International Joint Commission
Great Lakes
Water Levels Boards

Les conseils de régularisation
des eaux des Grands Lacs
de la Commission mixte internationale

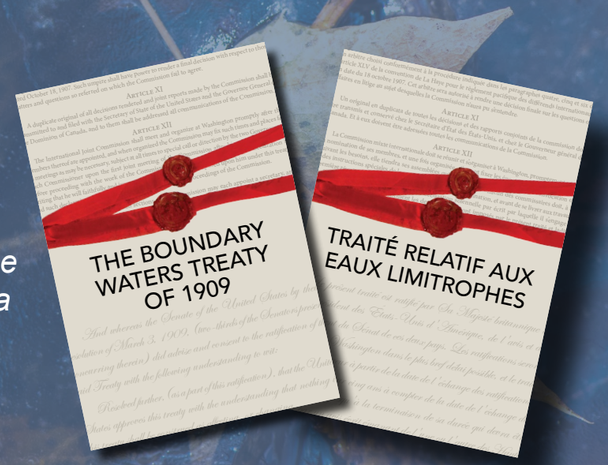
Tri-Board Tribune

The Great Lakes in Depth

Fall 2023

WELCOME!

The Tri-Board Tribune is a quarterly newsletter designed by the Great Lakes Water Levels Boards of the International Joint Commission (IJC) to share information and articles related to the entire Great Lakes basin and provide regional updates presented by each Board. The Great Lakes Water Levels Boards includes the International Lake Superior Board of Control, International Niagara Board of Control, and International Lake Ontario-St. Lawrence River Board.



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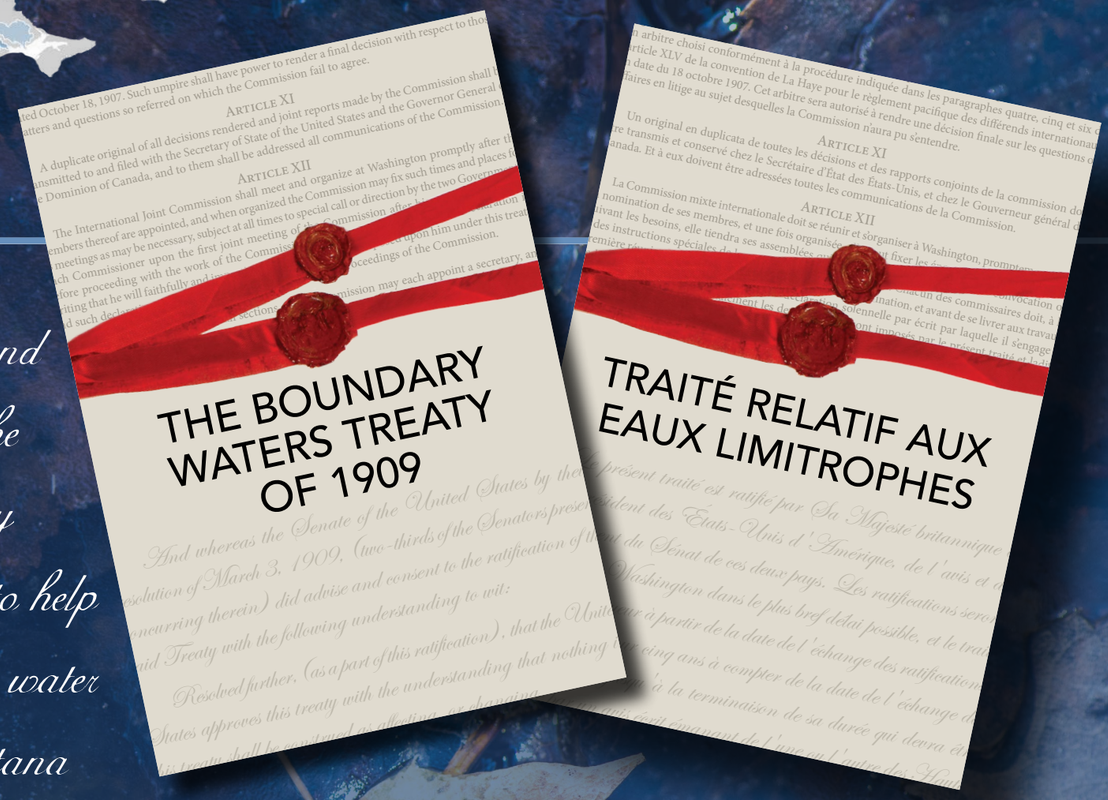

The Boundary Waters Treaty was signed in 1909 to prevent and resolve disputes over the use of the waters shared by Canada and the United States and to settle other transboundary issues. The treaty established the International Joint Commission (IJC) to help the two countries carry out its provisions. At the time, disputes over water were already creating tension along the border. Settlers in Montana and Alberta were building competing canals to divert the waters of the St. Mary and Milk Rivers for their own use. On the Niagara River, it was increasingly clear that the two countries needed a management plan that could balance the growing demand for hydroelectric power with the interests of navigation, while safeguarding the unique natural beauty of Niagara Falls. The treaty provided a framework to deal with these disputes. The IJC held its first meeting in 1912 and has worked to resolve more than 100 matters raised by the two federal governments.

