

NEW INTERNATIONAL STUDIES ON GREAT LAKES LEVELS AND FLOWS

The material herein has been compiled to assist interested persons in becoming familiar with the nature and scope of studies to be undertaken by the International Joint Commission at the request of the governments of Canada and United States.



INTERNATIONAL JOINT COMMISSION
United States and Canada

Washington July 15, 1977 Ottawa



NEW INTERNATIONAL STUDIES ON GREAT LAKES LEVELS AND FLOWS

The United States and Canadian Governments have asked the International Joint Commission (IJC) to study further the possibilities of improving the management of levels and flows of the waters in the Great Lakes Basin System.

Under the Boundary Waters Treaty of 1909, which provides that the Governments may refer questions to the IJC for examination and report, two matters on the Great Lakes water system were forwarded to the Commission for study. They are:

- a. To determine the possibilities for limited regulation of Lake Erie and the consequent effects throughout the Great Lakes Basin:
- b. To examine the effects of existing and proposed diversions of water within, into, or out of the Great Lakes Basin; and the effects on Great Lakes' levels and flows from existing or reasonably foreseeable patterns of consumptive uses.

Having received the References from the Governments, the Commission has outlined its plans to fulfill the Governments' requests that IJC submit reports on the above matters no later than March 1, 1979. These are:

- 1. The appointment of two international boards of experts to make the necessary studies on which the Commission will base its final reports. A full roster of Board matters and their present affiliations is attached.
- 2. The release of directives to the Boards outlining the Boards' responsibilities and setting forth procedures and guidelines for the Boards to follow. The directives are also attached.
- 3. The holding of public hearings, if warranted, on the planning of these studies. The Commission believes that such hearings might assist it in organizing and carrying out its inquiries in a thorough and effective manner, with opportunity for participation by the general public and provincial, state, and local governments. If sufficient interest by the public is shown, hearings will be planned to take place at an early stage of the study.

Following the issuance of the Commission's directive to the Boards, each Board will prepare a Plan of Study for the Commission's approval. The plans will be disclosed to the public for comment.

4. The Commission is now making available the Reference letters from the Governments to the IJC, the IJC directives to the Boards, and some background material on limited regulation of Lake Erie, and on Great Lakes diversions and consumptive uses. All are attached.

The Commission invites all concerned interests to comment on the references and directives, and to submit any other relevant information that would be helpful to the Commission and Boards in the conduct of these studies. The Commission encourages the transmittal of comments so that it can determine whether the extent of public interest warrants public hearings at this stage.

On completion of the Boards' reports in 1978, public hearings will be held by the Commission to receive views on the reports. With the benefit of the Boards' technical reports and public review, the Commission will make its own reports to the Governments.

The International Joint Commission, a permanent bilateral group, composed of three Canadians appointed by the Governor-General in Council and three Americans appointed by the President, acts as a single body seeking common solutions in the joint interest and in accordance with the rules and principles of the Boundary Waters Treaty of 1909. Implementation of the IJC's recommendations depends on the decisions of the two Governments, usually after consultation. In the great majority of references to the Commission, its recommendations have been accepted by the Governments.

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THE NATURE OF THE PROBLEM

Because the Great Lakes offer aesthetic attractions in addition to power and transportation many settlements have developed on the banks of the rivers and on the shorelines of the lakes over the years. For a number of reasons many of these communities have failed to comprehend the threat inherent in the uncontrollable and unpredictable natural forces that dictate the behaviour of the Great Lakes System.

The levels of the Great Lakes are never constant. Wind and changes in precipitation cause large variations. Since man cannot influence these natural forces, he must live in harmony with them. A better and more detailed understanding of the natural factors that control the levels of the Great Lakes and the flows of their Connecting Channels is needed so that all can recognize the limitations of man's interventions.

The high degree of natural regulation that exists in the Great Lakes has created undue reliance on a stable regime of water levels and has dulled the realization that vagaries of nature, such as storms, flood and drought, will cause the levels to fluctuate. Since the irregular changes from extreme low to extreme high lake levels occur over a period seldom less than a decade, and often longer, it is not easy for the shoreline owner, with little knowledge of historic fluctuation, to recognize the changes that will inevitably occur in the future. There is unfortunately a tendency among individuals and governmental agencies to ignore or forget published records.

