

Great Lakes International Joint Commission.



International Joint Commission
Interim Report under the
Great Lakes Water Quality
Agreement
January 28, 1981

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1978 Great Lakes Water Quality Agreement

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Introduction

In 1978, the Governments of Canada and the United States entered into a revised Great Lakes Water Quality Agreement. In contrast to the provisions of the 1972 Agreement which required annual reports, the International Joint Commission is charged by the 1978 Agreement with providing a full report to the Federal and State/Provincial Governments at least biennially. The first such report will be provided in late 1981, dealing with progress during the first two years of the 1978 Agreement. The revised Agreement also provides for summary reports in the alternate years and special reports at any time. This interim report is based largely on reports submitted by the Great Lakes Water Quality Board and Great Lakes Science Advisory Board at the Eighth Annual Great Lakes Water Quality Meeting at Toronto in November, 1980.

In this report, the Commission does not attempt to repeat or review all aspects of the Boards' reports. These reports have been made available to Governments and the public. Except as noted herein, the Commission generally supports the concerns and recommendations expressed in the two main Board reports and at the Annual Meeting. The Commission commends these reports and the transcripts of the Meeting to the Parties and to the State and Provincial Governments for their careful consideration. Many of the recommendations expressed in the Board reports are consistent with Commission recommendations contained in the Seventh Annual Report so that, for this reason too, their repetition is not required here.

This report provides the additional comments of the Commission on seven issues of concern. A number of these issues are planned to be the subjects of special reports during the next year. The Commission believes, however, that it is important for it or the Governments as specified herein, to take certain early actions on these matters to fulfil their responsibilities under the 1978 Agreement.

The seven issues are:

- I. Great Lakes International Surveillance Plan and Other Data Requirements
- II. Atmospheric Pollution of the Great Lakes
- III. The Niagara River
- IV. A List of 33 Chemicals for Possible Immediate Control
- V. Non-NTA Phosphate Substitutes in Detergents
- VI. Waste Disposal Sites
- VII. Phosphorus

Great Lakes International Commission

TD223.3.I44 1981
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I. Great Lakes International Surveillance Plan and Other Data Requirements

The 1978 Agreement requires that the Parties, in collaboration with the State and Provincial Governments, develop and implement a joint surveillance and monitoring program, using as a model the Great Lakes International Surveillance Plan (GLISP) contained in the 1975 Report of the Water Quality Board and revised in subsequent reports. The Commission has not yet been informed of specific program proposals of the Governments with respect to Annex 11 of the 1978 Agreement. Therefore, the Commission cannot comment that present surveillance and monitoring meet the needs of the Agreement.

Notwithstanding the primary role of the Governments in developing a program, on their own initiative the Water Quality Board and its Surveillance Subcommittee prepared a revised GLISP and presented it to the Commission in November, 1980. The Water Quality Board has recommended that the Commission accept the revised GLISP as satisfying the requirements of Annex 11 of the 1978 Agreement.

The Commission is not making a recommendation on GLISP at the present time. It has the following concerns.

There are four purposes of surveillance outlined in Annex 11: monitoring compliance with pollution control requirements; achievement of the General and Specific Objectives; the evaluation of water quality trends; and the identification of emerging problems in the Great Lakes Basin Ecosystem. Each of these purposes has a set of specific information and reporting requirements. The Commission has not completed a review of these information needs pursuant to Article VIII of the 1978 Agreement.

The revised version of GLISP was developed as "the basic framework for surveillance activities in the Great Lakes Basin as required in the 1978 Water Quality Agreement" to represent a long-term strategy to coordinate and plan monitoring activities. The Commission has not concluded whether the GLISP represents a scientifically effective and managerially implementable plan to obtain and assess the data required by Annex 11. The Commission is concerned that GLISP may have been constrained by budgetary considerations to the detriment of ensuring the satisfaction of the requirements of Annex 11. Until the Commission is informed by Governments of the relationship of GLISP to their programs and can assess the adequacy of GLISP as a framework for defining data needs under the Agreement, the Commission is not in a position to endorse GLISP.

