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GREAT LAKES FOCUS On Water Quality

International Joint Commission — Windsor, Ontario

Editor: Patricia Bonner

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SEPTEMBER 1977

CURRENT EVALUATION OF WATER QUALITY MAY BE INSUFFICIENT

During its presentation to the IJC the Great Lakes Research Advisory Board warned that effective management and restoration of the Great Lakes requires more than continued emphasis on chemical and physical measures of "water quality". The Board recommended adoption of a broader holistic approach, the concept of "ecosystem quality," which considers biological and societal measurements in addition to the currently stressed chemical and physical measurements. The Board elaborated that the use of environmental maps of the Great Lakes would improve managers' and planners' understanding of the ecological system. Members recommended a pilot effort to initiate environmental mapping in a sub-area of Great Lakes.

In this first area of emphasis, water quality and the Great Lakes ecosystem, the Board suggested one other action to the IJC. It recommended that the Commission articulate specific goals of the two Governments for, and the desired uses of the Great Lakes. With these goals defined, jurisdictions can plan more direct efforts to accomplish them.

The Board had two other critical concerns: phosphorus limitation and toxic substances. In 1976 the Board examined phosphorus from many related perspectives.

In evaluating eutrophication models, the Board indicated that Lake Ontario may respond to changes in phosphorus loadings in as short a time as 8 years. This is 7 to 12 years faster than was predicted in 1974.

A Task Force on non-phosphate detergent builders which evaluated ecological effects of NTA, the most likely substitute for phosphorus in detergents, could find no past evidence indicating that NTA use would create an obvious environmental hazard. The Task

Force, however, recognized that certain gaps in knowledge still exist. The Group recommended that continued use not be prohibited in Canada. However, they recommended that, should NTA be put into wide use in the United States in the Great Lakes Basin, caution be exercised. During the first five years of widespread NTA use a series of topics should be researched. The results of these studies should then be used as a guide to continuing NTA usage. The group will be studying other builders in 1978.

Another Task Force examined the results of recent studies on the health effects of NTA. The human toxicity of NTA was found to be very low and comparable to that of the phosphate which it would replace in detergent formulations. No potential genetic effects were foreseen. The only concerns the Task Force had resulted from the findings of carcinogenesis of the urinary tract of rats and mice which were fed extremely large doses of NTA over their lifetime. These dosages are much greater than would be in the environment, even if widespread use of NTA in detergents were to proceed. The Task Force estimated that the risk to humans would be, at the most, one incident in 2 million during a normal lifetime (about 70 years). The group said that this may be an overstatement of the number of cases which could occur.

The Board found that only 9 of the 44 municipal wastewater treatment plants studied in the Erie and Ontario basins are currently meeting the 1 mg/l phosphorus effluent concentration established under the Agreement. However, the Board reported that results of its cost analysis study indicate that a 0.5 mg/l limit is economically feasible. This finding implies a need for precise operational controls currently lacking in municipal treatment plants.

The Board told the IJC that with toxic substances there are more questions than there are answers. For example, in water and biota only a small portion of the organics present have been identified. When it comes to man, little work has been done. Therefore the Board is beginning a survey of contaminants in human tissues and has on a high priority basis recommended development of specific analytical methods of detection and identification.

In 1976 the Board attempted to develop an inventory of chemical substances used, manufactured or discharged in the Great Lakes Basin. The inventory was to be used to anticipate the presence of potentially toxic substances in the Great Lakes before their impacts are exhibited in living organisms. The information available to the Board for preparing the inventory was inadequate. Two reasons given were that the release of information was illegal because of its proprietary nature, and that there was inadequate staff to gather the requested information. In some cases, the information does not appear to exist. The Board therefore requested that the IJC ask the Governments to assure, for the jurisdictions enforcing toxic substances controls, access to precise informa-

tion for all chemicals used in their jurisdictions. With this information the jurisdictions could respond to two additional requests which the Board urged the IJC to make:

1. that the jurisdictions develop toxic substances loading data for each lake, and
2. that they provide more complete information, particularly about toxic or potentially toxic components of complex effluents, especially from facilities manufacturing many chemicals.

Further, the Board's examination of recent study results led it to conclude that biota in lakes which are less eutrophic than Lake Erie exhibit greater sensitivity to toxic substances than the biota of Lake Erie. This finding implies that stricter regulatory programs may be required for the Upper Great Lakes.

The Board's annual report is now out of print but will be reprinted if demand warrants. There are limited copies remaining of the NTA (health) task force report. Write to the IJC Great Lakes Regional Office, 100 Ouellette Ave., Windsor, Ontario N9A 6T3, to request copies.



The Great Lakes Research Advisory Board, left to right, Row 1: Dr. Donald I. Mount (U.S. Chairman), Dr. A.R. LeFeuvre (Cdn. Chairman), and Dr. Dennis Konasewich (Secretary). row 2: Mrs. F. Edna Gardner (Can.), Mitchell R. Zavon, M.D. (U.S.), Dr. José Llamas (Quebec), J. Douglas Roseborough (Ontario), Carlos Fetterolf (Ex-officio member, Great Lakes Fisheries Commission), Dr. Andrew Robertson (Ex-officio

member—President, International Association for Great Lakes Research), and Dr. Virginia L. Prentice (U.S.). Row 3: Dr. Herbert E. Allen (U.S.), Dr. J.R. Vallentyne (Can.), Paul D. Foley (Ontario), Professor Archie J. McDonnell (Pennsylvania), Professor Joseph Shapiro (Minnesota), Dr. G.H. Tomlinson (Can.), James H. Day, M.D. (Can.) and Dr. Eugene J. Aubert (U.S.). Missing was John J. Convery (U.S.).

