targets, even though the real task is much broader and there will be interim steps in achieving those targets. To focus on and demonstrate progress, the Commission recommended in 1990 that Lake Superior be a pilot project for achieving zero discharge of persistent toxic substances from point sources, including industrial plants and sewage treatment plants. The new report reviews progress to date and makes recommendations for more definitive reporting by specific target dates, including improved monitoring of atmospheric deposition. It encourages public involvement and also reiterates an earlier recommendation for strict control of incinerators affecting the Great Lakes basin.

While the Commission's mandate includes assessment of the adequacy of actions by the two federal governments, the Province of Ontario and eight states in the Great Lakes basin, it also includes providing public information on Great Lakes water quality issues. In its *Seventh Biennial Report*, the Commission reviews its activities to increase awareness of the issues and reinforces its stance that the responsibility for action goes beyond governments. To reflect this stance, there are specific recommendations to business, labor, scientists, educators and news media with a view to each adopting their own share of the responsibility for the integrity of the Great Lakes Basin Ecosystem.

To request a copy of the *Seventh Biennial Report on Great Lakes Water Quality* (signed in 1993), contact the Commission's Washington, Ottawa or Windsor offices.

Persistent Toxic Substances Disrupt Hormone Systems

Recent human health, wildlife and laboratory studies from around the world are consistent with findings observed in the Great Lakes. These lend further support to the International Joint Commission's conclusion that exposure to persistent toxic substances is the most significant problem facing the Great Lakes region.

Among the more recent concerns is the ability of various persistent toxic substances to disrupt natural hormone systems and interfere with critical stages of fetal development.

- The death rate of alligator eggs and hatchlings exposed to DDE, a breakdown product of the pesticides DDT and dicofol, on Lake Apopka in central Florida is several times higher than on surrounding lakes. Surviving alligators have elevated ratios of estrogen to testosterone (due to depressed testosterone production) and abnormal testes and ovaries. Most males also have penises that are half to one-third normal length. Turtle eggs from Lake Apopka produced hatchlings with abnormal hormone balance and malformed reproductive organs.
- Trout of both sexes placed at the outfalls of sewage treatment plants across Great Britain rapidly devel-

oped abnormally high levels of vitellogenin, an egg-yolk protein produced in response to estrogen activity, and male fish had reduced growth rates and gonad size. The suspected agents were alkyl phenols, estrogenic substances liberated from the breakdown of detergents released with treatment plant discharges.

- In laboratory tests on rats, a single dose of TCDD, the most toxic form of dioxin, administered on day 15 of pregnancy was sufficient to cause delayed testes descent, reduced production of testosterone, impaired sperm production and demasculinization of sexual behavior.
- Breast, prostate and testicular cancer, which are mediated by hormonal activity, are increasing in humans, particu-

larly in industrial countries. Women with breast cancer had significantly higher blood levels of DDE, a pesticide breakdown product, according to the results of a long-term study in New York.

- Male human reproductive tract disorders in the United Kingdom have more than doubled in the past 30-50 years while sperm counts have declined by about half. Similarity of the abnormalities to those of sons whose mothers took the synthetic hormone diethylstilbestrol (DES) during pregnancy indicates they may be related to exposure to estrogenic substances before birth.
- The first generation of humans widely exposed to synthetic chlorinated organic chemicals in the womb was born during the 1950s-1970s and began reaching reproductive age in the 1970s. Male children born to mothers exposed to PCB-contaminated cooking oil in Taiwan, who are now age 11-14, were found to have significantly shorter penises than children in a matched control group and female children had shorter body height. The exposed children consistently scored lower on cognitive ability tests.

Sommaire

Dans son *Septième Rapport biennal*, publié en février, la Commission mixte internationale conclut une fois encore que la contamination par diverses substances toxiques rémanentes constitue le problème le plus grave auquel doit faire face l'écosystème des Grands Lacs. En signant l'*Accord de 1978 relatif à la qualité de l'eau dans les Grands Lacs*, les gouvernements des États-Unis et du Canada se sont engagés à restaurer et à protéger l'environnement des Grands Lacs et les rapports publiés par la Commission les aident en recensant les progrès accomplis et en déterminant les besoins futurs.

En dépit des intentions de l'Accord, aucune substance toxique rémanente n'a jusqu'ici pu être «virtuellement éliminée» ou réduite jusqu'au point du «rejet nul». Toutefois, il semble de plus en plus plausible que certaines de ces substances, dont bon nombre sont des composés organochlorés, ont des répercussions sur la santé des organismes vivant dans l'écosystème des Grands Lacs, incluant les êtres humains. Parmi toutes les menaces pour l'intégrité de l'écosystème, les effets hormonaux et les incidences sur plusieurs générations semblent particulièrement alarmants (se reporter à l'encadré). De l'avis de la Commission, tout risque de telles incidences pour les popula-

tions humaines doit être considéré comme inacceptable et la société doit poser tous les gestes nécessaires pour son propre intérêt à long terme.

En raison de la diversité des sources et des impacts, ainsi que de l'ampleur des conséquences possibles, la Commission continue d'exhorter les Parties à adopter une stratégie binationale exhaustive, voire globale, afin de prévenir la production et l'utilisation de ces substances toxiques rémanentes. La Commission réitère ses précédentes recommandations à cet égard et en propose plusieurs autres, tout en posant certains principes.

[Suite à la page suivante]

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La stratégie binationale doit faire participer tous les segments de la société, incluant gouvernements, entreprises, travailleurs, organisations professionnelles, associations de consommateurs et autres, ainsi que les individus. Tous doivent apporter leur concours à cette transition vers une nouvelle approche du processus décisionnel et une économie indépendante des substances toxiques rémanentes. La stratégie doit transcender les concepts traditionnels de prospérité économique et de protection de l'environnement et reconnaître que les facteurs d'ordre économique, environnemental et social sont des éléments interdépendants du processus décisionnel. Elle doit également faire une plus large place à la prévention et aux précautions contre les dommages, par opposition à la réglementation et à la dépollution.

De l'avis de la Commission, le concept du «développement durable» respecte cette approche ainsi que les termes de l'*Accord relatif à la qualité de l'eau dans les Grands Lacs*. De fait, la mise en oeuvre de l'Accord pourrait servir de modèle global pour l'application du principe du développement durable. Ensemble, les deux concepts fournissent la base requise pour l'élaboration d'un plan d'action explicite, exhaustif et concerté pour le problème des substances toxiques rémanentes. Un processus stratégique visant à recenser les aspects critiques de ce défi, basé sur les travaux du Groupe de travail sur l'élimination virtuelle de la Commission, est recommandé pour l'établissement des priorités et la mise en oeuvre.

Si le mandat de la Commission comprend l'évaluation du caractère adéquat des gestes posés par les deux gouvernements fédéraux, la province

de l'Ontario et les huit États du bassin des Grands Lacs, il inclut aussi la communication au public des informations relatives à la qualité de l'eau des Grands Lacs. Dans son rapport, la Commission passe en revue ses activités de sensibilisation à ces questions et affirme une fois encore que les gouvernements ne sont pas les seuls responsables. Elle formule des recommandations à l'intention spécifique des entreprises, des travailleurs, des chercheurs scientifiques, des éducateurs et des médias d'information, qu'elle incite à assumer chacun leur part de responsabilité en ce qui concerne les efforts vers l'intégrité de l'écosystème du bassin des Grands Lacs.

Pour obtenir un exemplaire du *Septième rapport biennal sur la qualité de l'eau dans les Grands Lacs*, veuillez vous adresser à un des bureaux de la Commission.

Des études récentes sur la santé humaine, sur la faune et en laboratoire corroborent la conclusion de la Commission mixte internationale selon laquelle l'exposition aux substances toxiques rémanentes constitue le problème le plus grave auquel est confrontée la région des Grands Lacs. Parmi les motifs de préoccupation les plus récents figure la capacité de diverses substances toxiques rémanentes de perturber les systèmes hormonaux naturels et d'interférer avec les stades critiques du développement foetal.

- Le taux de mortalité des oeufs et des larves d'alligator exposés aux pesticides DDT et dicofol dans le lac Apokpa en Floride centrale est plusieurs fois plus élevé que dans les lacs voisins. Les alligators qui survivent présentent des ratios oestrogène/testostérone élevés et des anomalies au niveau des testicules et des ovaires. Par ailleurs, chez la majorité des mâles, la longueur du pénis est de la moitié au tiers de la longueur normale. Les oeufs de tortue du lac Apokpa produisent des larves présentant des déséquilibres hormonaux et des malformations des organes reproducteurs.
- La truite des deux sexes capturée

dans les émissaires des stations d'épuration des eaux usées en Grande-Bretagne présente une concentration anormalement élevée de vitellogénine, une protéine du vitellus produite en réponse à une activité oestrogénique, tandis que l'on observe chez les poissons mâles une diminution du taux de croissance et de la taille des testicules. Les agents présumés sont des substances oestrogéniques que l'on retrouve dans les détergents rejetés dans les effluents de la station d'épuration.

- Dans des essais en laboratoire sur le rat, une dose unique de TCDD, la forme la plus toxique de la dioxine, administrée au jour 15 de la gestation, est suffisante pour causer un retard de la descente des testicules, une baisse de la production de testostérone, une altération de la production de spermatozoïdes et une démasculinisation du comportement sexuel.
- Les cancers du sein, de la prostate et des testicules, dont le développement est lié à l'activité hormonale, sont de plus en plus fréquents chez l'humain, en particulier dans les pays industrialisés. Une étude à long terme révèle, chez les femmes souffrant d'un cancer du sein, des taux sanguins de DDE, un produit de dégradation des pesticides, significativement plus élevés.

tivement plus élevés.

- Les troubles du tractus génital masculin ont plus que doublé au cours des 30 à 50 dernières années, tandis que la numération des spermatozoïdes a diminué de moitié environ. La similarité de ces anomalies du développement avec celles des enfants de sexe masculin dont la mère a reçu l'hormone synthétique diéthylstilbestrol (DES) pendant la grossesse indique qu'elles pourraient être attribuables à une exposition à des substances oestrogéniques avant la naissance.
- La première génération des enfants largement exposés *in utero* aux substances organochlorées de synthèse est née entre 1950 et 1970 et a commencé à atteindre l'âge de la maturité sexuelle dans les années 1970. Chez les enfants de sexe masculin dont la mère a été exposée à de l'huile de cuisson contaminée par les PBC à Taiwan, qui sont à présent âgés de 11 à 14 ans, on a observé des pénis significativement plus courts que chez les enfants d'un groupe témoin comparable, tandis que les enfants de sexe féminin sont de plus petite taille. Les enfants exposés obtiennent toujours des résultats plus faibles aux tests d'intelligence générale.

Does Anyone Care About Great Lakes Water Quality?

by Gordon K. Durnil

It seems a lot of people care. Nearly 2,000 people came to the International Joint Commission's Biennial Meeting in Windsor last October, the most ever to attend. Approximately 14,000 individuals and organizations have been identified as interested enough in what the Commission does that we send them this newsletter. But please remember, 40 million or more people live in the Great Lakes basin.

It's true. I have more than 20 years of formal education and a doctorate degree, but math was not much of a factor in my education, qualitatively or quantitatively. Even so, I have calculated that somewhere between 0.005 percent and 0.035 percent of the people care, even in the slightest, about the work pursued by the Commission. The weight of evidence would imply that perhaps whistling in the dark would be a more fruitful use of our time and taxpayer resources.