The Commission wishes also to evaluate all data and information systems requirements necessary to fulfil its advisory function with respect to the various Articles and Annexes in the Agreement. These include the adequacy of Regional Office staff and facilities, quality control and the need for centralized information systems. Pending further assessment, the Commission reserves its further advice to the Governments on the questions of inter-jurisdictional data quality assurance programs (Water Quality Board recommendation) and a centralized information system for hazardous substances (Science Advisory Board recommendation).

The Commission supports, however, its Water Quality Board's concerns about adequate resources for analytical capability within the jurisdictions to accommodate the increased complexity and quantity of monitoring. It also supports Science Advisory Board concerns (expressed at the Eighth Annual Water Quality Meeting) about the need for adequate routine analytical capability to free the increasingly strained research facilities from performing routine chemical analyses required by a monitoring and surveillance program. Without expansion of routine analytical capability, both the routine and the research functions will be weakened to a point that they are inadequate to meet the needs of the 1978 Agreement.

In order to move quickly towards a resolution of the surveillance and other information needs issues that are outstanding, the following actions have been taken or are proposed by the Commission:

- (a) The Commission has requested the Science Advisory Board to review the GLISP for scientific validity and quality with emphasis on tributary and nearshore monitoring, the adequacy for trend analysis, sampling plans for toxic and hazardous substances, and the compatibility of simultaneous monitoring systems for eutrophication and toxic substances. Further, since the Science Advisory Board has strongly recommended centralized and coordinated information systems for toxic and hazardous substances in the Great Lakes Basin, the Commission has also requested this Board to provide a more definitive prospectus for such information systems so that the Commission can better assess the adequacy of current governmental and private systems (with attention to information management policies) and the need for further developments in this regard;
- (b) The Commission has established an internal Task Force to review the GLISP, other data needs of the Commission and the questions of data quality control between jurisdictions and information systems, all in consultation with the Boards as relevant;
- (c) The Commission requests that the Governments inform it of the current and planned surveillance programs of the jurisdictions pursuant to Annex 11 of the Agreement, as well as any comments that they may wish to provide on the GLISP document of November 1980.

The Commission is aware that the jurisdictions have used parts of GLISP as a basis of surveillance activities and, in order to ensure continuity, encourages the jurisdictions to proceed in the meantime with their annual programs of surveillance activities as planned. The Governments are also encouraged to continue and increase their activities in developing standardization of sampling and data handling, reporting and information exchanges and, further, to ensure that all jurisdictions make efforts to identify, within their own data systems, data that are specific to the Great Lakes Basin Ecosystem. This will allow rapid identification and retrieval of such data for the purposes of the Agreement.

II. Atmospheric Pollution of the Great Lakes

The importance of atmospheric pollution as a source of water pollution, as well as being an environmental problem in its own right, has been the subject of increasing knowledge and attention in recent years. Previous Commission reports (on pollution in the Upper Lakes, on pollution from land use activities, and the Seventh Annual Report on Great Lakes Water Quality in particular) as well as the various Board reports on which these documents were based, have given increasing emphasis to this problem.

While the atmospheric route was suspected of being of major importance in the movement and behaviour of pollutants in previous years, atmospheric deposition of pollutants to the Great Lakes had not really been assessed. In mid-1979, the attention of the public and the Governments was directed to the acid rain phenomenon, whereby the long range transport of acidic materials from thermal power plants, smelters, other industry and transportation sources results in depositions harmful to aquatic and terrestrial resources. It is now becoming apparent that acid rain is but one, albeit serious, instance of a wide range of air pollution problems that are having, or have the potential to have, a serious, long-term impact on the ecosystem of the Great Lakes Basin.

