

Great Lakes Diversions and Consumptive Uses

A Report to the Governments of the
United States and Canada under the 1977 Reference

January 1985

EXECUTIVE SUMMARY

Introduction

The Great Lakes, their connecting channels and the St. Lawrence River have been the key to the development of the industrial heartland of North America, providing economical and efficient transportation; low-cost hydro-electric power; abundant water supplies for domestic, agricultural and industrial needs; and for depositing municipal and industrial discharges. Estimates of economic activity in 1975 amount to some \$155 billion in the United States portion of the basin and some \$27 billion in the Canadian portion. In addition to their economic and social value and the contribution the Great Lakes make to the quality of life of the citizens of the basin, their environmental value is incalculable, containing as they do numerous species of mammals, reptiles, birds, fish and plants.

The basin's abundant water supply has largely been taken for granted, for the lakes are the largest freshwater chain in the world and store about one-fifth of the world's fresh water. Serious disputes have not arisen between the United States and Canada regarding the use of this shared resource, even though all of the water the basin contains is currently being utilized in some way. There is in effect no 'surplus' resource, but rather competition among users. Yet if demands on the resource increase, the competition among users, both domestic and international, will do likewise. It is appropriate, therefore, to examine existing and potential activities that have or could have a significant impact on the supply and consequently the sharing of the resource.

This Report of the International Joint Commission concerning diversions and consumptive uses of Great Lakes water has been prepared in response to a reference from the Governments of Canada and the United States, dated February 21, 1977, and continues the Commission's long involvement in Great Lakes water quantity issues, which first emerged through concern about lake levels. The Commission established the International Great Lakes Diversions and Consumptive Uses Study Board (the Study Board) to conduct the required technical investigations.

The Commission's Report on the reference is in two parts. Part One examines the effects of existing diversions, the potential to improve extremes in Great Lakes levels by changing existing diversion flow rates, and existing and projected consumptive uses in the Great Lakes basin. Part Two provides a broader and more appropriate context within which to address the longer-term prospects for the use of Great Lakes water.

Part One: Diversions

The Commission reviews the existing diversions at Long Lac, Ogoki, Chicago, and the Welland and New York State Barge Canals. The review shows that the diversions at Long Lac, Ogoki, Chicago and the Welland Canal have produced changes in Great Lakes levels and outflows, though the hydraulic effects are small in relation to the natural ranges on the lakes. The New York State Barge Canal diversion has no hydraulic effect on any of the Great Lakes. The diversions have also increased the long-term mean outflows from each lake, but the current regulation plans for Lakes Superior and Ontario have been designed to accommodate these diversions.

The Commission finds that while each diversion has been analysed to the extent possible within the constraints of the investigation, the information available is insufficient to draw any cumulative basin-wide economic or environmental implications. For many reasons discussed in the Report, the economic analysis must be treated with caution as a basis for decision-making.

With respect to the existing diversions, the Commission notes that there is a history of consultation and a recognition of the legitimate interests of both countries that has, regardless of legal considerations, by and large been reflected in mutual co-operation and concern. Nevertheless, there are several matters regarding existing diversions, both large and small, that might usefully be examined by Governments. For example, the Commission finds that although most data on existing major diversions are reported regularly to both Governments, through the Commission or otherwise, this does not appear to be the case for small diversions. In addition, the international requirements under the 1909 *Boundary Waters Treaty* with respect to both large and small diversions of boundary waters are not explicit, nor is any consistent practice followed.

The Report examines the Increased Lake Michigan Diversion at Chicago Demonstration and Study Program authorized by the U.S. Congress in October 1976. The study portion of the program resulted in several computer model simulations of large diversion increases; they determined that such increases were not economically justified. The demonstration part of the program was never funded and no actual demonstrations were conducted. The Commission finds that there are now no sponsored or approved new or changed major diversions in the basin.

The Commission's investigation shows that the present flow rates of the four diversions studied can be modified without structural change at existing locations to reduce high levels and raise low levels by various but small amounts. With respect to reducing levels, under all diversion management scenarios except one – which essentially has been in effect since 1979 and has a financial benefit – substantial net annual direct financial losses appear to accrue to the sectors considered in the analysis. The net losses are such that the further manipulation of diversions for the purpose of alleviating the adverse effects of high lake levels is not justified. As for raising low levels, the one alternative studied would result in a small net financial loss as currently assessed. However, should hydrological or economic criteria within certain sectors change significantly in the future, or should other considerations that would benefit from such a changed regime be given sufficient weight, the divergence of values under this scenario is sufficiently small that this management scenario might become more attractive.

Part One: Consumptive Uses

The second major area considered in Part One involves existing and reasonably foreseeable patterns of consumptive uses in the Great Lakes basin. Large quantities of water are withdrawn from the Great Lakes and their surface and groundwater tributaries for industrial (primarily manufacturing and power generation), agricultural and domestic purposes and for other human activities. In 1975, the base year for the Study Board's work, withdrawals in the Great Lakes basin totalled roughly 2,120 cubic metres per second (75,000 cubic feet per second), with close to 95 per cent of this water being returned to the basin after use.