Those interests affected by the inevitable variations in the levels of the Great Lakes fall into four general categories: shore property, fish and wildlife, navigation and hydro-electric power. Shore property interests include port facilities, marinas, recreational developments, home and cottage properties, industry and municipal facilities. Shore property interests would generally benefit most by the stabilization of water levels and a reduction of the extremes of both high and low levels. Navigation is best served by higher lake levels while hydro-electric power interests prefer the maintenance of minimum flows as large as possible particularly during periods of high demands for power. Fish and wildlife interests are divided on stabilization of water levels. These divergent interests compound the difficulties associated with high and low water levels. The socio-economic effects caused by low levels, although less dramatic than the damage caused by storms during periods of high water levels, are also costly.

BACKGROUND

The References

In 1964, the governments of Canada and US asked the IJC to resolve a number of basic questions concerning the Great Lakes water levels. After a ten year (1964-1974) technical investigation by the Commission's International Great Lakes Levels Board and after 22 public hearings, and during which there were normal as well as extremely high and extremely low water levels in the Great Lakes Basin, the IJC released its report in June, 1976.

The Commission was asked to study first of all the various factors which affect the fluctuations of the lake levels and to determine whether the fluctuation is primarily a natural process or due to man's intervention. It determined that fluctuations are primarily caused by nature, although man's intervention has resulted in some modifications.

The second question posed to the Commission was whether it is practicable and in the public interest to further regulate the levels of the Great Lakes to bring about a more beneficial range of stage for the various interests using the Lakes.

Since the Great Lakes already possess a high degree of natural regulation, the Commission concluded that only a limited reduction in the range of water levels is practical. Major reductions in fluctuation in any one lake would result in much wider variations in outflows and would necessitate extremely costly regulatory works and remedial measures and could cause serious effects upstream and downstream.

A wide array of possible regulation plans were examined. These ranged from doing nothing to mobilizing a vast amount of international technological skills and construction resources to achieve more complete control of the levels and flows in all the Great Lakes. The report described the Commission's investigation into the feasibility of additional but limited regulation involving consideration of regulation plans for all five lakes; a four-lake regulation plan (all but Erie); a three-lake plan for Lakes Superior, Erie and Ontario; and a two-lake regulation plan for Lakes Superior and Ontario. These plans encompass the beneficial and adverse effects of regulation control and the attendant economics.

The Commission concluded that protection from high and low water levels cannot be achieved from lake regulation alone. Protection is best derived from systematic management using all of the tools available. These tools include not only lake regulation but also encompass careful planning of residential, recreational and industrial activities along the shoreline to assure wise use of vulnerable areas.

To assist in the expansion of knowledge to reduce fluctuations, the Commission recommended that it be authorized to study and determine: environmental and other effects of limited regulation of Lake Erie; the effects of existing or new diversions into or out of the Great Lakes Basin; the effect of future consumptive use of water on Great Lakes levels and flows.

In response to the Commission's recommendations, the governments of Canada and the United States on February 21, 1977, requested the International Joint Commission to undertake the recommended studies. Two letters, identified as "the References", which detail the requests follow:

The Secretary of State
for External affairs

Secrétaire d'Etat
aux Affaires extérieures

Ottawa, Ontario
K1A 0G2
February 21, 1977

Dear Mr. Chance,

I have the honour to inform you that the Governments of Canada and the United States have agreed, pursuant to Article IX of the Boundary Waters Treaty of 1909, and in light of the first recommendation contained in the International Joint Commission's report of May 7, 1976, entitled "Further Regulation of the Great Lakes", prepared under an October 7, 1964 Reference from Governments, to request the Commission to undertake a study to determine the possibilities for limited regulation of Lake Erie, taking into account the applicable orders of approval of the Commission and the recommendations of the Canada-Quebec study of flow regulation in the Montreal region. In particular, this study should examine into and report upon the effects of such limited regulation with respect to:

- (a) Domestic water supply and sanitation;
- (b) Navigation;
- (c) Water supply for power generation and industrial purposes;
- (d) Agriculture;
- (e) Shore property, both public and private;
- (f) Flood control;
- (g) Fish and wildlife, and other environmental aspects;
- (h) Public recreation; and
- (i) Such other effects and implications which the Commission may deem appropriate and relevant.

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Mr. D. G. Chance
Secretary, Canadian Section
International Joint Commission
Suite 850, Burnside Building
151 Slater Street
OTTAWA, Ontario

The Commission, consistent with the principle of systemic regulation of the Great Lakes, which is endorsed by the two Governments, should consider such effects in light of anticipated impacts throughout the Basin, including the international and Canadian reaches of the St Lawrence River.