During 1980, the Science Advisory Board attempted to quantify the extent to which the atmosphere is a major pathway of pollutants to the Great Lakes. While not all the data are specific to the Great Lakes Basin Ecosystem, the 1980 Science Advisory Board report and background documents establish that the atmosphere is a major if not the dominant pathway to the waters of the Great Lakes Basin for a number of hazardous substances. These substances include a number known to bioaccumulate and cause serious threats to human health or biological resources including PCBs, DDT, dieldrin and PAHs (polynuclear aromatic hydrocarbons). The first two are substances under strictly regulated use, and the fact that atmospheric deposition represents the significant source to the Great Lakes is a matter of serious concern. Inorganic substances which are also deposited in significant quantities from the atmosphere include toxic elements (lead, nickel, and arsenic) as well as non-toxic but biologically active elements (manganese, calcium, and phosphorus).

Lakes Superior, Huron and Michigan are particularly susceptible to atmospheric inputs because of their large surface areas and air mass circulation patterns. Increased exposure of sensitive species occurs because long retention times, generally oligotrophic conditions and low sediment load per unit volume result in poor mechanisms for removal of the pollutants from the water.

The atmospheric sources of organic pollutants to the Great Lakes are scattered, originating both within and outside the Great Lakes Basin. The largest contributors are transportation vehicles, the escape of organic solvents from industrial processes, and petroleum production and distribution. It is notable that the largest sources are among those contributing significantly to other air pollution problems, specifically acid rain and/or photo-chemical oxidants.

The Commission recommends that the Governments review the reports of the Science Advisory Board with a view to overcoming the lack of sufficient monitoring data and to fulfil the need for a well designed, coordinated, efficient sampling network and monitoring study to identify and measure the atmospheric deposition and fluxes of both organic and inorganic substances throughout the Great Lakes Basin.

The Commission also recommends that the Parties consult immediately under Article VI(1) of the 1978 Agreement to ensure that adequate provisions are being made to address this problem including the vigorous pursuit of required remedial action, and under the ongoing coordinated research program and bilateral negotiations pursuant to the August, 1980 Memorandum of Intent between the Governments of Canada and the United States Concerning Transboundary Air Pollution.

The Commission has asked its Water Quality and Science Advisory Boards to continue to give priority to this area of environmental science and policy concern.

III. The Niagara River

There is a long history of Commission concern about the water quality problems in the Niagara River. As early as 1918, the Commission reported to Governments that the waters of the Niagara were polluted by industrial and municipal wastes. In 1950, the Commission recommended to Governments remedial measures as well as certain water quality objectives for the river. There were no significant positive results. In 1968, the Commission held Public Hearings to ascertain why the objectives were not being met in the Niagara River and to review in detail the programs and schedules of the local agencies having jurisdiction to meet the objectives. In 1970 the Commission reported to Governments recommendations for the adoption of certain proposed water quality objectives and supporting programs and measures for Lake Erie, Lake Ontario, the International Section of the St. Lawrence River and the Connecting Channels (including the Niagara River). Implementation of these recommendations resulted in the 1972 Canada-United States Great Lakes Water Quality Agreement.

Under the 1972 Agreement the Commission's Water Quality Board has identified the Niagara River as a Problem Area since 1973. The Board has reported that coliform, phenol, iron, ammonia levels, and aesthetic characteristics, were not in compliance with Agreement objectives. Repeated violations of coliform and phenol objectives were noted in subsequent reports and given as reasons for designating the Niagara River as a Problem Area.

Recently, public attention has been focused on several specific problems, most notably Love Canal in Niagara Falls, New York, and SCA Chemical Waste Services Inc. in Porter and Lewiston, New York. Brief descriptions of these problems are given in the Water Quality Board's 1980 Report to the Commission. While these are serious problems in their own right, the Commission believes that SCA and Love Canal should not be considered in isolation but are serious manifestations of problems that are river-wide.

Most recently, the Commission has provided the Governments with a Special Report on Pollution in the Niagara River, dated January 20, 1981. The Commission is concerned about the quality of the Niagara River, which does not at present meet or is close to exceeding a number of Specific Objectives contained in the 1978 Agreement including that for "unspecified organic compounds". It is also concerned about the adequacy of programs to ensure that the General and Specific Objectives and the Purpose of the Agreement are achieved.