Consumptive uses as reported by the Commission's Study Board totalled about 140 cms (4,950 cfs) in 1975. Another estimate of consumptive uses for the U.S. portion of the basin by the United States Geological Survey differs considerably from that of the Study Board. Consequently, the Commission finds that existing (1980) consumptive uses may be in the range of 82 cms (2,900 cfs) to 159 cms (5,600 cfs). The Commission emphasizes, however, that regardless of which estimate is more accurate, existing consumptive use data need to be improved in several areas in order to establish useful historical trends and to improve forecasts.

In assessing future consumptive uses in the Great Lakes basin, the Commission carefully considered the Study Board estimates for the years 1975 to 2035. The Commission concludes that projections beyond the year 2000 are too speculative and uncertain for planning and policy decisions given the imprecision in the forecasts of economic and demographic changes and the differing estimates of existing consumptive uses in the U.S. portion of the basin. In addition, the Commission revised downward the Study Board's estimates for the two largest growth sectors, power generation and manufacturing, based on events since the Study Board completed its work.

The Commission's investigation shows that consumptive uses in the Great Lakes basin will increase and that, based on current information and analysis, the most likely projection

of consumptive uses in the year 2000 will be of the order of 161 cms (5,700 cfs) to 238 cms (8,400 cfs). The Commission concludes there is a strong need for continual improvement in information on historical and projected water use trends in general and consumptive use trends in particular within the Great Lakes basin. Should changes in public policies regarding these trends prove desirable in the future, a continuous data and information base would provide an invaluable foundation.

Part Two

In this part of the Report the Commission addresses a number of matters that warrant the attention of appropriate jurisdictions in the United States and Canada as new or changed uses of Great Lakes waters are considered in the future. The Commission notes that not all existing large diversions appear to be subject to international control either by the Commission under the *Boundary Waters Treaty* or pursuant to special agreements between the Governments. The practice has been to permit domestic law and procedure to govern some large diversions, most small diversions and the consumptive use of Great Lakes water. While specific provisions of law and procedure vary from jurisdiction to jurisdiction, the legal regimes throughout the Great Lakes basin, unlike those further west, place relatively few restrictions on the use of water.

The *Boundary Waters Treaty* of 1909 contains some guidance to methods of addressing a range of issues raised recently at the initiative of one or both Governments or of individual jurisdictions. Its provisions appear sufficiently broad to permit agreed contemporary interpretation by the Parties. The Commission notes that the overall international legal regime is not to be found only in the texts of treaties. It has evolved and continues to evolve through a combination of agreements, custom, judicial decisions and writings. The jurisprudence of the International Joint Commission is a particularly significant element. In addition, it is necessary to look at history in order to put the various elements in proper perspective.

The Commission reviews recent diversion proposals involving Great Lakes water that have received press and public attention. The Report recognizes, however, that no major diversion from the Great Lakes basin is now under formal consideration and that none of the concepts is currently proposed or endorsed by any government directly involved in the management of the water. The Commission concludes that, although these large-scale diversions may be technically possible, at this time they have little political support; that they could be undertaken only at enormous, and at present unjustified cost; and that they would have unknown but likely significant social and environmental effects.

There may be circumstances in the future that could change this assessment. Changed global climatic conditions, or major shifts in current economic or political parameters, such as a world food crisis, are examples of events that could lead to a more serious interest in large inter-basin transfers of Great Lakes water. Furthermore, climate changes could lead to some reduction in basin precipitation and increased consumptive uses that would further reduce net basin supplies.

With this in mind the Commission suggests that in planning for the future Governments develop policies that would provide adaptive mechanisms for dealing with change and the unexpected. The Commission believes that this process will be evolutionary in nature, similar to the process that has emerged in addressing the issue of Great Lakes water quality. In this regard the Commission expects Governments will engage in water quantity discussions well in advance of and separate from the formal review of the 1978 *Great Lakes Water Quality Agreement*, and the Commission supports these early initiatives. It may also be useful for Governments to incorporate as they deem appropriate the relevant observations and conclusions of this Report at the time of the review.

The Commission notes that several anticipatory initiatives have already been or are being undertaken by the Parties and jurisdictions in the Great Lakes basin. The Commission believes that all these discussions and studies are important and relevant and should be encouraged, for they are all clearly germane to the issue of the diversion and consumptive uses of Great Lakes basin water.