In the event that the Commission should find that new or altered works or other measures examined pursuant to this Reference would be economically and environmentally practicable in light of the above stated considerations, it shall estimate the costs of such works or measures and indicate how the various interests on either side of the boundary would be benefited or adversely affected thereby. The Commission shall likewise consider the need for remedial or compensating works, or non-structural approaches, to protect interests potentially adversely affected by the proposed regulatory works or measures, and the approximate costs thereof. The Commission shall further consider as appropriate how such costs might be apportioned between the two Governments or concerned interests in each country.

In the conduct of its investigation and the preparation of its report, the Commission shall make use of information and technical data heretofore available or which may become available in either country during the course of its investigation. In addition, the Commission shall seek the assistance, as required, of specially qualified personnel in Canada and the United States. The Governments shall make available or, as necessary, seek the appropriation of the funds required to provide the Commission promptly with the resources needed to discharge the obligations under this Reference fully within the specified time period. The Commission shall develop as early as practicable cost projections for the studies under reference for the information of Governments.

The Governments request that the Commission, upon the availability of adequate funding, proceed with these studies as expeditiously as practicable and report to Governments no later than March 1, 1979.

An identical letter is being sent to the Secretary of the United States Section of the Commission by the United States Department of State.

Yours sincerely,

Don Jamieson

The Secretary of State
for External Affairs

Secrétaire d'Etat
aux Affaires exterieures

Ottawa, Ontario
K1A 0G2
February 21, 1977

Dear Mr. Chance,

I have the honor to inform you that the Governments of Canada and the United States have agreed, pursuant to Article IX of the Boundary Waters Treaty of 1909, and in light of the second recommendation contained in the International Joint Commission's report entitled "Further Regulation of the Great Lakes", in response to the October 7, 1964 Reference from Governments, to request the Commission to examine into and report upon the effects of existing and proposed diversions within, into or out of the Great Lakes Basin, and the effects of consumptive uses on Great Lakes water levels and flows.

The Governments are concerned about the increasing demand for water to meet the needs of domestic and municipal supply and sanitation, navigation, industry, power generation, irrigation and other such uses, which will have increasingly significant socioeconomic and environmental impact on all interests in the Great Lakes Basin.

During periods of extreme lake levels, attention in both countries has focused on the nature and effects of the various diversions within, into and out of the Basin. The Governments consider further study of these important hydrological features important in the context of the Commission's on-going efforts to promote a greater understanding of the Great Lakes system and to investigate possibilities of enhanced levels regulation consistent with the conclusions of the Commission's Report.

In light of the foregoing, and with reference to the following specific criteria:

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- (a) Domestic water supply and sanitation;
- (b) Navigation;
- (c) Water supply for power generation and industrial purposes;
- (d) Agriculture;
- (e) Shore property, both public and private;
- (f) Flood control;
- (g) Fish and wildlife, and other environmental aspects;
- (h) Public recreation; and
- (i) Such other effects and implications which the Commission may deem appropriate and relevant,

the Commission is requested to examine into and report upon the following matters which have, or may have, material effects on water levels and flows of the Basin, including the international and Canadian reaches of the St Lawrence River:

1. Existing and reasonably foreseeable patterns of consumptive uses of Great Lakes waters;
2. Existing diversions, including the Welland Canal and the New York State Barge Canal, and federally, state or provincially sponsored or approved proposed new or changed diversions, within, into or out of the Basin; and, in particular,
3. Existing diversions at Chicago and at Long Lac/Ogoki, and the proposed study and demonstration program authorized by United States P.L. 94-587 affecting the rate of diversion at Chicago.

The Commission, upon the availability of adequate funding, should proceed with the above studies as expeditiously as practicable, and report to Governments by March 1, 1979, and on an interim basis if deemed appropriate.

In the conduct of its investigation and the preparation of its report, the Commission shall make use of information and technical data heretofore available or which may become available in either country during the course of its investigations. In addition, the Commission shall seek the assistance, as required, of specially qualified personnel in Canada and the United States. The Governments shall make available or, as necessary, seek the appropriation of the funds required to provide the Commission promptly with the resources needed to discharge the obligations under this Reference fully within the specified time period. The Commission shall develop as early as practicable cost projections for the studies under reference for the information of Governments.

An identical letter is being sent to the Secretary of the United States Section of the Commission by the United States Department of State.