GREAT LAKES CLEAN-UP — PROGRESS THROUGH 1976

The Great Lakes Water Quality Board chairman reported overall progress in municipal and industrial pollution abatement and phosphorus control programs in their presentation to the six IJC Commissioners. Although the report emphasized enforcement, George R. Alexander, Jr., and Dr. Robert Slater, respectively the United States and Canadian Chairmen, cited some success stories to illustrate progress in pollution abatement in the Great Lakes Basin.

In addition to its regular procedure of identifying problem areas (map) and listing all significant dischargers in them, the Board differentiated between dischargers which are on compliance schedules and approaching conditions specified in permits or guidelines, and those industries and municipalities with incomplete remedial programs.

The Board was disappointed that it could not fully report on known problem areas because lack of adequate funding prevented complete implementation of the International Joint Commission's Great Lakes Surveillance Program which Governments accepted in 1976.

The Board strongly suggested that the two Federal Governments and all Great Lakes jurisdictions increase their enforcement activities, including court actions such as were taken against the City of Detroit because of its sewage treatment plant, Reserve Mining company of Silver Bay, Minnesota, and American Can of Canada Limited of Marathon, Ontario. The members recommended that the first candidates for application of the enforcement powers should be those dischargers identified in this year's report to the IJC as non-complying.

The Board emphasized the need for immediate strict control of toxic substances and enforcement of the federal acts pertaining to such contaminants.

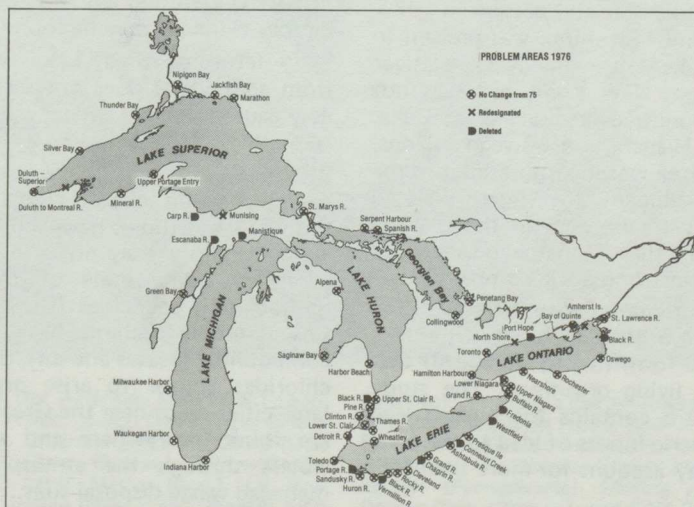
Recommendations in this regard included:

1. That the new water quality objectives it proposed for chlorine, silver, and dodecachloropentacyclodecane (mirex) be adopted.
2. That to meet the proposed water quality objective for mirex, the Governments ban its manufacture, processing, packaging, storing, and all uses in the Great Lakes Basin.
3. That Governments evaluate the hazards to human health posed by persistent chemicals present in the Great Lakes ecosystem, recognizing that chemicals could have additive or synergistic effects in their action on man.

Over the last several years the Board has recommended many actions to the IJC. Generally, the IJC has adopted the recommendations and urged the Governments to act. Last year the Commission recognized the urgency of the recommended actions and rapidly forwarded the Board's report to Governments emphasizing surveillance requirements, toxic substances, wastewater treatment plant construction and a few other key areas which IJC felt were of the highest priority. The Canadian Government's response was received in May; the United States responded in late June.

Board members expressed their disappointment in the long response time, the lack of concrete actions by Governments and the obvious lack of attention given priorities identified by the Board.

Copies of the Board's report are still available, but appendices A-D are already out of print. If requests warrant reprinting, some of the volumes may again become available (Appendix A—Water Quality Objectives, B—Surveillance, C—Remedial Programs, D—Radioactivity). Limited copies remain of Appendix E—Status Report on Persistent Toxic Pollutants in the Lake Ontario Basin. Documents may be requested from the **Focus** editor.





The Great Lakes Water Quality Board, left to right, Row 1: William Stegges (Ontario), George Reed Alexander, Jr. (U.S. Chairman), Dr. Robert Slater (Cdn. Chairman), and Laurence B. O'Leary (Secretary). Row 2: R.H. Millest (Can.), Oral H. Hert (Indiana), Eugene F. Seebald (New York), Dr. D.P. Dodge (Ontario), and John R. Hickman (Can.). Row 3:

Dennis P. Caplice (Ontario), Captain George Leask (Can.), David S. Caverly (Ontario) and Earl Richards (Alternate for Ned Williams—Ohio). Unrepresented were: P. Réal L'Heureux (Quebec), Walter A. Lyon (Pennsylvania), Sandra Gardebring (Minnesota), William G. Turney (Michigan), Anthony S. Earl (Wisconsin), and Leo M. Eisel (Illinois).