On the basis of widespread concern over certain proposed discharges to the Great Lakes System, the Commission requested information from the Governments of Canada and the United States as to the extent to which, and the mechanism by which:

1. all jurisdictions in the Great Lakes Basin ensure the application of water quality standards, regulatory requirements or procedures that are consistent with the achievement of the General and Specific Objectives and the Purpose of the Great Lakes Water Quality Agreement, in the granting and administration of approvals for discharges to the Great Lakes System;
2. the cumulative effects of multiple sources of contaminants on the Great Lakes Basin Ecosystem are taken into account in granting specific discharge permits within jurisdictions, and coordinated planning processes are being developed and implemented to ensure consideration of these effects between jurisdictions and pursuant to Article II(c) and Annex 12 of the Agreement; and
3. various alternatives available for reducing the discharge of toxic substances to the Great Lakes Ecosystem are taken into account in the consideration of specific discharge permits, in order to assess whether such permits are consistent with the prohibition and/or virtual elimination of such discharges further to Article II and Annex 12.

To date, the Commission has not received a reply to this request, but on the basis of the information that it had available to it, the Commission recommended in its Special Report that:

- a comprehensive and coordinated study of the Niagara River as a total system be undertaken;
- a comprehensive and continuing monitoring program for the entire Niagara River and western end of Lake Ontario be developed and maintained, coordinated and supported by all relevant jurisdictions;
- Governments prevent any additional discharges to the Niagara that would increase the input of those substances for which the Specific Objectives are exceeded or likely to be exceeded;
- Governments review the implications of discharges of inorganic substances for which Specific Objectives do not exist under the 1978 Agreement but which are present in the Niagara River in concentrations meriting concern;

- the Parties respond in a timely manner with respect to each jurisdiction to the questions posed in the Commission's letter of May 8, 1980 (noted above);
- the jurisdictions inform the Commission in detail as to the extent to which proposed or ongoing programs and pertinent specific discharge permits will result in a net increase or decrease in the amount of persistent toxic substances entering the ecosystem of the Great Lakes Basin, and individual Lakes and Connecting Channels therein.

IV. A List of 33 Chemicals for Possible Immediate Control

The Science Advisory Board has begun to classify those pollutants previously detected in the Great Lakes waters for which varying kinds of toxicological and health studies exist. Toxicological studies may include animal bioassays for use in human health risk assessment as well as for protection of fish and biotic communities. Health studies refer only to studies for human health, and include epidemiologic data as well as bioassay studies. Thirty-three chemicals were identified as "being known to cause chronic adverse effects in humans" (Table II, p. 14 of 1980 Annual Report of the Committee on the Assessment of Human Health Effects of Great Lakes Water Quality).

Because some of these above chemicals have a short environmental lifetime, are no longer manufactured or discharged and are rapidly disappearing from waters, have effects only known to occur at relatively high levels of occupational exposure, or have limited bioaccumulation potential, not all of the 33 chemicals on the list may be logical subjects of water quality objectives or further Commission concern. At the Commission's request, the Committee on the Assessment of Human Health Effects of Great Lakes Water Quality is therefore refining the list of 33 chemicals. When the refined list is available, the Commission will recommend that action be taken by Governments to strictly control those substances identified as being harmful to human health. It will also be important to ensure that monitoring systems are adequate to detect and quantify all emissions of these substances, whether they be end-of-pipe, leachates or fugitive emissions.

V. Non-NTA Phosphate Substitutes in Detergents

Since the early 1970's, when detergent phosphate restrictions were first implemented as part of eutrophication control programs in the Great Lakes Basin, a number of alternative detergent builders have been used or proposed. Nitrilotriacetic acid (NTA) was identified as one of the more effective builders in conjunction with a limited amount of phosphorus.

While it has had widespread use in Canada, its use in the United States ceased, pending further data on potential health effects that had been projected on the basis of preliminary laboratory data. In its Fifth Annual Report on Great Lakes Water Quality, in 1978, the Commission drew the attention of the Governments to the findings of its Research Advisory Board

Task Forces on the Health Effects and Ecological Effects of NTA, that there was no reasonable cause for restricting NTA on the basis of health effects, and no obvious environmental hazard from its use. In May, 1980, the United States Environmental Protection Agency stated that it could see no reason to take regulatory action against the use of this material in laundry detergents. The United States Congress has scheduled hearings on NTA, maintaining a constraint on the use of this compound in the United States.