Recommendations

Based on the foregoing considerations and conclusions, the Commission's response includes the following recommendations, which the Commission believes will assist Governments in effectively addressing future considerations regarding the use of Great Lakes water:

1. Regarding the general aspects of diversions and consumptive uses –
 - a) Governments establish a bilateral data committee, separate from the Commission, to monitor all existing diversions and consumptive uses in the Great Lakes basin and publish data as appropriate, but no less frequently than biennially. This committee would also recommend appropriate additional research and monitoring efforts that would be necessary to develop the methodology and data to derive a more accurate estimate of existing consumptive uses in the Great Lakes basin. The committee's report should be made public.
 - b) Governments authorize the establishment of a bilateral task force on diversions and consumptive uses, either by a reference to the Commission or otherwise. The task force would be created periodically, but no less frequently than every five years, and would update previous consumptive use projections, assess the impacts of those projections, review the potential for new or changed diversions, and make appropriate rec-

ommendations. Governments should agree to consult on each task force report. The task force would use information from the bilateral data committee, as well as other sources, and would build on the existing methodology developed in each country. The task force should have available to it pertinent social, economic and demographic data both within and outside the Great Lakes basin context, but would likely need to concentrate initially on the principal water use sectors of power and manufacturing. Membership on each task force would be determined by the nature of the primary issues at that time.

- c) Governments institute a co-operative review of current public policies at the federal and state/provincial levels to identify those having an effect on consumptive uses and to examine any that appear to have a significant potential for reducing such use.
 - d) Governments, taking into account the existing and possible future diversion of water into the Great Lakes, consult on the status of waters so diverted.
2. Regarding existing and future small diversions, Governments institute surveys on both sides of the border to identify and quantify existing and proposed small diversions and establish a mechanism whereby information is made available to the bilateral data committee.
 3. Regarding the management of existing diversions to ameliorate high and low levels –
 - a) Governments not consider under present conditions the further management of Great Lakes levels and outflows through the manipulation of existing diversions.
 - b) Governments take steps to ensure that better coastal zone management practices are followed to help reduce flood and erosion damage along the Great Lakes shoreline.
 4. Regarding federally, state or provincially sponsored or approved new or changed diversions –
 - a) Governments resolve the questions discussed in Chapter III of this Report.
 - b) Governments engage in a process of notice and consultation before additional new or changed diversions are approved.
 5. Regarding the broad aspects of this report, federal, state and provincial governments undertake appropriate measures to inform the public of the results of this study and to initiate an educational effort directed toward better understanding of the nature and effect of consumptive uses.

CHAPTER V

RECOMMENDATIONS

The Commission believes the following recommendations will assist Governments in effectively addressing future considerations regarding the use of Great Lakes water. The Commission recommends a broad scope of information and assessment, frequently updated and including national and global trends, in a variety of key policy areas that could affect water use directly and indirectly. The Commission also believes the design and implementation of the necessary mechanisms for review, consultation and action should incorporate flexible decision-making criteria so that the rate and scope of change can be measured and handled in a way that might anticipate and thereby minimize conflict.

Based on these considerations, and in conjunction with the more detailed matters examined in this Report, the Commission's recommendations are as follows:

1. Regarding the general aspects of diversions and consumptive uses—
 - a) Governments establish a bilateral data committee, separate from the Commission, to monitor all existing diversions and consumptive uses in the Great Lakes basin and publish data as appropriate, but no less frequently than biennially. This committee would also recommend appropriate additional research and monitoring efforts that would be necessary to develop the methodology and data to derive a more accurate estimate of existing consumptive uses in the Great Lakes basin. The committee's report should be made public.
 - b) Governments authorize the establishment of a bilateral task force on diversions and consumptive uses, either by a reference to the Commission or otherwise. The task force would be created periodically, but no less frequently than every five years, and would update previous consumptive use projections, assess the impacts of those projections, review the potential for new or changed diversions, and make appropriate recommendations. Governments should agree to consult on each task force report. The task force would use information from the bilateral data committee, as well as other sources, and would build on the existing methodology developed in each country. The task force should have available to it pertinent social, economic and demographic data both within and outside the Great Lakes basin context, but would likely need to concentrate initially on the principal water use sectors of power and manufacturing. Membership on each task force would be determined by the nature of the primary issues at that time.
 - c) Governments institute a co-operative review of current public policies at the federal and state/provincial levels to identify those having an effect on consumptive uses and to examine any that appear to have a significant potential for reducing such use.
 - d) Governments, taking into account the existing and possible future diversion of water into the Great Lakes, consult on the status of waters so diverted.
2. Regarding existing and future small diversions, Governments institute surveys on both sides of the border to identify and quantify existing and proposed small diversions and establish a mechanism whereby information is made available to the bilateral data committee.
3. Regarding the management of existing diversions to ameliorate high and low levels—
 - a) Governments not consider under present conditions the further management of Great Lakes levels and outflows through the manipulation of existing diversions.
 - b) Governments take steps to ensure that better coastal zone management practices are followed to help reduce flood and erosion damage along the Great Lakes shoreline.
4. Regarding federally, state or provincially sponsored or approved new or changed diversions —
 - a) Governments resolve the questions discussed in Chapter III of this Report.
 - b) Governments engage in a process of notice and consultation before additional new or changed diversions are approved.
5. Regarding the broad aspects of this report, federal, state and provincial governments undertake appropriate measures to inform the public of the results of this study and to initiate an educational effort directed toward better understanding of the nature and effect of consumptive uses.