But let's think about that. What is the Commission's agenda, as it relates to Great Lakes water quality? The duties are clearly set out in the **Great Lakes Water Quality Agreement**. The United States and Canada assigned the International Joint Commission the responsibility to monitor and assess progress made pursuant to the Agreement, in particular the adequacy of actions by the two federal governments, the Province of Ontario and the States of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin.



"Complex problems cannot be solved, or even understood, unless all interested parties are meaningfully involved," according to Gordon K. Durnil, Chair of the International Joint Commission's U.S. Section. Durnil's remarks were presented to the United Nations Conference on Environment and Development held June 1992 in Rio de Janeiro, Brazil.

Credit: M. Tzovaras, United Nations

The Commission was assigned the duty of assisting governments in implementing the Agreement, reviewing Remedial Action Plans and Lakewide Management Plans, and providing public information ... ergo this newsletter, as well as a variety of other information materials.

And what did Canada and the United States agree to do? They said the purpose of their Agreement was to "restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem." They agreed it was their policy that "the discharge of toxic substances in toxic amounts be prohibited and the discharge of any or all persistent toxic substances be virtually eliminated," pursuing a philosophy of "zero discharge."

All of those words, *ecosystem, virtual elimination and zero discharge*, are

words of the two federal governments, formally adopted in their Agreement, which was finally given the force of law in the United States by the Great Lakes Critical Programs Act of 1990. Too often, those who might disagree with these goals tend to think the Agreement and its words are the creation of the Commission. Not so!

So, the work is important. Progress has been made and plans for remediation in Areas of Concern are well along in some cases. Governments have spent large sums of money with many positive results. But the work is far from done. The Commission has been given important duties: to assist, to review, to monitor and assess and to provide public information.

It is that latter responsibility where I believe the Commission can best be a catalyst for future success. It is also the

area where the Commission, governments, public groups and others have experienced their greatest failures.

Serious problems exist because of the discharge of persistent toxic substances into the Great Lakes environment (and the global environment). Cancers, reproductive failures, immune suppression, neurological problems, learning deficiencies, behavioral abnormalities are just some of the possible adverse effects to wildlife and humans. All exist in an area of scientific uncertainty as problems expand faster than science can fully assess them.

But still, we who are engaged in these issues have not adequately informed the public about the possible consequences of what we do know. Most people do care about environmental quality, but don't think about it every day of their lives, as do *we*, the choir to whom I am preaching. And most people really are not aware of the potential problems. Most don't know what chemicals are good or bad, which ones are being discharged (legally or illegally) into the water, the air and the ground. Most people still believe they can trust their government to protect them from such toxic substances, although faith in government is diminishing.

Our failure is that even with all that *we* now know, *we* have not clearly told the residents of the Great Lakes basin (and the world) that precaution just might be in order. Fish consumption advisories go unnoticed or are ignored. People do not suspect their health is at risk primarily because *we* have not made it clear to those who fund cleanups and research, or to those who could prevent future discharges with a process change, or to those in the general public who should be made aware of the involuntary risks to which they might be subjected.

These are reasons why I am excited about one of the priorities set for the



But still, we who are engaged in these issues have not adequately informed the public about the possible consequences of what we do know.

next two-year cycle of the Commission. I will look forward to the next biennial report to see how it comes out. The priority would anticipate a grouping of staff and nonstaff communications experts to work at the task of:

- Defining the appropriate Great Lakes message. Included, I would think, would be the value of the Great Lakes to industry, recreation, riparians, education, preservation of natural systems and just the personal enjoyment of nature by individual citizens. A second area might be all the reasons why the system should be restored and maintained as called for by the Agreement. A third area **would need to be** a summary of the most serious problems facing the Great Lakes: persistent toxic substances, and a listing of potential effects.
- Defining the audience to whom the message should be delivered. Is the

audience the people who make the laws and fund research and clean-up activities? Is it the people who could most easily prevent such onerous discharges, if they would? Is it the educators, the physicians, the engineers, the municipal leaders or all of the above? Should audiences be prioritized?

- Defining the most effective methods to deliver the best messages to the appropriate audiences. I have sat with scientists, regulators and others, all agreeing upon a message of import that would, unfortunately, never find its way to the ears or eyes of legislators, administrators, educators, industrialists or the average person out there just going about her business. Quite often, how the message is delivered is as important as the message. Certainly an undelivered message is of little use.

Essentially, the task is to determine the message, define the audience and then come up with an effective delivery scheme. The Commission could then recommend that package for use by governments, industry, educational institutions, public groups and whoever else might be identified.

Technical people, I suspect, will not think this matter deserves priority status. And some will worry about blame being attached to the messenger. However, as a person who has spent a lifetime concerned about messages and their delivery, I am convinced that widespread public awareness is the first step toward solving societal problems. As an outgoing Commissioner, it is my hope that this priority just might be the catalyst that does truly make a difference for all who are concerned about achieving the goals of the Great Lakes Water Quality Agreement.

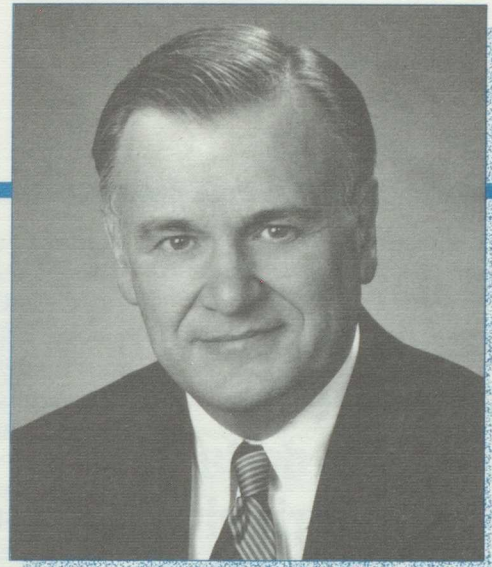
Sommaire

Il semble que l'on s'intéresse beaucoup à la qualité de l'eau dans les Grands Lacs. Près de 2 000 personnes ont assisté à la Réunion biennale de la **Commission mixte internationale** à Windsor en octobre dernier, une affluence record pour cet événement. Le présent bulletin est envoyé à environ 14 000 individus et organisations. Toutefois, n'oublions pas que l'on dénombre dans le bassin des Grands Lacs plus de 40 millions d'habitants. Une fraction comprise entre 0,005 et 0,035 de ces individus se sent concernée par les travaux de la Commission. Au vu de ces chiffres, il semblerait plus judicieux de consacrer notre temps et l'argent des contribuables à d'autres fins.

Le rejet de substances toxiques rémanentes dans l'environnement des Grands Lacs (et du monde) est à l'origine de problèmes graves. Les cancers, les troubles de la reproduction, l'immunosuppression, les problèmes neurologiques, les troubles d'apprentissage, les anomalies du comportement ne sont que quelques uns des effets néfastes qu'il peut avoir sur la faune et les êtres humains.

Toutefois, nous qui nous penchons activement sur ces questions n'avons pas adéquatement informé le public des conséquences possibles de ce que nous savons. Notre échec réside dans le fait que, en dépit de toutes les connaissances dont nous disposons à présent, nous n'avons pas fait réaliser clairement aux résidents du bassin des Grands Lacs (et du monde entier) l'importance d'une attitude préventive. Les avis relatifs à la consommation de poisson passent inaperçus ou sont ignorés. Les citoyens n'imaginent pas que leur santé est menacée, principalement parce que nous n'avons pas clairement averti ceux qui financent les travaux d'assainissement et les recherches, ou ceux qui pourraient prévenir les rejets futurs par l'adoption de nouveaux procédés, ou tous les citoyens qui devraient être mis au courant des risques auxquels ils peuvent involontairement être exposés.

Ce sont les raisons pour lesquelles j'appuie particulièrement l'une des priorités que s'est fixée la Commission pour son prochain cycle de deux ans, à savoir définir le message à véhiculer, déterminer le public cible et élaborer un plan de diffusion efficace. À titre de commissaire sortant, j'espère que cette priorité saura être le catalyseur permettant de changer la situation, pour tous ceux qui se soucient d'atteindre les buts de l'Accord relatif à la qualité de l'eau dans les Grands Lacs.



Thomas L. Baldini

Thomas L. Baldini Named as U.S. Section Chair

Thomas L. Baldini, has been nominated by President Bill Clinton as U.S. Section Chair of the International Joint Commission. As we go to press, Baldini is scheduled to appear before the U.S. Senate Foreign Relations Committee for a confirmation hearing on February 25, 1994. His confirmation will also require a vote by the full Senate.

As special assistant to Michigan Governor James Blanchard for Upper Peninsula affairs from 1983-1990, Baldini participated in major economic development decisions and advised the governor on a wide range of policy issues, including negotiation of the Great Lakes Charter and the Great Lakes Toxic Substances Control Agreement. In 1987, Baldini was appointed by the governor to represent Michigan on the Great Lakes Economic Development Commission of the Council of Great Lakes Governors. He also chaired a major study for the governor on telecommunication in Michigan. The special assistant position was elevated to cabinet level in 1989.

Since 1991, Baldini has served as assistant to the superintendent for personnel and finance for the Marquette area public schools. His background in education includes serving as the governor's senior education advisor from 1985-1989, developing a state education policy, lecturing on political science for four years at Northern Michigan University and teaching at Marquette Senior High School from 1965-1983.

Baldini earned a bachelor of science in secondary education in 1965 at Northern Michigan University and has pursued graduate work in school administration and economics. Until recently, he served on the board of directors for the Marquette Area Community Foundation, the Great Lakes Training Center Association and the Marquette County Economic Club.

Nomination de Thomas L. Baldini au poste de président de la section américaine

Thomas L. Baldini, nommé par le président des États-Unis Bill Clinton président de la section américaine, a comparu devant le comité des relations extérieures du Sénat américain pour une audience de confirmation le 25 février 1994. Au moment de la mise sous presse, on ignorait encore à quelle date aura lieu le vote de confirmation final du Sénat. À titre d'assistant spécial du gouver-

neur du Michigan James Blanchard pour les affaires de la Upper Peninsula de 1983 à 1990, M. Baldini a participé à la prise de décisions majeures en matière de développement économique et a conseillé le gouverneur sur un large éventail de questions, en particulier les négociations de la Charte des Grands Lacs et du Great Lakes Toxic Substances Control Agreement. En 1987, M. Baldini a été nommé par le gouverneur pour représenter le Michigan à la Great Lakes Economic Development Commission du Council of Great Lakes Governors. Il a également présidé une étude majeure pour le gouverneur sur les télécommunications au Michigan. Son poste d'assistant spécial a été rattaché au Cabinet en 1989.

Depuis 1991, M. Baldini est assistant du surintendant du personnel et des finances pour les écoles publiques

de la région de Marquette. Il a été conseiller principal du gouverneur en matière d'éducation entre 1985 et 1989, a élaboré une stratégie en matière d'éducation pour l'État du Michigan, a enseigné les sciences politiques pendant quatre ans à l'Université Northern Michigan et a enseigné à l'école secondaire de Marquette de 1965 à 1983.

M. Baldini a reçu un baccalauréat en sciences de l'enseignement secondaire en 1965 à la Northern Michigan University et a effectué des études de deuxième cycle en économie et en administration scolaire. Jusqu'à récemment, il faisait partie du conseil d'administration de la Marquette Area Community Foundation, de la Great Lakes Training Center Association et du Marquette County Economic Club.