A number of other compounds including synthetic zeolites and citric acid derivatives have also been proposed as phosphorus replacements in detergents. As the second stage of its review of non-phosphate builders, the Science Advisory Board had its two expert Task Forces examine these other compounds for their health and ecological effects as well as their effects on waste treatment processes.

The Task Force on the Health Effects of Non-NTA Detergent Builders examined seven different types of builders, none of which, on the basis of the information available and expected normal exposure, were found to constitute a human health hazard. These builders were carbonates, carboxymethyloxysuccinate (CMOS), carboxymethyltartronate (CMT), citrates, phosphates, soluble silicates and Type A Zeolite. With respect to the ecological implications, that Task Force (on the same assumptions) found no reason for concern for citrates and CMOS, but could not endorse CMT as a detergent builder at this time because the substance degrades very slowly and under special conditions, and because of the uncertainty of the fate and effects of its impurities.

Because some of the candidate compounds are proprietary, the Board's experts were forced in several cases to rely on studies performed in industrial and commercial laboratories. Without independent verification, the Commission is not certain of the extent to which it should accept some of the findings reported on the candidate builders CMOS and CMT. The Commission commends the efforts of its advisors, and recommends that the Governments further review those non-NTA chemicals for which the only data base is proprietary, prior to any decision which allows the widespread use of these substances.

VI. Waste Disposal Sites

In 1979 and 1980, the Water Quality Board expressed its concern about the hazardous waste disposal issue, particularly about the need for the establishment of safe waste disposal sites and the lack of public acceptance for new or expanded sites. It has recommended to the Commission that efforts be undertaken by the Commission to improve public acceptance for more sites for hazardous waste disposal.

The Commission believes that in order for this function to be carried out, it must know what disposal sites exist and where in the Great Lakes region, what studies have been performed to assure that these sites do not contaminate boundary waters via surface water or groundwater, what criteria exist to assure proper selection of a safe site, and whether and how current or future sites can be made "safe".

The Commission recommended in its Seventh Annual Report on Great Lakes Water Quality that the replacement of toxic and hazardous substances in the manufacturing process with less hazardous materials, and the reduction of wastes be vigorously pursued by industry and Governments. However, where such replacement and reduction may not be achieved in the near future, the Commission has recommended strict measures to bring hazardous waste disposal under control. To this end, the Commission urged Governments in its report, Pollution in the Great Lakes Basin from Land Use Activities to:

- a) prepare a complete inventory of operating and abandoned waste disposal sites in the Basin, including the nature and quantities of waste handled where possible;
- b) determine the adequacy of such sites, and any proposed sites, to properly and safely handle hazardous wastes and implement necessary measures to correct any deficiencies found;
- c) conduct a comprehensive review of all existing legislative and regulatory mechanisms and make alterations where necessary to assure the safe transportation and disposal of hazardous wastes in the Basin;
- d) establish a compatible manifest system for hazardous wastes between all jurisdictions within and beyond the Basin;
- e) because siting of hazardous waste facilities depends in part on public acceptance of such sites, efforts be made to demonstrate clearly that safe disposal sites are technically possible, or that associated risks can be held to a minimum;
- f) in addition, embark on a long-term effort to reduce or eliminate pollutants at their sources, including increased resource recovery efforts and alterations in the manufacturing process.

Further, the Commission again draws attention to its letter of January 31, 1979 to Governments and to its recommendation in the report, Pollution in the Great Lakes Basin from Land Use Activities that Governments provide information on the location and contents of hazardous waste disposal sites. The Commission is aware that Governments have been studying this question and looks forward to receiving information on waste disposal sites and programs required to assess the extent of the problem and the adequacy of corrective, preventive and monitoring measures. In providing for the control of hazardous wastes, Governments should ensure that provision is made in the regulations of the various jurisdictions for coordinated and effective control throughout the Basin.