PLUARG REPORTS MIREX AND LEAD SOURCES TO GREAT LAKES

When it reported to the IJC July 18-19, the International Reference Group on Pollution from Land Use Activities (PLUARG) members discussed problems in the lakes and the land use activities causing them. Phosphorus, mirex and lead were emphasized, but presentors stressed that these three pollutants are only a few examples of the compounds in the lakes.

Last July, after learning that mirex was present in sediment cores from 1968, the IJC asked PLUARG to determine if the compound was still present in 1976. A fall 1976 survey found that mirex was present in 33% of the samples taken near the Niagara River outfall and near Oswego, New York, but was not found in detectable amounts over much of the lake. It appears that in the Niagara and Oswego regions, 688 kg (1500 lb.) of mirex was incorporated into the top 3 cm (1-1/2") of sediment. Investigators traced the source of mirex upstream, and, in the Oswego region, determined that the discharge occurred in about 1961 from the Armstrong Cork Company.

Another sediment study pointed to the conclusion that lead can react with organic material in the lake bottom and change to a form (methylated-lead) that is easily taken up by living organisms. The study found that Lake Ontario contains the highest lead levels and that atmospheric inputs of lead to the total Great Lakes System may account for more than 50% of the lead loading.

Studies to date indicate that, in the order listed, the major non-point sources of phosphorus are runoff from agricultural land, atmospheric deposition and runoff from residential areas of cities and towns. The phosphorus reaching the lakes from the land is generally bound to fine soil particles washed off the land.

The phosphorus contained in the parent blue material which enters the lake from shoreline erosion is virtually unavailable as a nutrient for the growth of aquatic plants. Shoreline erosion would appear to be an economic and aesthetic problem, as distinct from a phosphorus related water quality problem. However, PLUARG's studies are not completed, and contradictory evidence may be found.

In terms of Great Lakes water quality, nitrogen from agriculture does not seem to be a problem. It may cause localized stream effects, but not detectable lake effects.

Numerous studies have been carried out over the past 3 years on selected land areas of the Great Lakes Basin. These studies have shown that pesticides from agricultural areas are not a long term problem to the lakes, providing none of the banned chlorinated hydrocarbon pesticides (DDT, aldrin, etc.) are used. Contaminants such as heavy metals, toxic organic compounds, greases and oils, pathogenic bacteria, and chlorides appear to arise predominantly from the large cities on or near the Great Lakes shoreline. PCBs are found everywhere and are contributed to the waters through the atmosphere and from poorly managed waste disposal sites.

The Reference Group has concluded that indeed, the Great Lakes are being polluted from land use activities, particularly agricultural and urban uses, but the group has still not fully established the relative importance of land drainage compared to other sources of pollution. The Reference Group is cataloging possible remedial measures and hopes to be able to recommend innovative and cost-effective measures recognizing that the feasibility and effectiveness of some proposals will not be demonstrated.

PLUARG advised the Commission that the traditional approaches to remedial measures implementation will require modification. We can no longer enjoy the luxury of uniform pollution control requirements for ease of enforcement and equity in cost-sharing. To illustrate this point, one speaker said that land use activities in hydrologically active areas may require significantly more expensive pollution controls than the same activities in less sensitive areas.

The Group alerted the Commission to its concerns that efforts to produce more of the world's food and fibre requirements in the Great Lakes Basin will mean increased pressures to farm more marginal agricultural lands. These lands, in addition to being less desirable for agricultural purposes, contribute significantly greater pollution loads per unit area than prime lands.

The Reference Group emphasized that more

attention should be given to an ecosystem approach to solving pollution problems. Solutions implemented to solve short term or local problems should not create long-term or more widespread problems. For example, local incineration of wastes may disperse pollutants to the atmosphere leading to widespread contamination of the lakes from dispersed sources which are difficult and expensive to control.

As explained in the last issue of *Focus*, the Reference Group is launching a very significant public information/consultation program designed to let the Great Lakes' public know what the problems are in the lakes, how diffuse source inputs are contributing to these problems and alternative solutions to the problems. As part of the recommendation process, PLUARG will solicit public opinion on the goals to be achieved in the lakes, the uses that people perceive for the lakes and the acceptable (in terms of cost and technology) remedies for restoring or enhancing the lakes. Eight consultation panels will be established in Canada and nine in the United States to achieve this objective. (For details of the program, or if you would like to join a panel, write to the editor.)

Copies of the PLUARG report are no longer available. However, if demand requires, a reprinting will occur.



The Pollution from Land Use Activities Reference Group, left to right, Row 1: John Wiebe, (Can.), Gerry Welsh (U.S.), Dr. Murray Johnson (Cdn. Chairman), Norman Berg (U.S. Chairman), and Dr. Harvey Shear, (Secretary). Row 2: Dr. Richard Thomas (Can.), Dr. H.V. Morley (Can.), J.E. Brubaker (Ontario), Dr. Leo Hetling (New York), Donald Jeffs

(Ontario), L. Robert Carter (Indiana), Kim Shikaze (Can.), and Merle Tellekson (U.S.). Row 3: John Pegors (Minnesota), Dr. John Konrad (Wisconsin), Dr. Ronald Waybrant (Michigan), G. Martin Wood (Ontario) and Dr. Richard Parisek (Pennsylvania). Missing were Floyd Heft (Ohio), Robert Code (Ontario), and John Ralston (Ontario).