Yours sincerely,

Don Jamieson

BACKGROUND (Cont'd)

Limited Regulation of Lake Erie

SEO Plans - Three approaches to the coordinated regulation of Lakes Superior, Erie and Ontario were investigated by the Commission's International Great Lakes Levels Board. The first involved regulation of Lake Erie with channel enlargements and a control structure in the upper Niagara River. The second involved channel enlargement only in the upper Niagara River while the third approach involved increasing the outflows from Lake Erie during periods of above-average supply by diverting additional outflow through the Welland Canal, the New York State Barge Canal or the Black Rock Canal.

The Black Rock Canal diversion was chosen as the most promising. In this scheme, a diversion channel through Squaw Island with a gate mechanism to control flow would permit increased flows to bypass the shallows section in the Upper Niagara River which naturally controls the outflows from the Lake. The plans prepared by the Board to represent the three approaches in numerical order are: Plan SEO-33 in the river, a control structure combined with dredging; Plan SEO-901, with only river channel enlargement; and Plan SEO-42P, utilizing a controlled diversion through Squaw Island. Plan SEO-42P is a trial plan representative of a concept, not a refined plan.

In response to a request from IJC, the US Corps of Engineers prepared a refined adaptation of the Squaw Island diversion plan, coded as SEO-17P, and presented it at a public hearing in Cleveland in 1974.

For additional background information on limited regulation of Lake Erie, see "Further Regulation of the Great Lakes" (IJC, 1976) pages 37-48.

BACKGROUND (Coned)

Diversions and Consumptive Uses

Consumptive water uses affect the water supply to the Great Lakes just as diversions into or out of the Basins do. Diversions must be studied in regard to their efficacy in lowering high levels and raising low levels without undue harm to power and navigation interests, shore property interests, and fish and wildlife.

Existing or New Diversions - Works constructed by man have transferred a limited amount of water into and out of the Great Lakes Basin. The Ogoki and Long Lac Diversions slightly increase the natural supplies to Lake Superior, while the Chicago Diversion slightly reduces the water supply to Lakes Michigan and Huron.

They only affect the water levels of Lakes Michigan, Huron and Erie because the Lake Superior and Lake Ontario regulation plans take account of these constant diversions. The Welland Canal through which some of the outflow from Lake Erie bypasses the Niagara River, slightly lowers the levels of the unregulated lakes. The New York State Barge Canal diversion, withdrawn from the Niagara River, has virtually no effect on the lakes.

The operation of the present Long Lac and Ogoki Diversions commenced in 1939 and 1943, respectively. They divert water into the Lake Superior Basin from the Albany River Basin, which under natural conditions would flow into the Hudson Bay. The sum of these diversions has averaged about 5400 cfs. This amount represents seven percent of the average outflow from Lake Superior and two and one-half percent of the outflow from Lake Erie. During the early years of World War II, the United States agreed that Canada could utilize 5000 cfs of the water diverted from the Albany Basin at Niagara Falls. The notes exchanged between the two Governments in 1940 concerning this subject were confirmed in Article III of the Niagara Treaty of 1950.

The Long Lac Diversion consists of a concrete overflow dam on the Kenogami River which diverts the natural flow into Long Lac. From there it flows through a five-mile channel built across the continental divide to convey the water from Long Lac to the Aguasabon River, a tributary to Lake Superior. There is a concrete regulating dam at the south end of this channel. Since 1940 an average of 1400 cfs has been diverted into Lake Superior. The remainder of the

water supply to Long Lac has been spilled down the Kenogami River to Hudson Bay. The diverted water is used to generate electricity at a power plant near the mouth of the Aguasabon River.

The Ogoki Diversion transfers water from the Ogoki River into Lake Nipigon which is within the Lake Superior Basin. It augments the natural water supply to Lake Nipigon. Waboose Dam on the Ogoki River raises the water level so that most of the flow is redirected across the summit, through a chain of small lakes to Little Jackfish River, and thence into Lake Nipigon. A dam at the summit controls the amount of water that is diverted. The diversion has varied from zero to 16,000 cfs with a long term average of 4000 cfs. For various reasons, the diversion has been closed or reduced over 25 times since it began operation in 1943.