BRIEFS



National Geographic Society President Gilbert M. Grosvenor (center) receives a certificate from International Joint Commission Chairmen Gordon K. Durnil and Claude Lanthier recognizing the society's outstanding efforts to raise public awareness of the need to protect North America's freshwater. These included one-hour television and radio specials, a special edition of National Geographic and a geography education campaign in the schools. (The meeting was arranged by renowned Canadian deep sea diver and author Dr. Joseph MacInnis who is helping the Commission explore communication on water issues.)

The International Joint Commission recently appointed **Hardy Wong** from the Ontario Ministry of Environment and Energy, **Robert Tétreault** from the Québec Ministry of Environment and **N.G. Kaul** from the New York State Department of Environmental Conservation to the Great Lakes Water Quality Board. Wong replaces **Douglas McTavish**, Tétreault replaces **Denyse Gouin** and Kaul replaces **Salvatore Pagano**.

New members appointed to the Council of Great Lakes Research Managers include **Warren Keith Marshall** of Environment Canada, **Dr. Charles Francis Marks** of Agriculture Canada, **Dr. Peter Toft** of Health and Welfare Canada and **Helle M. Tosine** of the Ontario Ministry of Environment and Energy.

Dr. Douglas Haffner from the University of Windsor, **Dr. Ian Rutherford** from Environment Canada and **Dr. Brian Gibson**, from the Department of Public Health Services in Hamilton-Wentworth, Ontario were recently appointed to the

Great Lakes Science Advisory Board.

Additional appointments include **Marjorie Hare** of Ontario Hydro as a member of the International St. Lawrence River Board of Control, **Russell Boals** of Environment Canada as Chairman of the Canadian Section of the International Souris River Board of Control and **Dr. Chris H. Pharo** as a member of the International Osoyoos Lake Board of Control.

La Commission mixte internationale a récemment nommé **Hardy Wong**, du ministère de l'Environnement et de l'Énergie de l'Ontario, **Robert Tétreault**, du ministère de l'Environnement du Québec et **N. G. Kaul** du New York State Department of Environmental Conservation au Conseil de la qualité de l'eau des Grands Lacs. **M. Wong** remplace **Douglas McTavish**, **M. Tétreault** remplace **Denise Gouin** et **M. Kaul** remplace **Salvatore Pagano**.

Les nouveaux membres nommés au Conseil des gestionnaires de la recherche des Grands Lacs comprennent **Warren Keith Marshall** d'Environnement Canada, le **D^r Charles Francis Marks** d'Agriculture Canada, le **D^r Peter Tofte** de Santé et Bien-être social Canada et **Helle M. Tosine** du ministère de l'Environnement et de l'Énergie de l'Ontario.

Le **D^r Douglas Haffner** de l'Université de Windsor, le **D^r Ian Rutherford** d'Environnement Canada et le **D^r Brian Gibson** des Services d'hygiène publique de Hamilton-Wentworth en Ontario ont récemment été nommés au Conseil consultatif scientifique des Grands Lacs.

Les autres nominations comprennent **Marjorie Hare** d'Ontario Hydro comme membre du Conseil international de contrôle du fleuve Saint-Laurent, **Russell Boals** d'Environnement Canada comme président de la section canadienne du Conseil international de contrôle de la rivière Souris et le **D^r Chris H. Pharo** comme membre du Conseil international de contrôle du lac Osoyoos.

Accepting an invitation for dialogue, Commissioners and staff of the International Joint Commission met with representatives of the **International Oil, Chemical and Atomic Workers** and the **Communications, Energy and**

Paperworkers Union of Canada in Washington, D.C. on December 14, 1993.

The union spokespersons outlined their support, in principle, for the sunseting of dangerous toxic chemicals including the phasing out of chlorine as an industrial feedstock. They noted that society could not afford to wait for irrefutable scientific evidence, but needed to act as a matter of social policy. As there is a wide range of opinion in the labor movement, however, support of their membership could not be expected if the burden of responding to legitimate social and environmental concerns were to fall primarily on the workers, as has happened in the past.

According to the union representatives, the social policy decision to phase out products should include plans for the transition and a consensus process involving governments, industry and labor. Rather than seeking a guarantee of current jobs, they see the issue as sustaining or "guaranteeing" income by a variety of means while moving to a more sustainable economy. Examples of how this approach can work well include the restructuring in the European coal and steel industry and some recent discussions concerning site cleanups under the U.S. Superfund law. What is needed is a rational, shared decision process to discuss how, rather than whether to phase out persistent toxics. Otherwise, the Commission and governments will be faced with strong resistance to changing the status quo.

The representatives proposed that the Commission is well placed to develop and lead an initial consultative process on how an orderly transition might be achieved. Commissioners thanked the representatives for presenting their views and agreed to consider them carefully.

In February, **U.S. Environmental Protection Agency Administrator Carol M. Browner** called for a national strategy for substituting, reducing or prohibiting the use of chlorine and chlorine compounds as one of the proposed changes to the Clean Water Act. The U.S. Congress is in the process of reauthorizing the act, which was last revised in 1986.

The proposed strategy is intended to move the United States toward the Clean Water Act goal of eliminating the discharge of toxic pollutants. It would include an 18-month interagency assessment of

chlorine use, environmental and health impacts and the availability of substitutes as the basis for the national strategy.

Other proposed changes to the law include stricter enforcement and new provisions to reduce nonpoint source pollution. In addition, the proposal calls for Congress to authorize a study by the National Academy of Sciences on the current knowledge of chemicals that cause hormone and nervous system effects, including evidence that they may increase the incidence of breast cancer, decreased sperm count or impaired reproduction.

For more information contact **Chuck Fox**, Office of Water, U.S. Environmental Protection Agency, 401 M Street S.W., Washington, DC 20460. Fax (202)260-5711.

The establishment of a new Technology Advancement Centre to boost western Canada's rapidly growing environmental industry was announced in January by Deputy Prime Minister and Environment Minister **Sheila Copps** and Western Economic Diversification Minister **Lloyd Axworthy**. The **Canadian Environmental Technology Advancement Corporation (CETAC)** will have its headquarters in Winnipeg, Manitoba and offices in Saskatoon, Saskatchewan, Edmonton, Alberta and Vancouver, British Columbia.

CETAC is an industry initiative of the four western provincial environmental industries associations, which will provide small and medium-sized companies with technical assistance, regulatory advice and business and financial counseling.

"This center, along with similar ones launched in Ontario and Quebec, will be a cornerstone of our Environmental Industry Strategy for Canada," said Minister Copps. "This strategy will help us achieve our twin goals of sustained job growth and a clean and healthy environment."

The federal government is investing \$4 million over the next four years in the start-up of CETAC. CETAC's partners have committed substantial cash and in-kind support over the same time period. They expect that by year four, 75 percent of the annual expenditures of the centre will be covered by revenues from the private sector.

For more information contact **Michael Van Wallegghem**, Canadian Environmental Technology Advancement Corporation, telephone (204)775-6157 or fax (204)775-9381.

Databases on human health research, including journal articles, government publications, reports and "grey" literature are now available on Internet. The **Great Lakes Human Health Research and Information Exchange Network**, a project of the Great Lakes Consortium in Syracuse, New York, has compiled a number of databases on human health effects of toxic pollution in the Great Lakes. As part of an ongoing effort to reach out to the research community, the network has been working with the Great Lakes Commission to make its bibliographic databases and compendium of projects available through the Great Lakes Information Network (see *Focus*, November/December 1993, page nine). The databases can be accessed online via gopher (gopher.great-lakes.net) or downloaded (ftp.great-lakes.net). For more information contact Sheila Myers, Great Lakes Research Consortium, State University of New York College of Environmental Science and Forestry, 24 Bray Hall, Syracuse, NY 13210, telephone (315)470-6720 or email smmyers@mailbox.syr.edu.

Final regulations setting effluent and adsorbable organic halide (AOX) limits for **Ontario pulp and paper mills** were released in December 1993 under the provincial Municipal-Industrial Strategy for Abatement. Announcing the regulation, Environment and Energy Minister Bud Wildman said it "confirms the Ontario government's commitment to the goal of zero discharge of AOX by the year 2002 and to the principle of pollution prevention. As well, it respects the Great Lakes Water Quality Agreement's principle of zero discharge of persistent toxic substances and is consistent with recommendations of the International Joint Commission." It is expected to reduce persistent toxic substances by up to 90 percent based on 1990 levels.

The regulation sets effluent limits for 10 parameters, nine of which apply to all of Ontario's 26 mills. The 10th applies only to the nine mills that use chlorine-based bleaching compounds. Each of the nine mills must also submit a series of reports setting out plans for meeting the government's goal of zero AOX discharge by 2002. The first reports are due May 25,

1994, with interim reports to be submitted by January 31, 1996 and final reports by January 31, 1999. For more information contact Edward Turner, Ministry of Environment and Energy, Program Development Branch, 40 St. Clair Avenue West, 14th Floor, Toronto, ON M4V 1M2, telephone (416)314-3933.

The **Ontario Clean Water Agency**, one of four Crown Corporations established under the Capital Investment Plan Act of 1993, helps municipalities provide more cost-effective water and sewage services, operates water and sewage systems and encourages residents, municipalities and industries to conserve water. For more information, contact the Ontario Clean Water Agency Head Office, 20 Bay Street, Seventh floor, Toronto, ON M5J 2N8. Telephone (416)314-8295 or fax (416)314-8300.

The 1993 U.S. National Crop Residue Management Survey shows more farmers are abandoning the plow for the economic and environmental benefits of **conservation tillage**. This soil-protecting and labor-saving practice has been increasing on average by about nine million acres for the last two years and is now less than 11 million acres away from the number of acres that are clean tilled. To find out more about the survey contact Jerry Hytry, Conservation Technology Information Center, 1220 Potter Drive, Room 170, West Lafayette, IN 47906-1383, telephone (317)494-9555.

In October 1993, Hamilton-Wentworth was selected by the Federation of Canadian Municipalities and the International Council for Local Environmental Initiatives as a model community under the Local Agenda 21 Model Community Programme. Agenda 21 is a protocol for action to achieve sustainable development that was adopted at the 1992 United Nations Conference on Environment and Development.

Beginning in 1990, **Hamilton-Wentworth** developed a community vision and strategy to make the concept of sustainable development a basis for review of all regional policy initiatives. It will be the only Canadian community selected and one of 21 communities around the world that will serve over the next 30 months as models for implement-

ing the actions required to create a sustainable community.

To receive further information on the model, contact Mark Bekkering, Senior Policy Analyst, The Regional Municipality of Hamilton-Wentworth, Planning and Development Department, 119 King Street West, 14th floor, Hamilton, ON L8N 3V9. Telephone (905)546-2195 or fax (905)546-4364.

A cruise ship will be sailing the Great Lakes in summer 1994. The 79-passenger **Akademik Ioffe**, a former Russian research vessel, is scheduled for eight and 10-day expedition-style cruises departing from Midland, Michigan, Toronto, Ontario and Duluth, Minnesota starting July 31. Lecturers and naturalists will lead onboard discussions. Shoreside excursions will focus on the landscape, history and culture of the Great Lakes. Rates start from \$1,295 US per person, double occupancy. For more information, contact your nearest travel agent or Caren Rapp, Blyth and Company, 13 Hazelton Avenue, Toronto, ON M5R 2E1. Telephone (416)964-2569 or 1-800-387-1387 in the United States.