UPPER LAKES HEARINGS

On July 14, 1977, the IJC concluded its six hearings in the United States and Canada on the report of its Upper Lakes Reference Group. Overall, people tended to support the Group's recommendations. Several questions, points for clarification, report weaknesses and a new recommendation resulted from the presentations and inquiries of attendees. Some of the speakers' thoughts are summarized in the remainder of this article.

Atmospheric considerations in the Reference Group's report are generally understated. Yet people recognized that the Reference Group study demonstrated long-range transport of atmospheric pollutants including nutrients, organics, metals, and acid. They concluded that air and water must be considered together; a discharge to one cannot be traded off at the expense of the other. What goes up a stack must be minimized — emission regulations must be developed and enforced. People asked about the effects from air contributed pollutants and other non-point sources and about air quality standards and enforcement procedures and their effectiveness re water quality. They also asked why areas nearly free of air pollution should be held back from industrial development because air currents bring them pollutants and take up the amount of air pollution permissible under ambient air quality nondegradation requirements.

Nondegradation is difficult to define, much less maintain, since baseline levels have not been determined or well established for many substances. Industry representatives asked why, with no demonstrated problem, should no increase, or even a decrease in loading be sought? Others wondered how to protect areas not technically classifiable as "polluted".

The report's recommendations about straight discharge controls (e.g. for phosphorus), no increase in loadings (metals), and a ban or restricted use on other compounds (organics) raised real concerns about loss of present jobs and business and about restrictions on future growth. People asked if, considering the consequences of strict discharge or use controls, any economic or water/land use tradeoffs are possible?

Generally the recommendation for no increase in metals loadings was misread to mean no discharge. The concept is that no increase should be permitted until the effects of present loadings on health, on the whole lake or some part of it are known. It is not a no-growth recommendation. Towns and industries could work together to reduce their present total loadings, thus enabling new or expanded facilities to be built.

Certain types of pollution, particularly inputs of toxic organic contaminants, should be stopped. Though attendees agreed with that premise, they asked questions. What will be the costs (monetary

and otherwise) to municipalities and industries to achieve compliance? Who is going to pay for controls and cleanup? To what extent does the polluter pay? Who sets priorities and schedules? What economic incentives to not pollute are possible?

Municipalities appear to be attempting to comply with discharge regulations to the extent possible with the funds available. However, city representatives said it is difficult to respond to new issues (e.g. need for advanced treatment or sewer separation) in a timely manner, especially when no pollution has been demonstrated (e.g. phosphorus removal at Sault Ste. Marie), or to new problems caused by established procedures (e.g. chloro-organics arising from chlorination of drinking and waste water).

A credibility gap exists between "the public" and both industry and government (all levels, both elected and enforcement agencies). To the general public it sometimes appears that industry has a "license" to pollute with the tacit approval of governments. Participants strongly criticized Ontario's process of industrial pollution abatement and, for the United States, pointed to such cases as Reserve Mining to show how enforcement proceedings can get tied up in lengthy and costly litigation. At the very least, enforcement and abatement occur too slowly. The public wants agencies to enforce regulations today.

A full (or adequate) disclosure of information to the public was suggested. People were not satisfied with the operation of the U.S. Freedom of Information Act, and pointed to the lack of similar laws for non-federal agencies and the problems of getting information and data from any level of government in Canada. Sufficient interpretation of the data is also required. Citizens want technical help to understand government and industry facts which they can obtain.

A recommendation for environmental education was proposed at a number of the hearings. Support to help implement recommendations could be enhanced through education programs designed to publicize problems and seek solutions. No shotgun approach or single-topic short-run program can work, presenters warned. Only a sustained, adequately funded, multi-level program can work; only schools can keep such a program going; other organizations can catch those missed by schools and maintain the interest of those reached.

Speakers said that existing abatement programs were not succinctly summarized and specific recommendations for remedial programs to correct problems were rarely spelled out in the Group's report. They asked for more direct linkages.

Other deficiencies were that the Group did not address the adequacy of the legislative base for managing the Upper Lakes, mechanisms for implementing and enforcing pollution control measures, present remedial programs, present technology, the data base or public involvement. Nor did it adequately consider costs, either direct or indirect, social or economic.

The IJC is now preparing its report to Governments of the United States and Canada. Transcripts of the hearings, all related materials submitted by mail to the IJC, and the Upper Lakes Reference Group report volumes are together the basis for the Commission's report. The document should be available by the end of this year.

LAW AND THE COURTS

Michigan House Bill 4329, Representative Warren Goemaere's wetlands bill, has been modified and has cleared the House Conservation Committee. It will be considered when the legislature reconvenes in the fall. The bill is complex and deserves careful consideration before your group decides whether to support or oppose its passage. Write to your Michigan representative's field office, to Representative Goemaere or to Conservation Committee Chairman Representative Tom Anderson at the State House in Lansing, Michigan for copies.

* * * * *

On July 29, 1977, a federal judge, John Grady, ordered the City of Milwaukee to stop dumping its improperly treated sewage into Lake Michigan because of the health hazards it caused Illinois citizens. Illinois Attorney General William Scott won the right to bring the suit against Milwaukee in the U.S. Supreme Court during 1972. The two sewage commissions, the defendants in the case, may spend between \$200 and \$300 million to provide the level of treatment required by Judge Grady. To date, we have no notice of an appeal being filed.