Lake Nipigon has a water surface area of 1740 square miles and a prescribed operating range of nearly seven feet. The average local inflow into Lake Nipigon, excluding the diversion is 8900 cfs. The outflow is controlled by a powerhouse at Pine Portage, the upper most of three hydro-electric plants on the Nipigon River. A minimum outflow of 8000 cfs is required so that the Town of Nipigon, located on a wide reach of the Nipigon River, can obtain its water supply. Flows in excess of 20,000 cfs endanger the railway and highway bridges at Nipigon.

During the high water period of 1951-53, Ontario Hydro voluntarily reduced the quantity of water diverted from the Ogoki River. For several months in each of those years diversions were stopped. Ontario Hydro again reduced diversions during the high water supply period of 1972-74. The outflow from Lake Nipigon was limited to its natural local inflow. All of the water diverted from the Ogoki River was stored in Lake Nipigon to be released to Lake Superior at a later date. When its level reached the upper limit in 1974, the diversion from the Ogoki was stopped. An average of 13,000 cfs was directed to the north for three months.

The Chicago Diversion has transferred water from Lake Michigan into the Mississippi River Basin since 1848. Water is diverted at three locations: at Wilmette through the North Shore Channel into the north branch of the Chicago River; at Chicago through the Chicago River which is closed by a lock to prevent flow from the River entering Lake Michigan; and at Calumet Harbour through the Calumet River and the channel into the Sanitary and Ship Canal. The primary purpose of the diversion is to dilute the sewage effluent of the Chicago Sanitary District and divert it into the Mississippi River Basin.

The Chicago Sanitary and Ship Canal is also used for navigation. The diverted water is used by hydro-electric plants at Lockport and Marseilles, Illinois.

Effective March 1, 1970, by a decree of the United States Supreme Court dated June 12, 1967, the maximum allowable diversion for Lake Michigan at Chicago is 3200 cfs, including domestic pumpage.

The original eight-foot Welland Canal was opened in 1829. It was the first complete navigable link between Lakes Erie and Ontario. Since then the canal has undergone several enlargements. The Welland Canal connects Lake Erie at Port Colborne, Ontario about 18 miles west of the head of the Niagara River, with Lake Ontario at Port Weller, Ontario. It presently diverts an average of 7000 cfs for navigation and for generation of power at DeCew Falls Power Plant on the Niagara Escarpment. By increasing the natural discharge from Lake Erie, the Welland Canal has lowered the water level of Lake Erie and slightly lowered the levels of Lakes Michigan and Huron.

The New York State Barge Canal system diverts water from the Niagara River at Tonawanda, New York. The average diversion is about 700 cfs. Its primary use is for the operation of the Erie Canal. The water is ultimately discharged into Lake Ontario through several tributary streams as far east as Oswego, New York.

Consumptive Use - Consumptive use is that portion of the water, withdrawn or withheld from the Great Lakes Basin, and not returned to it. Consumptive use includes water used by crops through irrigation, incorporated into manufactured products, lost by industrial processes and thermal power generation.

The consumptive use of water in any one lake basin not only reduces the net water supply to that lake, but also reduces the water supply to all the downstream lakes. Consumptive use of water is a direct result of increased evaporation and transpiration.

Water is needed for the production of thermal power. Of an estimated withdrawal of 33,700 cfs for cooling purposes, approximately 180 cfs is lost by evaporation. The consumptive use for irrigation is about 145 cfs. Industry withdraws about 16,500 cfs and consumptively uses 660 cfs. Withdrawal of water for municipal and rural use is about 7700 cfs. All but 1285 cfs is returned to the Great Lakes. The total present consumptive use of water in the Great Lakes Basin is estimated to be 2770 cfs. It is expected that the consumptive use of water will rise to

6000 cfs in the year 2000 and to 13,000 cfs by the year 2030. This will lower the levels of all the Great Lakes.

For additional background information on diversions and consumptive uses, see "Further Regulation of the Great Lakes" (IJC, 1976), pages 22,23. This publication is available for inspection at public and university libraries in the Great Lakes area and at the offices of the International Joint Commission.

THE DIRECTIVES TO THE NEW BOARDS

Having formed an International Lake Erie Regulation Study Board and an International Great Lakes Diversions and Consumptive Uses Study Board to assist in the requested studies, the International Joint Commission issued the following directives outlining responsibilities and procedures for the Boards' guidance.

The directives are as follows:

**INTERNATIONAL JOINT COMMISSION
DIRECTIVE TO THE
INTERNATIONAL LAKE ERIE REGULATION STUDY BOARD**

1. The Governments of the United States and Canada have forwarded the attached Reference, dated February 21, 1977, to the Commission for examination and report pursuant to Article IX of the Boundary Waters Treaty of 1909.