The newest weapon in the war on pollution may well be a 140-year-old product found deep in most medicine cabinets and refrigerators. Baking soda, developed in the United States by Church and Dwight Company, commonly known as Arm and Hammer, is moving into the world of high-power cleaning. Cart Environmental Cleaning, Limited, located in Sarnia, Ontario is using the environmentally friendly process of **baking soda blasting**, known as the Accustrip System. The baking soda, water and pressurized air combination cleans dirt, oil, grease, and carbon deposits from any substrate while creating no toxic solvent fumes and little dust. "There is next to nothing this won't clean," said company manager Ryan Phibbs, adding that some machinery can even be cleaned while it is running.

To learn more about the procedure, contact Ryan Phibbs, Environmental Cleaning Limited, 1173 Michener Road, Units #23 and 24, Sarnia, ON N7S 6G5. Telephone (519)383-6355 or fax (519)383-1315.

La Commission économique européenne produit un Guide pour la gestion écosystémique des ressources en eau

*Avec la permission
du Service canadien de la faune*

La Commission économique européenne des Nations Unies (Commission) a récemment publié un rapport sur la Protection des ressources en eau et des écosystèmes aquatiques. Ce rapport présente plusieurs expériences réussies de gestion des eaux acquises par le Canada et les États-Unis dans le bassin des Grands Lacs.

Le rapport est le premier d'une série de lignes directrices, de recommandations et d'études techniques sur les problèmes reliés à l'eau. Cette série a été lancée en mars 1993 par les pays européens et nord-américains membres de la Commission économique européenne des Nations Unies. La série *Water Series* est conçue afin d'offrir une direction pour des mesures nationales et internationales améliorées pour prévenir, contrôler et réduire les émissions de substances dangereuses dans l'environnement aquatique, pour promouvoir la conservation et le rétablissement des écosystèmes, pour diminuer l'eutrophisation et l'acidification, pour assurer une gestion des eaux rationnelle et écologiquement sage, et pour protéger les écosystèmes connexes, y compris l'environnement marin. La série vise particulièrement à partager, à grande échelle,



Les ressources en eau des terres humides et du littoral des Grands Lacs comptent parmi les écosystèmes les plus menacés au monde.

Photo : C. Rubec

l'expérience acquise avec la mise en oeuvre de la Convention sur la protection et l'utilisation des cours d'eau transfrontaliers et des lacs internationaux, signée en 1992, à Holsinki, par les NU et la CEE.

La première partie présente des lignes directrices concernant l'approche écosystémique de la gestion des eaux conçues pour aider les gouvernements des NU et de la CEE à élaborer et à mettre en oeuvre des politiques nationales sur les eaux et les terres humides, des plans d'action, des programmes et des pratiques qui aideront à appliquer concrètement l'approche écosystémique à la gestion quotidienne des eaux afin d'assurer une approche holistique de la gestion des eaux intérieures qui sera bénéfique pour l'environnement. Les eaux intérieures comprennent les lacs, les rivières, la végétation riparienne, les terres humides, les plaines riveraines inondables, les espèces sauvages qui y seront associées, et leurs habitats.

La deuxième partie présente les critères et objectifs pour la qualité des eaux et étudie les méthodes d'évaluation de l'état des eaux de

surface et de définition des critères et objectifs pour la qualité des eaux en Europe et en Amérique du Nord. Ces méthodes sont de plus en plus utilisées pour promouvoir les stratégies de prévention, de contrôle et de réduction des émissions de substances dangereuses et le déversement excessif de nutriments et autres polluants conventionnels dans les écosystèmes aquatiques. L'analyse porte aussi sur les arrangements conjoints qu'ont pris les pays qui partagent les mêmes eaux transfrontalières.

Le but des recommandations aux gouvernements des NU/CEE et qui sont présentées dans cette partie est d'aider les pays à définir des objectifs de qualité des eaux et à adopter des critères de qualité des eaux ayant pour but de maintenir et, lorsque nécessaire, améliorer la qualité actuelle des eaux transfrontalières. Ces recommandations peuvent aussi aider les pays dont les régions riveraines longent les mêmes cours d'eau transfrontaliers à résoudre les problèmes reliés à l'élaboration de critères et d'objectifs concernant la qualité des eaux. Elles aideront aussi aux gouvernements des NU/CEE à établir les

Great Lakes wetlands and shoreline water resources are among the most threatened ecosystems in the world.

Credit: C. Rubec

niveaux de pollution des eaux transfrontalières importantes, à résoudre les problèmes reliés à la responsabilité et à la fiabilité en ce qui concerne la pollution des eaux transfrontalières, et à choisir la technologie qui servira au traitement des eaux usées.

La troisième partie, traite de la prévention et du contrôle de la pollution des eaux causée par les fertilisants et pesticides, et étudie l'expérience nationale et internationale pertinente, acquise en travaillant efficacement avec les effets défavorables des fertilisants et pesticides sur l'environnement en général, et sur les eaux intérieures en particulier. Cette partie revoit aussi les principaux problèmes de pollution des eaux reliés aux pratiques agricoles; analyse les causes de ces problèmes; évalue les mesures législatives, les outils réglementaires et les mesures économiques et techniques de prévention, de contrôle et de réduction de la pollution des eaux causée par les fertilisants et pesticides; examine les mesures prises dans les domaines des politiques économiques, de la technologie, de l'éducation, de la formation, de la sensibilisation, la recherche et le développement. On porte une attention particulière au besoin de maintenir une production agricole viable.

Pour obtenir cette nouvelle publication, veuillez envoyer un chèque ou mandat poste de 39,05\$ canadiens aux Publications Renouf, 1294 chemin Algoma, Ottawa, Ontario K1B 3W8, téléphone (613)741-4333.

Pour d'autres renseignements sur la gestion des eaux des Grands Lacs, veuillez communiquer avec Hans Foerstel, Chef de la conservation de l'eau, Division de la conservation de l'eau et des habitats, Service canadien de la faune, Environnement Canada, Ottawa, Ontario K1Z 0H3, télécopieur (613) 994-0237.



European Economic Commission Issues Guidance for Ecosystem Management of Water Resources

courtesy of Canadian Wildlife Service

The United Nations European Economic Commission (UN/ECE) has recently released a report on *Protection of Water Resources and Aquatic Ecosystems*, which draws extensively on successful water management experience gained by Canada and the United States in the Great Lakes basin.

The report is the first in a series of guidelines, recommendations and technical studies on water problems launched by the European and North American UN/ECE in March 1993.

"The Water Series" is intended to provide guidance to strengthen national and international measures to prevent, control and reduce the release of hazardous substances into the aquatic environment, to promote conservation and restoration of ecosystems, to abate eutrophication and acidification, to ensure rational and ecologically sound water management, and to protect related ecosystems including the marine environment. The series is particu-

larly intended to share, on a broad basis, experience gained with the implementation of the 1992 Helsinki UN/ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes.

The first part of the report provides guidelines on the ecosystem approach in water management intended to assist UN/ECE governments in developing and implementing national water and wetland policies, action plans, programs and practices. These are to help in the practical application of the ecosystem approach to day-to-day water management in order to ensure a holistic approach to the environmentally sound management of inland water resources. These include lakes, rivers, riparian vegetation, wetlands, riverine floodplains and associated wildlife and habitats.

The second part provides water quality criteria and objectives that examine methods for assessing the status of surface waters and defining water quality criteria and objectives in Europe and North America. These are increasingly used to promote strategies to prevent, control and reduce emissions of hazardous substances and the excessive release of nutrients and other conventional water pollutants into aquatic ecosystems. The analysis also covers cooperative arrangements made by UN/ECE countries sharing transboundary waters.

Recommendations to UN/ECE governments contained in this part are intended to assist countries in defining water quality objectives and

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in adopting water quality criteria that will maintain and, where necessary, improve the existing water quality of transboundary waters. They may also help countries with riparian areas bordering the same transboundary waters to resolve problems associated with joint water quality objectives and criteria. The recommendations will also assist UN/ECE governments in defining levels of significant transboundary water pollution, resolving problems related to responsibility and liability in regard to transboundary water pollution, and selecting technology for wastewater treatment.

The third part addresses prevention and control of water pollution from fertilizers and pesticides, and examines relevant national and international experience gained in coping effectively with the adverse effects of fertilizers and pesticides on the environment, in general and on inland water, in particular. It also reviews major water pollution problems related to agricultural practices; analyzes the causes of these problems; evaluates legislative measures, regulatory instruments, and economic and technical measures to prevent, control and reduce water pollution from fertilizers and pesticides; and examines accompanying measures in the fields of economic policies, technology, education, training, awareness raising, research, and development. Due attention is given to the need to maintain viable agricultural production.

To obtain *Protection of Water Resources and Aquatic Ecosystems*, send check or money order for \$33.50 plus \$5.55(Cdn) shipping and tax to Renouf Publishers, 1294 Algoma Road, Ottawa, Ontario K1B 3W8. (613)741-4333.

For further information on Great Lakes water management contact Hans Foerstel, Chief of Water Conservation, Water and Habitat Conservation Branch, Canadian Wildlife Service, Environment Canada, Ottawa, Ontario, K1A 0H3. Fax (613)994-0237.



Action Recommended to Alleviate Adverse Impacts of Fluctuating Great Lakes-St. Lawrence River Water Levels

by Frank Bevacqua

In its report to the Governments of Canada and the United States, the **International Joint Commission** recommends a range of actions to alleviate the adverse impacts of fluctuating water levels in the Great Lakes-St. Lawrence River basin. These include effecting comprehensive shoreline management, making useful information accessible to the public, improving data gathering and analysis efforts and preparing to respond effectively to crisis conditions.

The report, released in March, is the final response by the Commission to an August 1986 request by the two governments to investigate potential responses to fluctuating water levels.

The International Joint Commission's final report under the 1986 request from the Governments of Canada and the United States was signed in December 1993. Pictured from left to right are Levels Reference Study Lead Commissioners Claude Lanthier and Robert F. Goodwin (seated) and Commissioners James A. Maccauley, Hilary P. Cleveland, Gordon K. Durnil and Gordon W. Walker.

The Commission's final recommendations are based on studies conducted by the Great Lakes Water Levels Task Force, Project Management Team, Levels Reference Study Board and Citizens Advisory Committee, as well as extensive public consultation over the seven years. A number of recommendations and interim reports were previously provided to the governments as major study components were completed.

The Commission did not recommend building additional dams and control works to regulate levels and flows. At present, the only control structures are at located at hydropower projects at the outlets of Lakes Superior and Ontario.

Studies performed for the Commission concluded that the dollar costs of plans to regulate all five Great Lakes

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would exceed any potential economic benefits and that major adverse environmental impacts would likely result. In addition, while flooding and erosion on Lakes Michigan, Huron and Erie would decrease, they would increase on Lake Ontario and the St. Lawrence River. For these reasons, the Commission recommended that no further consideration be given to plans for regulating all five Great Lakes.

Plans to regulate the outflows of Lake Erie together with Lakes Superior and Ontario were also examined by the **Levels Reference Study Board**.

Because of serious concerns about the quality of available shoreline damage data, the study board developed a "maximum plausible estimate" of the economic benefits of three-lake regulation. Based on this scenario, the study board concluded that three-lake regulation was not justified.

However, several people who testified at the Commission's September 1993 public hearing questioned the methods and the data used to analyze three-lake regulation. Having considered the arguments and information presented, the Commission does not believe that the case to support three-lake regulation has been made or that it could be made in the near term.