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Under PL 92-500, the 1972 Amendments to the Federal Water Pollution Control Act, EPA has enforcement powers which it can use to press industries to install best practicable technology and municipalities to provide at least secondary treatment. July 1, 1977 was the deadline for both. EPA may seek fines up to \$10 million from industry. About 100 municipalities do not provide the required treatment. With them, the agency will attempt to establish tight compliance schedules and make funds available. The agency may file suit against cities which do not make use of the funds or which improperly operate or maintain treatment facilities.

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Ohio EPA has issued five Enforcement Compliance Schedule Letters (ECSL), written agreements prepared by U.S. EPA stating that the discharger will not be prosecuted for failure to achieve effluent limitations in his NPDES (National Pollutant Discharge Elimination System) permit, provided he adheres to a strict compliance schedule specified in the letter. Ten more letters are proposed. Others are being evaluated for possible enforcement actions. Armco Steel, Middletown; Dayton Power and Light, Dayton and

Miamisburg; Ohio Power, Beverly, and Union Camp of Dover received letters. Cleveland Electric Illuminating of Ashtabula, Avon Lake, Willoughby, and Cleveland Lake Shore; Dayton Power and Light of Aberdeen; Empire Detroit Steel of Portsmouth; Ford Motor of Brookpark, Pittsburgh Plate Glass of Barberton, and U.S. Steel of Cleveland and Lorain are the proposed candidates for letters. Ninety-two municipalities are being considered for ECSL's.

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Inco Ltd.'s Spanish River hydroelectric generating project has been designated for full assessment under Ontario's Environmental Assessment Act. The company requested the assessment of its development project. Inco is in the first phases of a feasibility study and not yet committed to going ahead with the long range project.

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Ontario has exempted the Darlington Nuclear Power Plant of Ontario Hydro from the Assessment process. The Province stated that the plant was too far along to stop; any delay now could impede their ability to provide power. Hydro itself is performing environmental studies and public consultation programs on the Darlington plant.

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The Environmental Protection Agency has proposed new reporting requirements under the Toxic Substances Control Act. Most chemical manufacturers will now have to report the names, production volumes and production sites of the chemicals they make. The information will be used when EPA develops the inventory of all chemicals (in commerce) as required in the Act. Thirty days after the publication of the inventory, those who wish to produce chemicals not on the inventory will have to notify agency 90 days before beginning commercial production. EPA will evaluate the new chemicals before permitting them on the market. More reporting will be phased in over the next two years.

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North Bay has the first noise by-law in effect under Ontario Environmental Protection Act. Another 30 municipalities are preparing noise by-laws based on Ontario's model municipal noise by-law which was prepared in 1975. Hamilton, Guelph, Barrie and Lakefield's by-laws are awaiting final Ministry approval.

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On June 28, 1977, Government bill C-38, an Act to Amend the Fisheries Act and to amend the Criminal Code in consequence thereof, introduced February 21, received third and final reading in the Canadian House of Commons. Several provincial governments (British Columbia, Alberta, Ontario and Nova Scotia), the Council on Forest Industries of British Columbia and the Mining Association of British Columbia have expressed concerns about the increased federal powers which the amendments provide. (Eco-Log Week)

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Though the decision was given in an Alabama federal court, it may sometime in the future affect the Great Lakes: Judge Lewis R. Morgan, of the United States Court of Appeals for the Fifth District, ruled that the EPA does not have the authority under the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) over disposal of wastes into ground waters.

In June, the Environmental Protection Agency (EPA) began implementing interim water quality standards under the Safe Drinking Water Act of 1974. About 50,000 community water systems and 200,000 mostly private systems that supply water are to begin testing for chemicals, bacteria and turbidity to meet new maximum contaminant levels. System operators are supposed to tell users when there are problems.

Interim water quality standards regulate 10 metals, six inorganic chemicals, coliform bacteria, turbidity and radioactivity. Permanent standards for the current list of contaminants and more are to be set in 1979.



The International Joint Commission. Seated left to right are Chairmen Henry P. Smith III (U.S.) and Maxwell Cohen (Can.). Standing are Charles R. Ross (U.S.), Bernard Beaupré (Can.), Victor L. Smith (U.S.) and Keith A. Henry (Can.).

BRIEFS

Only lakes Huron and Erie retain levels above their long-term averages for this time of year, although in June they were 57 and 30 centimetres respectively below last year's figures. Lake Superior was about 19 centimetres below average and 27 centimetres below the levels of June, 1976. Outflow was consequently reduced to a minimum at the end of the month. Lake Ontario's long-term average for June was some 22 centimetres higher than the present level which in turn is 71 centimetres below values of a year ago.

Extremely dry weather this summer and autumn would produce below normal water levels on all of

the Great Lakes. With the possible exception of Lake Superior, even extremely wet weather over the next six months would not raise any of the Great Lakes above last December's elevations.

The August issue of World Environment Report (published by the Center for International Environment Information in New York City) stated that acid rains are killing 40,000 lakes in Sweden. The Government is fighting back. After October 1, much of the nation will have to use fuels with no more than one percent sulphur. In addition, a five-year-\$21 million lakes liming program was launched. Inland lakes in the United States and Canada Great Lakes Region are being affected by acid rains. The atmosphere was shown to be a significant source of pollutants to the Upper Lakes. Significant PCBs and phosphorus loadings to Lake Michigan come from the air, and PLUARG's studies indicate that fallout from the air may account for 50% of the lead loadings to the Great Lakes. Though acid rains are not a major Great Lakes problem, changes in air quality controls to permit burning high sulphur content fuels may eventually worsen the situation.