The Commission also draws attention to the Science Advisory Board's recommendation that jurisdictions recover hazardous substances for reuse and employ treatment technologies that destroy, rather than merely remove, contaminants from waste discharges. Use of wastes as raw materials is crucial to reducing or avoiding the need for more disposal sites. Since many substances can only be containerized, rather than be treated, a permanent reliance on sites is not the final solution to most hazardous waste problems

(an exception at the present time may be radioactive materials). The Commission therefore commends its Science Advisory Board's recommendation on recycling and utilization of hazardous wastes to the Governments to encourage new approaches to waste handling.

VII. Phosphorus

Phosphorus control is the primary thrust in programs to control eutrophication in the Great Lakes. The report of the Commission's Task Force on Phosphorus Management Strategies was completed in July, 1980 and the Commission conducted Public Hearings on this subject in November, 1980.

The recommendations of the Task Force revolve around a cautious, staged approach involving the consolidation and completion of existing programs (sewage treatment plant effluent limitation at 1.0 mg/L phosphorus, detergent phosphate limitations, low-cost non-point remedial programs, etc.) during the next five years while further studies on a number of topics are undertaken. The Great Lakes Water Quality Board has essentially supported the recommendations of the Task Force. The Commission is preparing its own separate report on the subject based on all the information available to date, for submission to Governments in early 1981.

In its November, 1980 report, the Great Lakes Water Quality Board reviewed the progress in sewage treatment plants and found that, while some were surpassing expectations, several major municipal treatment plants have yet to reach their target effluent loadings for phosphorus. In this latter category, the Commission notes the substantial progress from 1978 to 1979 in reducing phosphorus loads from Detroit, Lorain, Tonawanda S.D. #2 and Cornwall, but also notes with concern increasing loadings and effluent concentrations at the Cleveland Westerly and Akron (Ohio), Niagara Falls (New York), and Hamilton (Ontario) plants, among others.

The Commission draws attention to and adopts the recommendation of the Water Quality Board that the Governments increase their efforts to ensure that all plants meet their target effluent concentrations as quickly as possible.

The Water Quality Board has also renewed its recommendation that the limitation of the phosphate content of detergents be extended to the portions of Ohio and Pennsylvania in the Great Lakes Basin. The Commission has made a similar recommendation on several occasions in the past and continues to support this strategy in all Great Lakes jurisdictions. The rationale for this view, explored more fully in the phosphorus report, is based on the Commission's conclusions that:

five of the largest Ohio municipal treatment plants discharging to Lake Erie and that of Erie, Pennsylvania remained above the phosphorus effluent limitation in 1979. These plants were among the eight largest municipal phosphorus dischargers to Lake Erie in 1978. In the other jurisdictions, which have adopted it, the phosphate limitation has had a marked effect in reducing phosphorus loadings, particularly pending the full operation of phosphorus removal facilities in sewage treatment plants.

- there is a need to reduce the load to sewage treatment plants to assist in maximum efficiency in operation, particularly where population and/or loads are increasing, and to minimize the difficult sludge disposal problems facing sewage treatment plant operators.
- there is a need to reduce phosphorus discharges to the lakes due to combined sewer overflows, plant breakdowns, and non-sewered populations, notably in areas where soils are sub-optimal for septic tank systems and in the cases of poor maintenance of private waste disposal systems.
- utilization of detergents in Canada and research studies in both the United States and Canada have shown that NTA and other non-phosphate and non-carbonate builders are available as alternatives to high-phosphate detergents, to minimize any real and potential phosphorus pollution control problems at source, while maintaining an acceptable product from the cost and washability standpoints. Much of the concern expressed about phosphate alternatives has been directed at alleged problems and additional costs resulting from the use of carbonate builders (now commonly used in the United States) and liquid detergents.

The Commission is cognizant of the position of the soap and detergent industry that further economic studies should be undertaken concerning the impacts of limiting phosphates in detergents. The Commission continues to believe, however, that the retention and geographical expansion of the phosphate limitation is justified for the reasons noted above.

Signed this 28th day of January, 1981 as the Commission's Interim Report under the Great Lakes Water Quality Agreement.

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