The Commission recommends that governments aggressively promote shoreline land use and management measures as the principal component of a strategy to alleviate the adverse impacts of fluctuating water levels. A range of options was found to be effective by the study board including erosion setback requirements, relocation of dwellings, flood elevation and protection requirements and others. Although these measures would not completely eliminate shoreline damage, they offer practical and effective solutions to specific shoreline problems if undertaken in harmony with local conditions.

The studies also indicated that, regardless of whether there is further

regulation of lake levels, damage to shore properties will continue to occur. A comprehensive approach to shoreline management should include structural shore protection measures such as well-constructed sea walls, and nonstructural measures such as vegetation to stabilize shorelines.

In organizing the studies, the Commission attempted to incorporate broader environmental and socio-economic considerations than in its previous investigations of Great Lakes-St. Lawrence River water levels. For the first time, the ways humans respond to fluctuating water levels were studied in addition to the impacts of water's action on the shoreline. Though the Commission was aware of the difficulties broader considerations could bring, it believes that traditional approaches are no longer capable of providing the information needed by decision makers.

Attempts to evaluate environmental impacts of water levels regulation focused on wetlands as the most sensitive indicator. The study board examined how water level fluctuations affect the diversity of plant species in wetlands and concluded that existing regulation, by narrowing the range of fluctuations, has diminished the extent and diversity of Lake Ontario's wetlands.

In addition, the Commission recognized that progress in addressing the water levels issue depends in large part on public understanding of the causes of water level problems, and recognition that most proposed solutions could have consequences for others. The level of public involvement in the final phase of study was unprecedented for the Commission. The study board included four citizen members, four state and provincial members, a study director and only two federal agency members. In addition to participating on the study board, individuals drawn from the relevant interests were members of all

of working level subgroups.

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.

Sommaire

Dans son rapport aux gouvernements du Canada et des États-Unis, la **Commission mixte internationale** recommande diverses mesures pour atténuer les incidences néfastes de la fluctuation du niveau des eaux dans le bassin du Saint-Laurent et des Grands Lacs, notamment mieux aménager le littoral, faciliter l'accès du public aux informations utiles, améliorer les méthodes de collecte et d'analyse des données et se préparer à réagir efficacement en cas de crise.

Le rapport, publié en mars, constitue la réponse finale de la Commission à une demande formulée en août 1986 par les deux gouvernements pour se pencher sur les mesures pouvant être prises en ce qui concerne la fluctuation du niveau des eaux.

La Commission n'a pas recommandé la construction de barrages et d'ouvrages additionnels pour la régulation du niveau et du débit. À l'heure actuelle, les seuls ouvrages régulateurs sont ceux des projets d'aménagement hydro-électrique situés à la décharge des lacs Supérieur et Ontario.

La Commission recommande aux gouvernements de s'employer à promouvoir le recours à l'aménagement et à l'utilisation des terres du littoral à titre de volet principal de leur stratégie pour atténuer les impacts néfastes de la fluctuation du niveau des eaux.

REMEDIAL ACTION PLAN
RAP
 UPDATES

Plusieurs options ont été jugées efficaces, notamment l'imposition de marges d'isolement pour tenir compte de l'érosion, la relocalisation des logements, les exigences en matière de niveau critique et de protection en cas de crue, etc. Une approche globale de l'aménagement du littoral doit inclure des mesures de protection des côtes tant structurales, telles les ouvrages longitudinaux de défense judicieusement construits, que non structurales, par exemple l'implantation de végétation pour stabiliser le littoral.

Dans l'organisation des études, la Commission a tenté d'intégrer des considérations d'ordre environnemental et socio-économique plus globales que dans ses précédentes études du niveau des eaux dans le bassin des Grands Lacs et du Saint-Laurent. Si la Commission est consciente des difficultés, elle estime cependant que les approches traditionnelles ne permettent plus de fournir les informations dont on a besoin les décideurs.

En outre, la Commission reconnaît que, si l'on veut régler le problème de la fluctuation du niveau des eaux, il importe que le public comprenne les causes du problème et réalise que la plupart des solutions proposées pourraient avoir des conséquences pour d'autres. De l'avis de la Commission, le degré de participation du public à la phase finale de l'étude a été sans précédent. Outre la participation à la commission d'étude, des individus provenant de différents secteurs ont été membres de tous les sous-groupes de travail. Pour obtenir une copie du rapport, veuillez vous adresser au bureau de la Commission à Ottawa ou à Washington.

U.S. Agencies Develop a Broad Approach to Cleaning Up Great Lakes Sediment

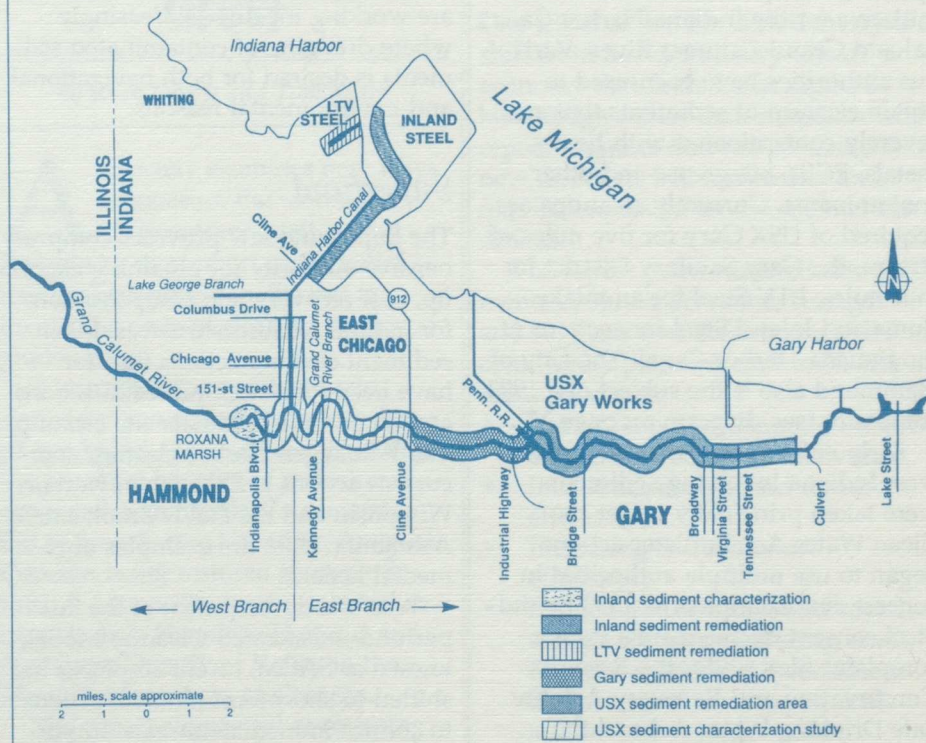
by Howard Zar

As reported often in these pages, sediment contamination problems in nearly all the 43 Areas of Concern and in other Great Lakes locales are significant. The legal issues involved in remedying these problems can be as complex as the technical issues. Increasingly, U.S.

agencies are relying on a broad-based regulatory approach that coordinates activities under multiple legal authorities and among different agencies.

Regulatory approaches were quite limited in 1976 when PCBs were discovered in Waukegan Harbor, Illinois. At that time, the Clean Water Act provided authority to stop the discharge of PCBs, but proved ineffective

Grand Calumet River / Indiana Harbor Canal Area



Commitments secured through enforcement actions to clean up and characterize sediments in the Grand Calumet River/Indiana Harbor Canal Area are shown above.

to bring about sediment cleanup. It took amendments to the Superfund law in 1986 before the U.S. Environmental Protection Agency (U.S. EPA) could compel a cleanup, which was completed just last year.

Enforcement

As concerns about contaminated sediments grew, regulators found another opportunity to obtain cleanup in 1985 through enforcement proceedings against a USX steel mill in Lorain, Ohio. To offset some of the penalties assessed for Clean Water and Clean Air Act violations, a consent decree was issued requiring contaminated sediments to be dredged from the Black River, which drains into Lake Erie. The project was completed in 1990.

In cooperation with the Indiana Department of Environmental Management, U.S. EPA Region V developed a geographic enforcement initiative for the Indiana Harbor Canal and Grand Calumet River. Various authorities have been used to obtain cleanup of sediments that are severely contaminated with heavy metals, PCBs, oil, grease and other contaminants. Currently cleanups are required of USX Gary for five miles of stream, the Gary Sanitary District for four miles, LTV Steel for an intake flume and Inland Steel for sections of the Indiana Harbor Canal. The City of Hammond also is the subject of a 1993 complaint (see diagram on page 15).

Early enforcement actions in northwest Indiana involving sediments were taken principally under the Clean Water Act, but later actions began to use multiple authorities in concert. For example, the 1993 Inland Steel consent decree results from a complaint filed under the Resource Conservation and Recovery Act, the Safe Drinking Water Act and the Clean Water Act. U.S. EPA now uses the strongest available authority or multiple authorities in sediment en-

forcement actions and issued an enforcement strategy with the Great Lakes states in September 1993.

Coordination With Corps of Engineers

The U.S. Army Corps of Engineers would normally dredge much of the contaminated area in the Indiana Harbor Canal for navigational purposes, but has had difficulty finding suitable disposal sites for the contaminated sediments.

U.S. EPA and the Corps of Engineers started formal cooperation on the problem in 1991 and have made considerable progress. A bankruptcy settlement lodged in October 1993 may provide a suitable disposal site. A draft Environmental Impact Statement, developed by the Corps of Engineers with assistance from U.S. EPA, is expected shortly. This is just one example of how the two agencies are working together increasingly where dredging of contaminated sediments is desired for both navigational and environmental reasons.

Superfund

The Superfund law provides comprehensive authority for obtaining cleanup, cost recovery and compensation for natural resources trustees. Most sediment cleanup actions thus far have been long-term remedial actions associated with complete site cleanup. The Waukegan Harbor cleanup and current actions at Sheboygan Harbor, Wisconsin and the Fields Brook site in Ashtabula, Ohio are examples of remedial actions.

With the development of the Superfund Accelerated Cleanup Model, known as SACM, recent emphasis has shifted to short-term removal actions to control immediate threats. Implementation of this model in 1994 is bridging the remedial and removal approaches in order to achieve more

timely and efficient cleanups. The Manistique and Raisin Rivers in Michigan are examples of removal actions now in progress.

Corrective Actions

In addition to remedial activities implemented through Resource Conservation and Recovery Act administrative orders, remediation can be obtained through permits. Permits issued to facilities that treat, store or dispose of hazardous waste under this act must incorporate corrective actions to address hazardous waste releases to all environmental media, including sediments. This approach is expected to get more use in the future.

Cooperative Public-Private Partnerships

While enforcement and Superfund approaches have been effective in achieving sediment cleanup, they can involve considerable expenditures of time and money by agencies and responsible parties. A number of entities, including the State of Wisconsin, have advocated working closely with responsible parties in a nonadversarial mode. The objective is to redirect the potential costs of adversarial proceedings into real cleanup efforts and to avoid delays from contentious lawsuits.

Natural Processes and Source Control

Natural processes of degradation and overtopping with cleaner sediments can sometimes reduce the risk at a contaminated sediment site. Remediation may not even be appropriate where current risks and downstream movement can be tolerated or the impact of the remediation effort itself is considered too risky.

RAP UPDATES

Control of current contaminant sources is also crucial. An expensive sediment remediation effort can be wasted if new or current sources are allowed to recontaminate the sediment surface all over again.

Sediment contamination can be a daunting problem from both a technical and regulatory standpoint. U.S. EPA and state agencies are working together to determine which sites require action in cooperation with the Corps of Engineers and other agencies. With the additional resources and new approaches that are being applied, we are on the way to reducing the problem of contaminated sediments in the Great Lakes basin.