The Carter Administration, specifically Charles L. Schultze, Chairman of the President's Council of Economic Advisers, stated support for economic incentives rather than government regulation to abate pollution. Toxic substances are the exception and regulations should be the primary enforcement mechanisms.

More than 425 university and community college students spent the last four months tackling 12 environmental projects for the Ontario Ministry of the Environment. They participated in the Youth Secretariat's student employment program, Experience '77. Programs included the study of farming practices in the Thames River Valley, design and construction of a domestic solar water heater, blackfly classification according to chromosomal make up, stresses on native communities and development of a set of guidelines for land use controls based on potential collector requirements for solar energy.

In 1972, the Ministry of the Environment began its Self-Help program for recreational lakes. Today over 150 lakes are monitored by cottagers whom the Ministry supplies with Secchi discs and devices for chlorophyll *a* sampling. Ideally, samples are collected weekly (when the lakes are ice free) and sent to MOE's Toronto laboratory for analysis. Biologists use the readings to help determine the degree of nutrient enrichment of the lakes. During the winter results are summarized and reports on findings are sent to the participants and made public. For details about the program, write to the Ministry of the Environment, Central Region, 150 Ferrand Drive, Don Mills, Ontario, M3C 3C3.

A 1975 study by Ohio EPA showed that the state was second only to Texas in the production of industrial wastes. This year and next the state, with the assistance of Battelle Labs-Columbus, will study and develop a hazardous wastes management plan for Ohio. Battelle will conduct a 10-month study to depict the size and scope of Ohio's hazardous wastes problems, establish a data base to assist in obtaining federal funds and provide the framework for a state-wide hazardous wastes program.

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In July at the University of Wisconsin's Great Lakes Research Facility on Milwaukee Harbor, over 60 junior and senior high school students learned about the Great Lakes. They learned about the fish, dissected and made slide specimens of them; went on a mini-cruise of Lake Michigan, taking samples, measuring temperature and doing other research tasks; learned to snorkel, sail, sport fish and take underwater photographs. They toured the harbor to see what kinds of work people were doing and heard about other related careers. To learn more about the program and the development of related teaching materials write to Gene Woock, University of Wisconsin-Sea Grant, 1800 University Avenue, Madison, Wisconsin, 53706.

EVENTS

The 50th Annual Conference of the Water Pollution Control Federation will be held in Philadelphia, Pennsylvania, October 2-7, 1977. For further information contact the Federation at 2626 Pennsylvania Avenue, N.W., Washington, D.C. 20037, (202) 337-2500. IJC Regional Office Deputy Director, Kenneth H. Walker, will present a paper "The Great Lakes Clean-up—an International Success Story" in session 16 on October 4.

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The United States Water Resources Council (2120 L Street N.W., Washington, D.C. 20037, (202) 254-6453) held hearings in Minneapolis, Denver, Boston, Atlanta, Los Angeles, Seattle, Cincinnati, and Dallas during July and August. The purpose was to gather public input to the joint Water Resources Council (WRC), Office of Management and Budget and the President's Council on Environmental Quality review of existing water resources policy. The three agencies are to recommend reforms to President Carter before the year's end. Copies of the study plan and timetable are available from the Water Resources Council.

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A call for papers has been issued for an International Symposium on the Analysis of Hydrocarbons and Halogenated Hydrocarbons in the Aquatic Environment. The event will be held May 23-25, 1978, at McMaster University, Hamilton, Ontario. Organizers are Canada Centre for Inland Waters at Burlington, and the Institute for Environ-

mental Studies of the University of Toronto. Papers are requested to focus on analytical techniques to determine concentrations, chemical species and form; sampling methods; monitoring programs; rates and mechanisms of transport and transformation; biological or ecological effects; health effects. Selected papers will be published in proceedings. Abstracts of two to three hundred words should be sent to B.K. Afghan c/o the International Symposium CCIW, P.O. Box 5050, Burlington, Ontario. L7R 4A6.

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On September 19-20, a conference was held at the University of Iowa on the Microbiology of Power Plant Thermal Effluents. The titles of the sessions were General and Ecological Issues, Biofouling and Control, Pathogenicity, and Stress on Indicators. Notice was received after the last **Focus** issue went to print. For details about the conference or information about papers and their availability, contact Jack Huttig, at the Center for Conferences and Institutes, University of Iowa, Iowa City, Iowa, 52242, (319) 353-5505.

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The Great Lakes Water Quality Board and the Great Lakes Research Advisory Board met in Duluth, Minnesota at the Radisson Hotel, September 20-21-22. Results of the Water Quality Board meeting were reported in a public session on the 22nd. Topics on the Board's agenda included toxic substance disposal, inventory of toxic substances, formation and functions of a health effects group, discussion of the Upper Lakes Reference Group report to determine which recommendations the Board will support, guidelines for designating mixing zones, and Minnesota's progress toward fulfilling Water Quality Board recommendations about a statewide ban on phosphates in detergents, Reserve Mining, and the Duluth sewage treatment facility. These items were also discussed during the public session September 22 beginning at 1:00 p.m. The Chairmen summarized meeting highlights and with Board members responded to questions from the public and media representatives on agenda items, Great Lakes pollution abatement programs and water quality matters. For details on the topical discussions, write to the editor.

