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Great Lakes Update

Upper Lakes Plan of Study Revisited

The International Joint Commission (IJC) has decided to revise its plan for an Upper Great Lakes Study. The plan was submitted to the U.S. and Canadian governments in 2002, but the study has not been initiated due to lack of funding. The purpose of the study is to review Lake Superior outflow regulation and how it might be improved to meet the needs of the affected interests in the upper Great Lakes system from Lake Superior downstream through Lake Erie.

While this original intent of the Study has not changed, two recent events have led to the necessity to revise the study plan. The first issue is that of possible ongoing physical changes in the upper St. Clair River, which could impact water levels on the upstream lakes (Michigan and Huron) and downstream lakes (St. Clair and Erie). Secondly, the Lake Ontario – St. Lawrence River Study is nearing completion and it is expected that lessons learned from this multi-year comprehensive study can be applied to the revision of the study plan.

This article will review some of the history and background on Lake Superior outflow regulation, discuss the International Lake Superior Board of Control, provide insight into the revisions for the Upper Lakes Plan of Study, and provide you with some ways you can have input.

History and Background on Lake Superior Outflow Regulation

Water flows out of Lake Superior into Lake Huron through the 63 mile-long St. Marys River. The river falls about 20 feet in a distance of 0.75 miles as it passes through the St. Marys Rapids near the cities of Sault Ste. Marie, Michigan and Ontario. See Figure 1 for an aerial view of the St. Marys River and Rapids area.

Figure 1: Aerial View of St. Marys River/Rapids Area

Since 1797, when the first lock was built to allow boats to bypass these rapids, the St. Marys River has undergone many physical changes to both harness its energy and to allow the passage of vessels. Over the years, the construction of three hydropower plants, five navigation locks and a 1,000-foot long dam with sixteen vertical lift gates have made it possible to regulate the flow in the river and thus the outflow from Lake Superior.

The dam, known as the Compensating Works, is owned half by Canada and half by the U.S. government. The release of water from Lake Superior through the various structures has been completely regulated since 1921. The Fishery Remedial Works, a 2,800-foot long dike, constructed in 1985, is designed to retain a sufficient flow of water along the south bank of Whitefish Island to approximate the previous natural conditions in that area of the rapids.

International Lake Superior Board of Control

The Boundary Waters Treaty of 1909 gives the IJC certain authorities, one of which is to approve construction and operation of works that affect boundary water levels and flows. In its 1914 Orders of Approval, which allowed increased hydropower development in the St. Marys River and established the basic objectives for and limits to the regulation of Lake Superior's outflow, the IJC acknowledged the needs of various interest groups on Lake Superior and the St. Marys River, including navigation, hydropower and riparian owners.

The 1914 Orders also established the International Lake Superior Board of Control. This Board oversees the operation and maintenance of the Compensating Works, power canals, and all appurtenances on the St. Marys River at Sault Ste. Marie, Michigan and Ontario. The Board also specifies the Lake Superior outflow each month in accordance with the objectives and criteria of the IJC's Orders of Approval. The Board has two members, one each from Canada and the United States. Each section has a Secretary, Regulation Representative and On-Site Representative to assist in carrying out Board directives.

Since 1978, the IJC has issued several supplements to the original Orders of Approval. The Orders currently in effect require that the levels of both Lake Superior and Lakes Michigan and Huron be considered when determining the outflow from Lake Superior. There is also a requirement to provide water flow for the fishery habitat in the rapids.

Since 1916, seven different regulation plans have been used to determine Lake Superior outflows. Each of these plans has adhered to the operating conditions contained in the IJC's Orders. The main objective of the present regulation plan, Plan 1977-A, is the determination of flows that will bring the levels of Lake Superior and Lakes Michigan and Huron to nearly the same relative position within their respective ranges of actual historic levels. This is shown graphically in Figure 2.

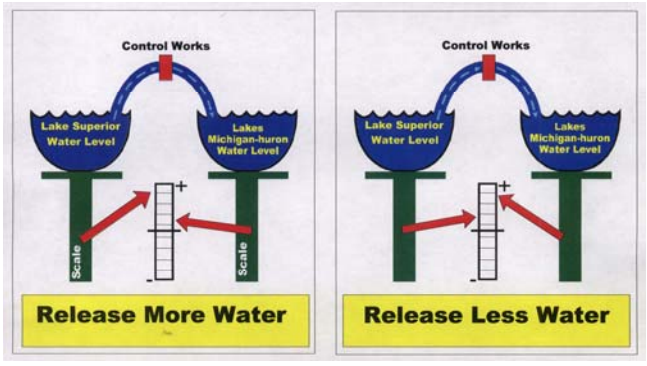

Figure 2: Regulation Plan 1977-A Water Level Balancing

At the same time, the plan tries to prevent the level of Lake Superior from rising above or falling below certain water levels specified in the Orders. The plan also contains provisions to safeguard against high levels in the harbor below the locks, provides for a minimum release, limits winter flows, and employs a forecast of future water supply conditions. Maximum allowable

outflows specified in the regulation plan, and the use of ice booms in the critical part of the river, are designed to reduce the risk of ice jams in the winter.

The ability to regulate the outflows from Lake Superior does not mean that full control of lake levels is possible. This is because the major factors affecting the water supply to the Great Lakes – over-lake precipitation, evaporation and runoff – cannot be controlled; neither can they be accurately predicted over the long term.