For more information contact Howard Zar, Chairman, In-Place Pollutants Task Force, U.S. Environmental Protection Agency, Region V: WS-16J, 77 West Jackson Street, Chicago, Illinois 60604, telephone (312)886-1491.

Sommaire

Les problèmes posés par la contamination des sédiments dans la plupart des 43 secteurs préoccupants et dans d'autres régions des Grands Lacs sont significatifs. Les questions d'ordre juridique que soulève la correction de ce problème sont souvent aussi complexes que les aspects techniques. De plus en plus, les organismes américains s'appuient sur une approche réglementaire globale où l'on coordonne les activités des différents organismes assujetties à différents paliers de compétence.



Waterfront restoration in Hamilton, Ontario has improved opportunities for recreation.
Credit: The Hamilton Harbour Commissioners

Cleaning Up Watersheds Helps Local Economies Grow

by Ruth Edgett and Tom Muir

As society examines new ways to measure the worth of a clean environment, recent analysis lends support to the belief that the economic benefits can far exceed the costs of cleaning up degraded areas.

A consultant's report commissioned by Environment Canada applies a broad approach to calculating the potential benefits of restoring degraded watersheds. To illustrate the approach, two Canadian Areas of Concern being restored through Remedial Action Plans were selected as case studies: Hamilton Harbour and the Lower Don River Valley in the Metro Toronto Area of Concern.

The report suggests that restoring and enhancing these two watersheds will encourage new forms of economic development. The International

Joint Commission has long encouraged incorporating the economic benefits of restoration into Remedial Action Plans and provided early funding to develop this approach.

Economy in Evolution

One trend of the late 20th Century is a shift from heavy industry toward an economy that finds its strengths in knowledge rather than materials. The report suggests that the economy's new direction will both foster and require improved environmental conditions.

The report points to five basic elements of future economic strength and suggests that these be included in community planning and redevelopment processes:

- Developing and retaining knowledge-based economic activities;
- Increasing energy and resource efficiency;
- Increasing infrastructure efficiency;
- Reducing health care and social service costs by providing environmental and social conditions that are conducive to physical and mental health;
- Capturing more of the growing world tourism trade.

RAP
UPDATES

Ecological Capital

Manufactured capital (factories, equipment and machinery) has always been viewed as the major factor of production in industrialized society. In the emerging post-industrial economy, several other factors should also be termed capital because they must receive continuous investment in some form to maintain productivity. These are social/organizational, human and ecological capital.

In the emerging economy, all forms of capital must complement each other. The perspective of sustainable development suggests that, in terms of ecological capital, humans are consuming more than their income. Watershed restoration is presented as a means to stop this trend.

Five Types of Benefits

The report identifies five types of benefits that could derive from integrating watershed restoration into an area's overall economic development:

- **Sustainability** strengthens the area's ability to sustain life, productive ecosystems and enjoyment of the area.
- **Avoided costs** for health care could result from decreased physical and psychological stresses by reducing pollution and revitalizing the economy. Water treatment costs could be reduced by water conservation and upgrading sewage facilities. Existing infrastructure could be used more efficiently through residential intensification in restored watershed areas. This, in turn, would allow for savings in the provision of community services such as fire and police.
- **Use benefits** include enhanced wildlife and fisheries, recreational opportunities, health and aesthetics.
- **Direct economic development benefits** arise from increased capital investments by private investors

and government, as well as increased annual expenditures by new private industries. They might include a waterfront park or new retail business.

- **Indirect and induced economic development benefits** are new expenditures by firms that supply the requirements arising from direct economic benefits. Induced benefits are new expenditures from increased income generated by direct and indirect economic development benefits.

The perspective of sustainable development suggests that, in terms of ecological capital, humans are consuming more than their income. Watershed restoration is presented as a means to stop this trend.

Potential Benefits

Initial restoration expenditures in Hamilton of \$674 million in capital and \$30 million in annual operating costs could lead to further public and private spending in the area. The consultants estimated potential follow-on capital investments at \$2.2 billion (90 percent private sector, 10 percent public sector), and annual expenditures at \$2.3 billion. This local spending could also generate \$3.4 billion in income, 49,000 person years of employment and about \$1 billion in tax revenues throughout Ontario. The annual expenditures could generate \$3.5 billion annually in income, 58,000 person years of employment and \$973 million annually in tax revenues provincewide.

Similarly, initial restoration expenditures on the Lower Don River Val-

ley of \$784 million and annual operating costs of \$1.4 million could lead to other follow-on public (10 percent) and private (90 percent) investments. Potential new capital expenditures of \$2.6 billion could stimulate province-wide benefits of \$4.1 billion in income, 60,200 person years of employment and about \$1.3 billion in tax revenues. Potential annual expenditures of \$4.4 billion could generate \$7.1 billion annually in income, 120,000 person years of employment and about \$2 billion annually in tax revenue.

Potential sustainability, avoided costs and use benefits are more difficult to quantify at this stage of the framework's development. However, for Hamilton, the consultants estimated potential cost savings of \$84 million on infrastructure and \$2 million on sewage treatment and from water conservation. Annual user benefits could be \$43 million. For the Lower Don River Valley, the consultants estimated capital savings of \$42 million and annual savings of \$12 million. Annual user benefits could be \$55 million.

The timing of these benefits would depend upon the pace of restoration and follow-on investments. Further refinement of the consultants' approach is required.

For further information, or a copy of *Development Potential and Other Benefits from Restoration, Enhancement and Protection of Great Lakes Basin Watershed*, contact Tom Muir, Senior Economist, Citizenship, Assessment and Economics Branch, Environment Canada, 867 Lakeshore Road, Burlington, Ontario L7R 4A6, telephone: (905)336-4951.

RAP Highlights

Sommaire

Alors que notre société se penche sur de nouveaux moyens de mesurer la valeur d'un environnement non pollué, une analyse récente vient appuyer l'hypothèse selon laquelle les bénéfices économiques de l'assainissement des régions dégradées peuvent largement compenser les coûts de l'opération. Dans le rapport d'un consultant commandé par Environnement Canada, on adopte une approche globale pour calculer les bénéfices potentiels de la remise en état des bassins hydrographiques pollués. Pour illustrer l'approche, deux secteurs préoccupants canadiens où l'on procède actuellement à des travaux de dépollution dans le cadre d'un Plan d'action correctrice ont été choisis pour une étude de cas : le port de Hamilton et la vallée inférieure de la rivière Don. Selon les résultats de l'étude, la remise en valeur de ces deux bassins favorisera de nouvelles formes de développement économique.

Pour obtenir un exemplaire du rapport *Development Potential and Other Benefits from Restoration, Enhancement and Protection of Great Lakes Basin Watershed*, veuillez vous adresser à Tom Muir, économiste principal, Citizenship, Assessment and Economics Branch, Environnement Canada, 867 chemin Lakeshore, Burlington (Ontario) L7R 4A6. Téléphone : (905) 336-4951.

Members of the Waukegan Harbor Remedial Action Plan team and Citizens Advisory Group were joined by Commissioner James Macaulay, technical reviewers and Commission staff at a meeting to review the **Waukegan Harbor Stage 1 Remedial Action Plan (RAP)** on January 13, 1994. The review meeting took place in Waukegan, Illinois on the same day as a regularly scheduled Citizens Advisory Group meeting to encourage dialogue among the reviewers and a diverse group from the community that has been actively involved in the RAP's development. A major focus of discussion was progress that has been achieved in cleaning up sediments and other sources of contamination in and around Waukegan Harbor (see *Focus*, July/August 1993, pages 23-24).

In its December 1993 review of the **Presque Isle Bay Stage 1 Remedial Action Plan (RAP)**, the International Joint Commission notes that the document contains a large amount of information on Presque Isle Bay, Pennsylvania and that it was compiled in a timely manner. In addition, the RAP team provided opportunity for broad community involvement in the process. While steps toward embodying an ecosystem approach have been taken, the Commission urges the RAP team to consider whether there are use impairments in the vicinity of the Area of Concern, including the Outer Harbor, that should be addressed by the RAP. In addition, the Commission encourages additional study of possible water quality problems related to fish and wildlife consumption, the health of bottom-dwelling creatures and water-based recreation.

On the Thunder Bay and Nipigon Bay waterfronts in Ontario, some **innovative habitat restoration** projects are underway. The McKellar River Project in **Thunder Bay** is a two-year initiative to create two lagoons along a dredged navigation channel. These shallow ponds will warm more quickly in the spring and provide much-needed spawning and nursery habitat for many cool-water fish. Small boats will also be able to use the lagoons when the open waters of Lake Superior are too rough. Lakehead Region Conservation Authority and the City of Thunder Bay are partners in the project along with the Thunder Bay Remedial Action Plan and the Great Lakes Cleanup Fund.

On the picturesque shores of **Nipigon Bay**, the Town of Red Rock, in conjunction with the Remedial Action Plan and Great Lakes Cleanup Fund, is building an environmentally friendly marina. The first of its kind in Ontario, the design transforms a traditional hard rock berm into a "living breakwall" with overlying vegetation and in-water habitat structures to increase the amount of hospitable habitat. The full-service marina has been operating since the summer of 1993. The entire project, including 238 slips and a waterfront park, will be completed in time for summer 1994.

Lake Superior Program Office, a Canada-Ontario joint venture, and Environment North, a Thunder Bay environmental advocacy group, are coordinating the third annual **Lake Superior Day** in Thunder Bay, Ontario on Sunday, July 17, 1994. In 1993, Thunder Bay, on the Canadian

side of Lake Superior and Ashland, Wisconsin on the U.S. side, held twin Lake Superior Days. This year, the aim is to get as many coastal communities around Lake Superior as possible to take part. Interested in getting involved? Please call Lake Superior Programs at (807)768-2113 or (807)768-1826.

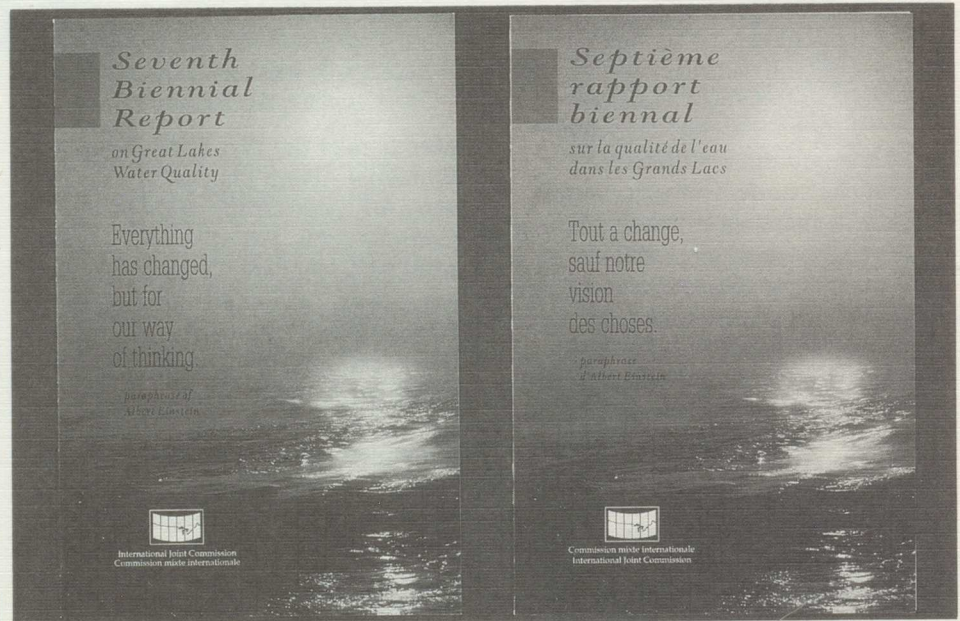
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BOOKSHELF

To obtain the following reports by the International Joint Commission and its various boards, contact a Commission office.