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Another item which arrived too late for the last **Focus** issue concerned Environment III-Environmental Problem Solving, a conference held at the Bayshore Inn, Vancouver, B.C., September 18-20. The conference, sponsored by the Association of Consulting Engineers of Canada, was aimed at presenting practical solutions to environmental problems faced by government, industrial, manufacturing and municipal clients. IJC Commissioner Keith Henry and Canadian Water Quality Board Chairman Dr. Robert Slater participated. For copies of the program and information about papers availability, write to Eon Fraser, Director of Communications and Research,

Association of Consulting Engineers of Canada, 130 rue Albert Street, Suite 616, Ottawa, Ontario L5P 5G4.

use of coastal resources. It may be even more useful with the **Teacher's Activity Guide to Coastal Awareness**. Though both concern saltwater coasts, they provide many ideas. Write to the Council for price

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PEOPLE

Sincere thanks to retiring Research Advisory Board members *Dr. Herbert Allen* of the Illinois Institute of Technology, and *Dr. Eugene Aubert* of the National Oceanic and Atmospheric Administration Great Lakes Research Laboratory in Ann Arbor. Welcome to the two new members: *Ms. Anne Spacie*, Associate Professor with the Department of Forestry and Natural Resources at Purdue University, West Lafayette, Indiana and *Dr. Joseph Kutkuhn*, Director of the U.S. Fish and Wildlife Services, Great Lakes Fishery Laboratory in Ann Arbor, Michigan.

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Ronald Waybrant of the Department of Natural Resources has been Michigan's PLUARG member for several months. Apologies for our late recognition and thanks for his contributions since joining the Group.

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Colonel Leonard Goodsell, Executive Director of the Great Lakes Commission, died July 11, 1977. His many friends will long remember him and his effectiveness with the Commission.

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Research Advisory Board member *Dr. J.R. Vallentyne* has assumed the position of Senior Scientist in the Ontario Region of the Fisheries and Marine Service, Department of Fisheries and Environment. He will be located at the Canada Centre for Inland Waters, Burlington. *Dr. Vallentyne* was formerly with the Fisheries Research Board of Canada at Winnipeg, and most recently was the Senior Scientific Advisor with Ocean and Aquatic Sciences headquarters in Ottawa. His duties will involve communication with the public to promote an environmental ethic toward the Great Lakes, and to emphasize the importance and relevance of science in helping to resolve social issues.

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Dr. Virginia Prentice became Director of the Sigurd Olson Institute of Northland College in Ashland, Wisconsin, effective September 12, 1977. *Dr. Prentice*, formerly of the Environmental Research Institute of Michigan, is a member of the Great Lakes Research Advisory Board.

BOOKSHELF

Down Where the Water Is: A Coastal Awareness Activity Book is available from Rhode Island Coastal Resources Management Council, 83 Park Street, Providence, Rhode Island, 02903. It is a workbook written to inform children about the importance and

The National Research Council (Publications, NRCC/CNRC, Ottawa, Ontario, K1A 0A6) has two new publications of possible interest to **Focus** readers: **Fenitrothion: its long term effects on forest ecosystems - current status** (no. NRCC 15389, \$1.00) and **Sulphur and its inorganic derivatives in the Canadian environment** (NRCC 15015, \$5.00).

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A brochure is now available from the IJC Regional Office outlining the IJC's Great Lakes Water Quality Agreement responsibilities and functions.

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Many of the volumes prepared for presentation at the IJC's Great Lakes Water Quality Agreement meeting in Windsor are already out of print. If you received an incomplete packet, you are not alone. Supplies of all four regularly published appendices to the Water Quality Board report and the Research Advisory Board's annual report are depleted. Limited copies of **Appendix E-Status Report of Persistent Toxic Pollutants in the Lake Ontario Basin**, the Research Advisory Board's **NTA Task Force Report**, and **Proceedings of a Workshop on Environmental Mapping**, and the PLUARG progress report still remain. Some of the volumes may be reprinted if the demand for them indicates a need. Write to the editor if you wish to receive copies of any of the July 1977 reports. Orders will be filled whenever possible.

THINGS TO SEE

A new ten minute movie, **Winter on the St. Lawrence Seaway**, is the story of ice conditions during this past winter. This new Corps of Engineers film shows the problems encountered by navigation because of the severe ice conditions which developed earlier than usual.

The movie can be obtained by contacting the Public Affairs Office of the North Central Division, U.S. Army Corps of Engineers, 536 South Clark Street, Chicago, Illinois, 60605, the Corps' District Offices in Buffalo and Detroit, or the St. Lawrence Seaway Corporation office in Massena, New York.

On February 21-22, 1977, the Research Advisory Board sponsored a Workshop on Economic and Legal Mechanisms which could be applied in the Great Lakes to help meet environmental objectives. Proceedings are currently being printed and may be ordered from the editor. Beginning on the next page, Richard Robbins, Executive Director of Lake Michigan Federation, presents his views about one of the mechanisms which could be used by Great Lakes jurisdictions.