2. The Commission established the International Lake Erie Regulation Study Board on May 3, 1977, to undertake, through appropriate governmental or other agencies in the United States and Canada, the necessary investigations and studies and to advise the Commission on all matters which it must consider in making its reports to Governments under the attached Reference.

3. The Board shall undertake a study to determine possibilities for limited regulation of Lake Erie, taking into account the applicable Orders of Approval of the Commission and the recommendations of the Canada-Quebec study of flow regulation in the Montreal region. Consistent with the principle of systemic regulation of the Great Lakes, the study should include an examination of the effects throughout the Great Lakes Basin, including the international and Canadian reaches of the St Lawrence River, of such limited regulation on:
 - (a) Domestic water supply and sanitation;
 - (b) Navigation;
 - (c) Water supply for power generation and industrial purposes;
 - (d) Agriculture;
 - (e) Shore property, both public and private;
 - (f) Flood control;
 - (g) Fish and wildlife, and other environmental aspects;
 - (h) Public recreation; and
 - (i) Such other effects and implications which the Commission may deem appropriate and relevant.

4. If the Board finds that new or altered works or other measures examined in the course of this study would be economically and environmentally practicable in light of the consideration set forth in paragraph 3 above, it shall estimate the costs of such works or measures and indicate how the various interests on either side of the boundary would be benefited or adversely affected thereby. The Board shall likewise consider the need for remedial or compensating works, or non-structural approaches, to protect interests potentially adversely affected thereby. The Board shall likewise consider the need for remedial or compensating

works, or non-structural approaches, to protect interests potentially adversely affected by any proposed regulatory works or measures, and the approximately costs thereof. The Board shall also consider as appropriate how such costs might be apportioned between the two Governments or concerned interests in each country.

5. The study should include consideration of works or other measures which might be required in the international and Canadian reaches of the St Lawrence River to accommodate flows resulting from limited regulation of Lake Erie.

6. The Board shall prepare and submit for Commission approval by July 22, 1977, a plan of study for the investigations that it proposes to undertake, and a schedule of the estimated time and costs involved in the completion of each of the necessary phases of the study and submission of a final report to the Commission. In preparing its plan of study, the Board should be guided by the following considerations:

- a) Provision should be made for the investigation of all environmental impacts of limited regulation of Lake Erie,
- b) The Board shall act as a unitary body, carrying out its investigations jointly in both countries as a coordinated and integrated effort, and
- c) Provision should be made, where appropriate, for public information and participation throughout the course of the study.

7. The Board shall carry out the programs in accordance with the plan of study approved by the Commission. If it appears to the Board at any time in the course of its investigations and studies that the programs should be modified, it shall so advise the Commission and request instructions.

8. The Board shall submit its final report and appendices, if any, in the necessary quantity for public distribution, to the Commission no later than September 1, 1978.

9. In the conduct of its investigation and in the preparation of its report or reports, the Board should make use of information and technical data heretofore available, or which may become available during the course of the investigation. The Board's attention is specifically drawn to the Final Report of the International Great Lakes Levels Board, the report of the US Army Corps of Engineers on Plan SEO 17P and the report of the International Joint Commission on Further Regulation of the Great Lakes.

10. The Board will consist of a United States Section and a Canadian Section, each having four (4) members. The Commission will appoint one member of each Section to be Chairman of that Section. At the request of any member, the Commission may approve in each case an alternate member to act in the place and stead of such member whenever the said member, for any exceptional reason, is not available to act as a member of the Board.

11. Members of the Board, and of its committees and working groups, whether or not employed by departments or agencies of government, are not representatives of their employers. They serve in a personal and professional capacity under the direction of the Commission, and their employers or superior officers are not committed in any way by the actions of the individual members or of the Board.

12. The Chairmen of the two Sections shall be joint Chairmen of the Board and shall be responsible for maintaining proper liaison between the Board and the Commission and between their respective sections of the Board and the corresponding sections of the Commission.

13. Each Chairman shall ensure that the other members of his Section of the Board are informed of all instructions, inquiries and authorizations received from the Commission; also of activities undertaken by or on behalf of the Board, progress made and any developments affecting such progress.

14. A Chairman, after consulting the other members of his Section of the Board, may appoint a Secretary of that Section and a Public Information Officer of that Section. Under the general supervision of the Chairman, these individuals shall carry out such duties as are assigned to him by the Section.