- *Seventh Biennial Report on Great Lakes Water Quality* (signed in 1993)
- *Septième Rapport Biennal sur la qualité d'eau dans les Grands Lacs* (signé en 1993)
- *Methods of Alleviating the Adverse Consequences of Fluctuating Water Levels in the Great Lakes-St. Lawrence River Basin*
- *Great Lakes-St. Lawrence Research Inventory 1991-1992*
- *Our Community, Our Health: Dialogue Between Science and Community*
- *The Ecosystem Approach: Theory and Ecosystem Integrity*
- *Source Investigation for Lake Superior*
- *An Examination of the Integrity of Five Hazardous Waste Disposal Sites in the Great Lakes Basin*
- *Bioindicators as a Measure of Success for Virtual Elimination of Persistent Toxic Substances*

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The Seventh Biennial Report.

Wally and Deanna's Groundwater Adventure...to the Saturated Zone is a new illustrated children's book, explaining in simple terms the water cycle and the importance of groundwater. Copies are available for \$5.95 (Cdn) plus eight percent GST, or \$4.95 (US) by contacting Leanne Appleby, Waterloo Centre for Groundwater Research, University of Waterloo, Waterloo, ON N2L 3G1. (519)885-1211; fax (519)725-8720.

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Investigating Human Exposure to Contaminants in the Environment consists of two handbooks intended to help communities understand this relationship. A *Community Handbook* helps to develop a descriptive exposure assessment and health profile of the community. A *Handbook for Exposure Calculations* describes the general methods followed for calculating human exposure to environmental contaminants.

For further information contact the Great Lakes Health Effects Division, Main Statistics Canada Building, Wing 1100, Tunney's Pasture, Ottawa, ON K1A 0K9. (613)957-1876.

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Toward Integrating Remedial-Action and Fishery-Management Planning in Great Lakes Areas of Concern and *A Survey of Fish-Community and Habitat Goals/Objectives/Targets and Status in Great Lakes Areas of Concern* are both available from the Great Lakes Fishery Commission, 2100 Commonwealth Boulevard, Suite 209, Ann Arbor, MI 48105-1563. (313)662-3209.

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Ecological Economics is a book about the contribution of ecological economics to economic development and to implementing the sustainable development policy of the Canadian International Development Agency. To

order a copy of the book send check or money order for \$20 (Cdn) or \$22 (US) payable to the Institute for Research on Environment and Economy, University of Ottawa, 5 Calixa Lavallée, Ottawa, ON K1N 6N5. (613)564-7644; fax (613)564-6716. Bulk order discounts are available.

Zero Discharge and Virtual Elimination in the Great Lakes: A Collection of Viewpoints provides different perspectives on zero discharge and virtual elimination. To obtain the booklet (MICHU-SG-93-702) for \$2.50 (US), contact Michigan Sea Grant College Program, 2200 Bonisteel Boulevard, Ann Arbor, MI 48109-2099, telephone (313)764-1138, or contact a Sea Grant office in your area.

Our Living Heritage: The Glory of the Nipigon, by John R.M. Kelso and James W. Demers, is a historical account of the rivers, lakes and bays of Nipigon from the ice age, through the time when anglers could pull out buckets full of trout in an afternoon, to the present efforts to restore and protect the area. The Nipigon Bay Remedial Action Plan Public Advisory Committee will financially support local environmentally related projects with proceeds from the sale of *Our Living Heritage*. To receive a copy, send a check for \$16 (Cdn) to Nipigon Bay Remedial Action Plan, 1194 Dawson Road, R.R. 12 site 8-16, Thunder Bay, ON P7B 5E3. (807)768-1826; fax (807)768-1889.

Recently released from the Ramsar Convention Bureau is a final report entitled *Towards the Wise Use of Wetlands* (1990). This 180-page document is available for \$20 (US) by con-

tacting Mireille Katz, Communications Officer, Convention on Wetlands, rue Mauverney 28, CH-1196 Gland, Switzerland. Telephone 022-999-01-70 or fax 022-999-01-69.

Waterfronts: Cities Reclaim Their Edge is a 352-page, illustrated hardback book by Ann Breen and Dick Rigby, co-directors of The Waterfront Center. To receive a copy, send check or money order for \$52.95 (US) to The Waterfront Center, 1536 44th Street NW, Washington, DC 20007. (202)337-0356. Add \$10 (US) per book for shipping outside the United States.

Papers from the **Second Cause-Effect Linkages Workshop** held in conjunction with the Sixth Biennial Meeting on Great Lakes Water Quality in Traverse City, Michigan in October 1991 have been published in volume 19-4 of the *Journal of Great Lakes Research*. For copies contact the International Association for Great Lakes Research Central Office, The University of Michigan, 2200 Bonisteel Boulevard, Ann Arbor, MI 48109. (313)747-1673.

Ontario spends well over \$150 million annually to restore and protect the Great Lakes and their interconnecting channels, according to the report, **Restoring and Protecting the Great Lakes** (PIBS 2726e), recently released by the Ministry of Environment and Energy. Copies of the report *Candidate Substances for Bans, Phase-Outs or Reductions: Multimedia Revision* (PIBS 2709) can also be obtained by calling the Ministry of Environment and Energy's Public Information Centre at (416)323-4321 or 1-800-0565-4923, or Judi Barnes of the Ministry's Great Lakes Section at (416)314-7972.

Normal Water Temperature and Ice Cover of the Laurentian Great Lakes: A Computer Animation, Database and Analysis Tool animates data of normal surface water temperature, ice cover concentration, derived lake-averaged vertical temperature profiles and lake bathymetry to allow users to easily visualize different aspects of temperature and ice cover on the Great Lakes. For more information about this free program that runs on a personal computer, contact Cathy Darnell, Publications Unit, Great Lakes Environmental Research Laboratory, 2205 Commonwealth Boulevard, Ann Arbor, MI 48105. (313)741-2262.

The **1993 Lake Ontario Monitoring Program** report documents the chemistry of the water drawn from Lake Ontario by the Metropolitan Water Board and provides comparisons to existing and proposed state and federal regulatory criteria for water purveyors. To receive a copy contact the Metropolitan Water Board, Alexander F. Jones Administration Center, 4170 Route 31, Clay, NY 13041. (315)652-8656; fax (315)652-1977.

Two **environmental indicator bulletins** are available from State of the Environment Reporting under Environment Canada's Green Plan. *The Toxic Contaminants in the Environment* focuses on indicators of certain persistent organochlorines in biota. *Stratospheric Ozone Depletion, Update* provides background on stratospheric ozone depletion and target dates for the phaseout of major ozone-depleting substances. To request a complimentary copy in English or French, write to State of the Environment

Reporting (Publications), Environment Canada, Ottawa, Ontario K1A 0H3, fax (613)941-9646.

New York State Angler Cohort Study: Health Advisory Knowledge and Related Attitudes and Behavior, With a Focus on Lake Ontario is a new report from a series dealing with public issues in the management of wildlife, fish and other natural resources. For more information contact the University at Buffalo, State University of New York, Department of Social and Preventive Medicine, Faculty of Health Sciences, 270 Farber Hall, Buffalo, NY 14214. (716)829-2975; fax (716)829-2979.

New York Sea Grant has just completed the first edition of the *Public Information Inventory of Lake Ontario*, which inventories materials of special interest to citizens, teachers and municipal officials living on Lake Ontario or in its drainage basin. To obtain the 100-page document, make a check for \$2 (US) payable to Cornell University and send to New York Sea Grant, 21 South Grove Street, East Aurora, NY 14052-2398.

Science Is ... A Source Book of Facts, Projects and Activities, by Susan V. Bosak, covers a wide variety of environmental themes such as pollution, recycling, ecosystems and water in a scientific problem-solving context for children aged 6-14 years. The 515-page book is available for \$29.95 (Cdn) from the National Science Teachers Association, 1-800-722-NSTA or Scholastic (314)636-8890.

The book *Chemically Induced Alterations in Sexual and Functional Development: The Wildlife/Human Connection* reviews the adverse effects of chemicals on the endocrine systems of fish, wildlife and humans. To obtain a copy, send a check for \$68 (US) plus \$3 shipping to Princeton Science Publishing Company, Inc., PO Box 2155, Princeton, NJ 08543. (609)683-4750; fax (609)683-0838.

To receive a copy of the protocol on *The Great Lakes Sport Fish Consumption Advisory* contact James Amrhein, Wisconsin Department of Natural Resources, 101 South Webster Street, Box 7921, Madison, WI 53707. (608)266-5325.

The *1993-1994 Environmental Resource Book* is a comprehensive listing of environmental organizations in Ontario and their printed and audiovisual resources. Issues covered include agriculture, air pollution, energy efficiency and supply, environment and democracy, health and safety, municipal waste and resource efficiency, nuclear power and transportation. Copies are available for \$10 (Cdn) for individuals, \$20 (Cdn) for government. Contact the Ontario Environment Network, 27 Douglas Street, Guelph, ON N1H 2S7. (519)837-2565; fax (519)837-8113.

International Program Monitors Airborne Toxic Contaminants in Eastern North America

by Barry Mower

Over the years, scientists have found metal contamination in fish in New England and Canada. Recent data have indicated an alarmingly high concentration of mercury in the feathers of American bald eagle chicks in Maine. These data, when viewed in conjunction with air emissions data available through the U.S. Environmental Protection Agency, focus our need to gather information to assist in the explanation of the sources of toxic materials.

The International Toxics Monitoring Program is a joint effort of the Provinces of New Brunswick, Newfoundland, Nova Scotia and Quebec, and the States of Connecticut, Maine, Massachusetts, New Hampshire, New York, Vermont and Rhode Island. Its purpose is to gather data to assist in determining the extent of toxics contamination of eastern freshwater fish species and investigate possible sources of the contamination.

In 1992 fish were collected and analyzed for mercury, arsenic, lead and cadmium. In addition, snow pack samples were collected from selected lake drainage basins and analyzed for the same metals. Snow pack samples include both wet and dry deposition and give insight to atmospheric loading of these heavy metals to a lake drainage system.

Fish tissue residues for each lake and comparisons to historical data for some lakes showed that lake trout had higher levels of mercury than brook trout or salmon. Larger fish had higher levels than smaller fish. None of the composites exceeded the U.S. Food and Drug Administration action level of one part per million, but several were higher than the 0.5 parts per million action level used by some states and provinces. Three of the 10 fish from Maine analyzed as individuals had residues at or over the one part per million level. Due to the small sample size and differences in species and sizes of fish, it was not possible to identify any regional trends in residues.

Snowpack samples showed decreasing amounts of mercury as one proceeds from southern New England toward Canada. This suggests major sources are to the south and west of New England.

In addition to fish and snowpack samples, *Sphagnum* moss samples were also collected in 1993 to supplement snow pack data in measuring atmospheric deposition and regional trends. Preliminary data indicate a similar trend in mercury concentrations to that found in snowpack samples. It is hoped that by analysis of data from these and additional field seasons, the monitoring program will provide a basis for understanding toxic contaminant trends in the region, including the importance of atmospheric inputs.