EFFLUENT CHARGES—A CHANGE FOR THE BETTER?

by Richard Robbins

The Setting

By mid-1976, EPA had set almost 500 effluent guidelines and had issued 45,000 plant permits. Every permit was potentially subject to dispute. EPA had to consider all types of factors — age of equipment, process changes, energy impacts, economic achievability and other criteria in setting effluent standards.

In Region V, we have seen some excellent responses, but the agency has been hampered by the complexity of the regulations. Some well-funded industries have stymied enforcement through continuous battles over standards and requirements.

The organization which I represent, Lake Michigan Federation, is committed to "a strong, irreversible and concerted commitment from government . . . to rehabilitate and restore those areas of the Great Lakes which have been degraded, and to maintain in non-degraded conditions the remainder." We want to see workable programs, not arbitrary and impossible fiats administered by agents who engender hostility toward all regulation because of ineffective rules. Effluent charges, fees per unit of pollutant discharged, could solve some problems.

Why Use Effluent Charges?

Some experts say that the present system of setting limits on pollutants, issuing permits and going to court to enforce requirements is too administratively complex. Polluters can hold up administrative enforcement through continuous debate. An effluent charge is less subject to attack and permits industry to make the decision on how much control it wants and how fast.

The present system, too, is organized around "treating" pollutants. Other methods such as changes in industrial processes, substituting raw materials, and reducing sales of items which cause pollution during manufacture might occur if effluent charges were utilized. An effluent charge can also achieve pollution control at least cost (by charging the same price per unit of emission).

Where do Effluent Charges Stand in Federal Law?

Section 204(b) of PL 92-500 describes a system of "user charges". Grants for municipal treatments works are conditioned upon a system of users' paying a proportionate share of the costs of operation and maintenance of the system. Industrial users must also pay a portion of the construction cost of the treatment works allocable to treatment of their wastes. But these are not strictly effluent charges. EPA can request fines against non-complying polluters;—fines could be based on the effluent charge concept as well.

States could independently develop effluent charges. A system of effluent charges applied to

industries and municipalities based on discharges into waterways would probably require amendment to PL 92-500, the basic water quality law.

During the prior administration, a draft bill was presented to add Section 319 to the 1972 Water Quality Amendments. The bill is a first step toward the effluent charge. Yet in many ways it needs to be improved to be more specific about how high and how (method) to set charges—any bill should do this. The criteria applied: fee payable in an amount equal to the economic value of non-compliance (capital costs delayed, the cost of capital, operating and maintenance cost delayed, the duration of non-compliance) is straightforward, but fails to consider the costs inherent in pollution related health injury, recreation and water supply losses. Costs of alternative strategies other than water treatment options should also be considered in the charge.

State capacities and interests in administering a fee program need consideration. Perhaps effluent fees should be administered and set only by the federal government to insure uniformity and effective technical understanding.

A "non-compliance" fee — as in Connecticut — is not enough. Fees in any new program should apply to all effluents. This would move us closer to the 1985 zero-discharge position, and carry out the incentive goals in any effluent charge proposal.

Do Effluent Charges Work?

The answers are not in yet. West Germany proposed an effluent charge system in 1974. Similar approaches have been used in France, Holland, Czechoslovakia and Hungary. Vermont and Connecticut use non-compliance fees. User charges are employed to limit some U.S. and Canadian pollution and have already had a favorable impact. There is substantial evidence that polluters will respond to pricing.

The effluent charge might remedy difficulties with the present effluent limitation system. The important facts are that the charges present the potential for differing private approaches to meet pollution control objectives. Industry could reduce sales of a product because effluent charges are built into its price, change raw materials, modify processes, redesign products, etc. The effluent charge also has the important characteristic of encouraging the polluter to go beyond present effluent limitations to even stricter control—when this is economically feasible.

But perhaps the charge is not enough or not effective enough. Big polluters could challenge effluent charges. The constitutionality of the charge can be challenged as well, but a fee — like a tax — is less susceptible to such challenge than is an effluent limit. However, there is no constitutional or statutory history for charging for use of "common property" such as the water of the Great Lakes.

It may be even more difficult to keep effluent

charges keyed to marginal costs than it is to keep effluent limitations current. What will be the basis of the charges — cost of clean-up only, damage to health, potential damage, proved damage? Will effluent charges have an easier road than effluent limitations? Will they lead to faster water quality improvement and use of the best possible technological solutions at lowest cost to the public?

Experiments

Perhaps effluent charges could be levied in a single region or nationally on a single industry to test the efficiency of the process. The problem with a single-region experiment is that the national market for that area's goods could be altered, unreasonably affecting regional producers. However, the effect on products could be offset with a payback on some other basis than the charge amount.

Action

Lake Michigan Federation suggests:

1. A review of PL 92-500, its administration and effect.
2. Widespread industrial and public participation in the development of workable means to enforce the 1977, 1983 and 1985 deadlines.
3. Strong consideration of a comprehensive effluent charge for the private and municipal use of the public and common property in Great Lakes waters.
4. Insuring that the effluent charges adopted encourage rehabilitation and restoration of our waters; that they work so that increased economic growth under stated effluent limitations does not undercut improved water quality.

FOR ADDITIONAL COPIES

Write to Patricia Bonner — Editor, Great Lakes Focus, IJC Regional Office, 100 Quellette Avenue, Windsor Ontario, Canada N9A 6T3.

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