15. The Board may establish such committees and working groups as may be required to discharge its responsibilities effectively and may enlist the cooperation of federal, provincial or state departments or agencies in the United States and Canada. The duties and composition of any such committees shall be subject to prior approval by the Commission. The Board should consider and advise the Commission whether it would be desirable to appoint a coordinator to assist the Board in its investigation in view of the severe time constraints imposed on the study. Board and Committee members will make their own arrangements for reimbursement of necessary expenditures for travel.

16. The Board shall maintain liaison with the International Great Lakes Diversions and Consumptive Uses Study Board, the International Lake Superior Board of Control, the International Niagara Board of Control and the International St Lawrence River Board of Control so that each may be aware of any activities of the other Boards which may be useful to it or may have a bearing on its activities.

17. The Chairmen shall keep the Commission currently informed of the Board's plans and progress and of any developments, actual or anticipated, which are likely to impede, delay or otherwise affect the carrying out of the Board's responsibilities.

18. The Chairmen shall submit, at least semi-annually and more often if necessary, reports to the Commission describing the progress that has been made and any problems that have arisen in the investigation. All such reports shall be sent to the Secretaries of the Commission. Regular semi-annual reports should be submitted at least two weeks prior to the Commission's April and October meetings.

19. If, in the opinion of the Board, there is a lack of clarity or precision in any instruction, directive or authorization received from the Commission, the matter shall be referred promptly to the Commission for appropriate action.

20. Documents, letters, memoranda and communications of every kind in the official records of the Commission are privileged and become available for public information only after release by the Commission. The Commission considers all documents in the official records of the Board or of any of its committees to be similarly privileged. Accordingly, all such documents shall be so identified and maintained in separate files. They shall become available for public information only after Commission approval.

21. In its dealing with the public and the news media, the Board shall observe the principles of the attached documents on Public Relations Policy dated 27 July 1973 and 20 September 1974 of the Commission as supplemented by the provisions of the study plan of the Board when approved by the Commission.

10 May 1977

William A. Bullard

David G. Chance

Joint Secretaries
International Joint Commission

INTERNATIONAL JOINT COMMISSION
DIRECTIVE TO THE

**INTERNATIONAL GREAT LAKES DIVERSIONS AND CONSUMPTIVE
USES STUDY BOARD**

1. The Governments of the United States and Canada have forwarded the attached Reference, dated February 21, 1977, to the Commission for examination and report pursuant to Article IX of the Boundary Waters Treaty of 1909.

2. The Commission established the International Great Lakes Diversions and Uses Study Board on May 3, 1977, to undertake, through appropriate governmental or other agencies in the United States and Canada, the necessary investigations and studies and to advise the Commission on all matters which it must consider in making its reports to Governments under the attached Reference.

3. The Board shall undertake an investigation of the following matters which have, or may have, material effects on water levels and flows in the Great Lakes Basin, including the international and Canadian reaches of the St Lawrence River:

- (a) existing and reasonably foreseeable patterns of consumptive uses of Great Lakes waters;
- (b) existing diversions, including Welland Canal and the New York State Barge Canal, and federal, state or provincially sponsored or approved proposed new or changed diversions, within, into or out of the basin, and in particular;
- (c) existing diversions at Chicago and at Long Lac/ Ogoki, and the proposed study and demonstration program authorized by United States P.L. 94-587 affecting the rate of diversion at Chicago.

In conducting this investigation, the Board shall examine the effects of the above on:

- (a) domestic water supply and sanitation;
- (b) navigation;
- (c) water supply for power generation and industrial purposes;
- (d) agriculture;
- (e) shore property, both public and private;
- (f) flood control;
- (g) fish and wildlife, and other environmental aspects;

- (h) public recreation; and
- (i) such other matters as the Commission may indicate to the Board during the course of the study.

4. In its studies the Board should note the concerns of the Governments expressed in the Reference about the increasing demand for water to meet the needs of domestic and municipal supply and sanitation, navigation, industry, power generation, irrigation and other such uses, which will have increasingly significant socio-economic and environmental impact on all interests in the Great Lakes Basin.

5. The Board should in particular assess the effects of varying the rate of existing diversions during periods of extreme levels on the Great Lakes.