For more information on the International Toxics Monitoring Program, contact Barry Mower, Maine Department of Environmental Protection, State House Station 17, Augusta, Maine 04333, telephone (207)287-3901.



International Toxics Monitoring Program staff collect fish samples in Maine.

Sommaire

Au cours des ans, les scientifiques ont trouvé des traces de contamination par le métal chez les poissons de Nouvelle-Angleterre et du Canada. Des données récentes ont indiqué une concentration anormalement élevée de mercure dans les plumes des jeunes pygargues à tête blanche dans l'État du Maine. Lorsque étudiées conjointement avec les données sur les émissions atmosphériques disponibles par le biais de l'Environmental Protection Agency des États-Unis, ces données font ressortir la nécessité de rassembler de l'information afin d'expliquer les sources des matières toxiques.

EVENTS

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

March	23-25	Council of Great Lakes Research Managers Columbus, OH
April	12-15	International Joint Commission Semi-Annual Meeting Washington, DC
	13-14	Great Lakes Water Quality Board Washington, DC
May	16-17	Great Lakes Science Advisory Board Windsor, ON
June	8-9	International Joint Commission Executive Meeting Ottawa, ON

General Conferences

The Sixth Annual Diplomatic Study Tour on **Economic Development and Preserving the Environment: Can the World Afford Both?** will be held April 6-9, 1994 in Washington, D.C. Contact Fran Luebke, Assistant Director, Institute of World Affairs, PO Box 413, Milwaukee, WI 53201-0413. (414)229-4251.

Enviro-Expo '94 will be held in the St. Denis Centre at the University of Windsor from May 13-15, 1994. To receive more information contact the Southwestern Ontario Enviro-Expo, 1968 Wyandotte Street East, Suite 201, Windsor, ON N8Y 1E4. Telephone (519)255-9435; toll free 1-800-663-1127 or fax (519)256-9569.

Ecosystem Management Strategies for the Lake Superior Region, a conference and workshop applicable to the Great Lakes region, will be held May 16-19, 1994 in Duluth, Minnesota. For more information, contact Terri Williams at (218)726-8835, Lynne Olson at (218)26-6296 or Marge Erickson at (218)726-6819, Continuing Education and Extension, University of Minnesota-Duluth, 316 Darland Administration Building, 10 University Drive, Duluth, MN 55812-2496.

The **1994 Annual Conference on Great Lakes Research** will be a joint effort by the International Association for Great Lakes Research and Estuarine Research Federation. The purpose of the conference, to be held June 5-9, 1994 at the University of Windsor, is to exchange information on all aspects of research applicable to large lakes and estuaries of the world and to the human societies surrounding them.

A series of integrated symposia will compare approaches and processes among Great Lakes and estuarine systems. Over 300 papers and 25 special symposia are already scheduled on topics such as biomonitors and bioindicators, predator-prey interactions, contaminant cycling, contaminated sediments, agriculture, Remedial Action Plans, zebra mussels, algal blooms and atmospheric deposition. Exhibit space is also available.

For information or registration forms, please contact the Great Lakes Institute for Environmental Research, University of Windsor, 304 Sunset Avenue, Windsor, ON N9B 3P4. (519)253-4232 ext 2732.

Water: A Resource in Transition will be the topic of the Forty-Seventh Canadian Water Resources Association Conference on June 14-17, 1994 in Winnipeg, Manitoba. Contact Canadian Water Resources Association Conference, Environment Canada, 500-269 Main Street, Winnipeg, MB R3C 1B2. (204)983-7174; fax (204)983-4506.

The First International Symposium on **Ecosystem Health and Medicine: New Goals for Environmental Management** will be held on June 19-22, 1994 in the Ottawa Congress Centre, Ottawa, Ontario. Sponsored by Environment Canada, the U.S. Environmental Protection Agency and others, this symposium will allow professionals working in ecosystem science and management, medical and health sciences, environmental ethics and law and ecological economics to take part in the development of integrated approaches to the evaluation, monitor-

ing and rehabilitation of environmental health. Contact Remo Petrongolo, Office of Continuing Education, 159 Johnston Hall, University of Guelph, Guelph, ON N1G 2W1. (519)767-5000; fax (519)767-0758.

Rivers 2000 Conference: Building Partnerships for River Conservation will be held on June 20-22, 1994 at the Hilton Hotel in Harrisburg, Pennsylvania. For more information contact Pennsylvania Recreation and Park Society Inc., 1315 West College Avenue, Suite 200, State College, PA 16801-2776. (814)234-4272; fax (814)234-5276.

Environmental Education 2000, Communications for the Future, will be held at the Sheraton Premiere on June 20-22, 1994 at Tysons Corner, Virginia. For more information, contact the Alliance for Environmental Education, 51 Main Street, PO Box 368, The Plains, VA 22171. (703)253-5812; fax (703)253-5811.

The International Symposium on **Water Resources Planning in a Changing World** will be held June 28-30, 1994 in Karlsruhe, Germany. This conference is sponsored by the UNESCO International Hydrological Programme to exchange ideas, methods and experience with sustainable development concepts for water resource systems. For more information contact International Hydrological Programme Secretariat, Bundesanstalt für Gewässerkunde, Postfach 309, D5400 Koblenz, Germany. Fax 49(0)261-1306-302.

Yosemite National Institutes is presenting an **International Seminar on Environmental Education** from July 11-31, 1994 at the Headlands Institute, Golden Gate National Recreation Area and the Yosemite Institute, Yosemite National Park in California. For more information contact Denise Dumouchel, Education Director, Headlands Institute, Golden Gate National Recreation Area, Building 1033, Sausalito, CA 94965. (415)332-5771; fax (415)332-5784.

Lake Superior Center will be holding a four-day **Environmental Education Workshop** from July 21-24, 1994 in Duluth, Minnesota. This residential program will include Great Lakes history, an ecology cruise in the Apostle Islands, a canoe outing in the St. Louis Bay, a program on native cultures and computer networking and partnerships. Tuition will be approximately \$125 (US) for Minnesota teachers and \$320 (US) for those from outside the state.

To receive more information on this workshop or another outdoor education workshop to be held on August 22-24, 1994, contact Andrew Slade, Lake Superior Center, 353 Harbor Drive, Duluth, MN 55802. (218)720-3033; fax (218)720-3407 or Email aslade@ua.d.umn.edu.

Second International Symposium and Exhibition on **Environmental Contamination in Central and Eastern Europe** will be held from September 20-23, 1994 at the Budapest Convention Center, Budapest, Hungary. For more information, contact Roy C. Herndon, Symposium Co-chairman, Florida State University, 2305 East Paul Dirac Drive, 226HMB, Tallahassee, FL 32310-3700. Fax 904-574-6704.

The 21st in a series of **Aquatic Toxicity Workshops** will be held October 2-5, 1994 at the Holiday Inn in Point Edward (Sarnia), Ontario. For further information contact Scott Munro, Lambton Industrial Society, Suite 111, 265 N. Front Street, Sarnia, ON N7T 7X1. (519)332-2010; fax (519)332-2015.

The Second International Conference on **Environmental Fate and Effects of Bleached Pulp Mill Effluents** will be held in Vancouver, British Columbia from November 6-9, 1994. For information contact Jill Parker, Canada Centre for Inland Waters, PO Box 5050, Burlington, ON L7R 4A6. Fax (905)336-4972.

The **Science Teachers Association of Ontario (STAO)** will be holding their fall conference, "Making Connections," from November 16-19, 1994 at the Royal York Hotel in Toronto, Ontario. To receive more information contact STAO '94, 2003-210 Steeles Avenue West, Brampton, ON L6Y 2K3. (905)874-1541.

Si vous pouviez prendre quelques instants pour nous donner votre opinion sur *Focus* : vos commentaires nous aideront à mieux vous informer. Tous les renseignements fournis sont confidentiels.

SI VOUS DÉSIREZ ENCORE RECEVOIR FOCUS, VEUILLEZ NOUS LE FAIRE SAVOIR AU PLUS TARD LE 13 MAI 1994.

Il n'est pas nécessaire de répondre aux questions 2 à 10 pour recevoir *Focus*.

Vous pouvez nous faire parvenir le questionnaire aux adresses suivantes.

(Retournez la dernière page avec votre adresse, s'il vous plaît.)

Services d'information
Commission mixte internationale
100 Avenue Ouellette, 8^e étage
Windsor (Ont.)
K1P 5M1

Information Services
International Joint Commission
P.O. Box 32869
Detroit, MI
48232

1) Je désire encore recevoir *Focus*.
 Oui Non

2) Indiquez dans quelle mesure vous lisez les sections énumérées ci-après :

	En majeure partie	En partie	Seulement un coup d'oeil	Jamais
Articles sur la qualité de l'eau des Grands Lacs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronique sur le niveau des eaux	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronique sur les Plans d'action correctrices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Articles sur la qualité de l'air	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nouvelles en bref	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nouvelles publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Événements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3) Indiquez dans quelle mesure vous lisez les sections énumérées ci-après :

	En majeure partie	En partie	Seulement un coup d'oeil	Jamais
Articles en français	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Résumés en français	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4) Dans un article récent, il a été question d'un bassin versant situé hors du bassin des Grands Lacs et du fleuve Saint-Laurent où certaines des utilisations qu'on veut faire des eaux sont inconciliables. De quel bassin hydrographique s'agit-il?

- Columbia Souris Rainy Ste-Croix

5) Indiquez dans quelle mesure les énoncés énumérés ci-après traduisent votre opinion : Plus le chiffre est élevé, plus l'énoncé traduit fidèlement votre opinion.

[0 - désaccord complet 5 - aucune opinion 10 - entièrement d'accord]

Focus m'apprend tout ce que je dois savoir sur les activités de la Commission mixte internationale. 0 5 10

Les articles consacrés au niveau des eaux des Grands Lacs et du Saint-Laurent sont compréhensibles. 0 5 10

Focus m'apprend beaucoup sur les Plans d'action correctrices des autres villes. 0 5 10

Focus se lit sans difficulté. 0 5 10

Focus est une publication attrayante. 0 5 10

Focus reprend des informations que je trouve ailleurs. 0 5 10

6) Indiquez quelle importance vous accordez aux divers types d'information énumérés ci-après. Plus le chiffre est élevé, plus l'information est importante.

[0 - sans importance 5 - aucune opinion 10 - très important]

Nominations aux conseils de la Commission mixte internationale. 0 5 10

Nouveaux programmes gouvernementaux et nouvelles activités. 0 5 10

Activités et programmes industriels novateurs. 0 5 10

Nouvelles lois et nouveaux règlements. 0 5 10

Sources à consulter sur les derniers progrès scientifiques dans le domaine. 0 5 10

7) Les articles publiés dans *Focus* sont généralement :

- trop longs
 trop courts
 d'une longueur adéquate

8) Qui d'autre lit votre numéro de *Focus*?

- collègue
 membre de la famille
 ami(e)
 autre

9) Que faites-vous des vieux numéros de *Focus*?

- Je les garde en permanence.
 Je les garde un certain temps.
 Je les donne à quelqu'un.
 Je découpe ou je copie les articles qui m'intéressent.
 Je les jette.

10) Quelles améliorations pourrait-on apporter à *Focus*?



IJC Great Lakes Regional Office
100 Ouellette Ave., 8th Floor
Windsor, Ontario N9A 6T3

**Address Correction/
Changement d'adresse**