The regulated release of water from Lake Superior is made through the various structures located on the St. Marys River. The allocation of flow to these facilities is determined monthly, based on the outflow specified by the regulation plan and the conditions given in the Orders of Approval. The available water is allocated for domestic water supply, navigation through the locks, fish habitat in the rapids and hydropower production. The water available for hydropower is split 50/50 between the U.S. and Canadian hydropower plants. If the outflow determined by the regulation plan exceeds these needs, additional gates are opened at the Compensating Works to allow passage of the total specified outflow.

Upper Lakes Plan of Study Revision

In May this year, the IJC appointed an Upper Lakes Plan of Study Revision Team. The revision will retain the original principal purpose of the study which is to (1) review the operation of the structures controlling the outflows from Lake Superior in the light of the impacts of those operations on water levels, flows, and consequently affected interests in the Upper Great Lakes system from Lake Superior downstream through Lake Erie, including the environment; (2) assess whether changes to the Orders or regulation plan are warranted to meet contemporary and emerging needs, interests and preferences for managing the system in a sustainable manner, including under climate change scenarios; and (3) evaluate any options identified to improve the operating rules and criteria governing Lake Superior outflow regulation.

There are two additional tasks to be included: (1) to identify studies that would be necessary to examine physical processes and possible ongoing changes in the St. Clair River channel and impacts on levels of the upper Great Lakes, and (2) to incorporate lessons learned from the Lake Ontario – St. Lawrence River Study which is now near completion. Similar to the original plan of study, the revised plan will describe the study tasks (and their costs) that would be needed.

The study area is quite large, encompassing the upper Great Lakes, from Lake Superior through Lake Michigan and Huron to Lake Erie. Due to the large geographic area of the study, shown in Figure 3, it will be time and cost prohibitive to collect large amounts of new data for interest impact analyses. The study will need to rely on as much existing data and studies as possible, which can be applied to a streamlined evaluation methodology.

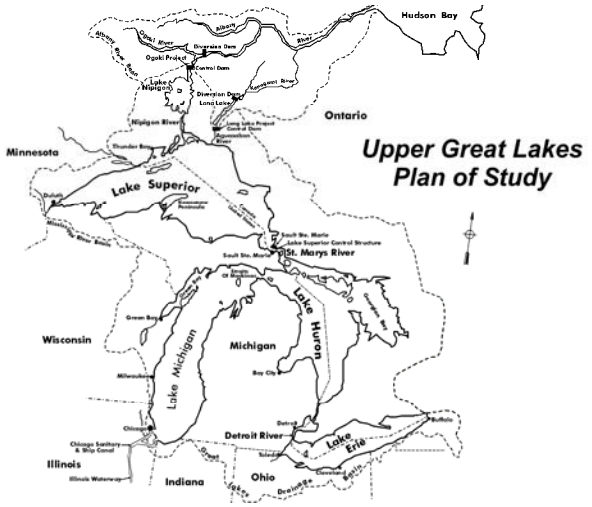

Figure 3: Geographic Extent of the Upper Lakes Study

The revision also assumes that there would be no changes to the Treaties and other bilateral agreements between Canada and the United States. Issues to be addressed will include

climate change and variability, future land use and basin changes, environment/ecosystem, diversions, connecting channel hydraulic changes, hydropower, commercial navigation, recreational boating and tourism, municipal/ industrial/domestic water use, and coastal zone.

The revised approach will include an early phase to focus on assessing the opportunities and limitations of Lake Superior outflow regulation. This would lead to a determination of the maximum impact achievable on water levels and river flows. This knowledge will help determine the necessity for further studies of specific interest groups based on the levels of impact.

Also part of the early phase would be studies to assess the physical processes and possible ongoing changes in the St. Clair River. Figure 4 shows the area where Lake Huron ends and the St. Clair River begins. Studies would include evaluation of: basic data sets; diversions and consumptive uses; hydrology and net basin/total supplies; impacts of glacial isostatic adjustment; and, a thorough review of the discharge characteristics of the system. The outcomes of these studies will also be used as input to identify and assess changes to Lake Superior regulation plans. Recommendations may be made that identify either alternative physical mitigation works to alleviate the impacts of any changes found, or the regulation plan would be designed to adjust to the ongoing dynamics of the system.

Figure 4: Aerial view of the head of the St. Clair River

The impacts of any new regulation plans would then be assessed for each of the interest groups. Depending on the magnitude of the changes in levels and flows, and the sensitivity of the interest to change, further study may be necessary. Some details may be addressed with existing data and lessons learned from the Lake Ontario – St. Lawrence River Study. Other interests might require additional data collection and study to best determine impacts. If so, these could be conducted as part of a more detailed Phase 2.

Plan of Study Revision Schedule

The Plan of Study Revision team will prepare a draft Plan of Study by August 25, 2005. The draft will be posted on the web, where interested parties can download it and provide comments. In addition, the Team will hold four public meetings to discuss the Plan of Study revision and solicit feedback. While the dates and locations have not yet been finalized, it is anticipated that they will take place in September 2005.

Following public consultation on the draft Plan of Study revisions, the Team will provide the final Plan of Study to the IJC on 14 October 2005. Actual implementation of the Plan of Study would not be initiated until funds are appropriated by the Governments of the U.S. and Canada.

Contact the Plan of Study Team

To find out more about the Plan of Study revision, dates and locations of public meetings, or to provide any comments – please visit the IJC's Upper Lakes Plan of Study web site at www.ijc.org. Then follow the links to "Boards", "Completed Task Forces" and "Upper Great Lakes Plan of Study Team". If you prefer, you can email the two Team secretaries: In the U.S., email Scott Thieme at Scott.J.Thieme@usace.army.mil. or in Canada email Peter Yee at Peter.Yee@ec.gc.ca.