6. The Board shall prepare and submit for Commission approval by July 22, 1977, a plan of study for the investigations that it proposes to undertake, and a schedule of the estimated time and costs involved in the completion of each of the necessary phases of the study and submission of a final report to the Commission. In preparing its plan of study, the Board should be guided by the following considerations:

- (a) Provision should be made for the investigation of all environmental impacts of the matters under investigation as described in paragraphs 3, 4 and 5 of this directive,
- (b) The Board shall act as a unitary body, carrying out its investigations jointly in both countries as a coordinated and integrated effort, and
- (c) Provision should be made, where appropriate, for public information and participation throughout the course of the study.

7. The Board shall carry out the programs in accordance with the plan of study approved by the Commission. If it appears to the Board at any time in the course of its investigations and studies that the programs should be modified, it shall so advise the Commission and request instructions.

8. The Board shall submit its final report, and appendices, if any, in the necessary quantity for public distribution, to the Commission no later than September 1, 1978.

9. In the conduct of its investigation and in the preparation of its report or reports, the Board should make use of information and technical data heretofore available, or which may become available during the course of the investigation. The Board's attention is specifically

drawn to the Final Report of the International Great Lakes Levels Board, and the Report of the International Joint Commission on Further Regulation of the Great Lakes.

10. The Board will consist of a United States Section and a Canadian Section, each having five (5) members. The Commission will appoint one member of each Section to be Chairman of that Section. At the request of any member, the Commission may approve in each case an alternate member to act in the place and stead of such member whenever the said member, for any exceptional reason, is not available to act as a member of the Board.

11. Members of the Board, and of its committees and working groups, whether or not employed by departments or agencies of government, are not representatives of their employers. They serve in a personal and professional capacity under the direction of the Commission, and their employers or superior officers are not committed in any way by the actions of the individual members of the Board.

12. The Chairmen of the two Sections shall be joint Chairmen of the Board and shall be responsible for maintaining proper liaison between the Board and the Commission and between their respective sections of the Board and the corresponding sections of the Commission.

13. Each Chairman shall ensure that the other members of his Section of the Board are informed of all instructions, inquiries and authorizations received from the Commission; also of activities undertaken by or on behalf of the Board, progress made and any developments affecting such progress.

14. A Chairman, after consulting the other members of his Section of the Board, may appoint a Secretary of that Section and a Public Information Officer of that Section. Under the general supervision of the Chairman, these individuals shall carry out such duties as are assigned to them by the Section.

15. The Board may establish such committees and working groups as may be required to discharge its responsibilities effectively and may enlist the cooperation of federal, provincial or state departments or agencies in the United States and Canada. The duties and composition of any such committees shall be subject to prior approval by the Commission. The Board should consider and advise the Commission whether it would be desirable to appoint a coordinator to assist the Board in its investigation in view of the severe time constraints imposed on the study. Board and Committee members will make their own arrangements for reimbursement of necessary expenditures for travel.

16. The Board shall maintain liaison with the International Lake Erie Regulation Study Board, the International Lake Superior Board of Control, the International Niagara Board of Control and the International St Lawrence River Board of Control, so that each may be aware of any activities of the other Boards which may be useful to it or may have a bearing on its activities.

17. The Chairmen shall keep the Commission currently informed of the Board's plans and progress and of any developments, actual or anticipated, which are likely to impede, delay or otherwise affect the carrying out of the Board's responsibilities.

18. The Chairmen shall submit, at least semi-annually and more often if necessary, reports to the Commission describing the progress that has been made and any problems that have arisen in the investigation. All such reports shall be sent to the Secretaries of the Commission. Regular semi-annual reports should be submitted at least two weeks prior to the Commission's April and October meetings.

19. If, in the opinion of the Board, there is a lack of clarity or precision in any instruction, directive or authorization received from the Commission, the matter shall be referred promptly to the Commission for appropriate action.

20. Documents, letters, memoranda and communications of every kind in the official records of the Commission are privileged and become available for public information only after release by the Commission. The Commission considers all documents in the official records of the Board or of any of its committees to be similarly privileged. Accordingly, all such documents shall be so identified and maintained in separate files. They shall become available for public information only after Commission approval.

21. In its dealing with the public and the news media, the Board shall observe the principles of the attached documents on Public Relations Policy dated 27 July 1973 and 20 September 1974 of the Commission as supplemented by the provisions of the study plan of the Board when approved by the Commission.

Issued this 10 May 1977

William A. Bullard

David G. Chance

Joint Secretaries
International Joint Commission