Read the entire treaty.

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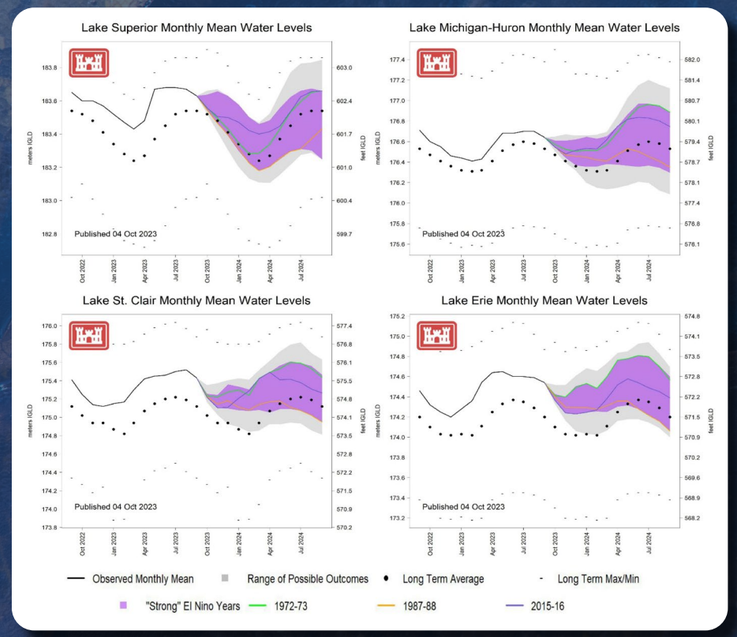
What Can We Learn About the Great Lakes from Historic El Niño Data?

In May 2023, the World Meteorological Organization, encouraged preparation for El Niño which typically causes drier and warmer than usual conditions in the northern United States and Canada. In November 2023, the National Oceanic and Atmospheric Administration forecasted the El Niño has a 62 percent chance of lasting through Spring 2024. The U.S. Army Corps of Engineers, Detroit District created water level scenarios that project water levels through July 2024 based on historic El Niño data.



Water levels follow a seasonal cycle. During the fall and early winter, the lakes generally decline due to an increase in evaporation as temperatures decline and cold air moves over the relatively warm lake waters. In the spring and early summer, water levels typically rise due to increased precipitation and enhanced runoff from snowmelt. The combination of precipitation over the lake, evaporation from the lake, and runoff to the lake is known as Net Basin Supply (NBS).

The water level scenarios created by the Corps of Engineers assumed NBS conditions like those experienced for the 12 months during and after the 8 strongest El Niño events to date. Three of the strongest El Niño's occurred in 1972-73, 1987-88, and 2015-16, and their hypothetical impacts on future water levels are represented by the green, orange, and blue lines in the graphs. The effects of the 8 strongest El Niño NBS sequences are represented by the purple plume. The gray shaded area represents the full range of possible outcomes using historical sequences of NBS from 1900 through 2022. The bottom line is that even if the climate scientists are confident about future El Niño conditions, the impact on water levels of the Great Lakes is still uncertain as there are other factors that affect the weather in our area and thus a large range of possible future outcomes remains. Because of this uncertainty, the forecasters encourage you to keep an eye on the monthly updates as conditions change.

Join Us for a Virtual Meeting

International
Lake Superior
Board of Control

Conseil international
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The International Lake Superior Board of Control will host a virtual meeting to give an update on operations in the St. Marys Rapids and Regulation Plan 2012. Advance registration is required. Click the link below to register. Please provide your questions and comments in advance during registration.

Tuesday, December 12, 5:30-6:30 pm (Eastern)

Lake Erie-Niagara River Ice Boom Installation

A common question we hear during this time of year is When will the Lake Erie ice boom be installed? In accordance with the International Joint Commission's 1999 Supplementary Order of Approval, placement of the ice boom near the head of the Niagara River may begin December 16 or when the water temperature of Lake Erie at Buffalo, NY reaches 4°C (39°F), whichever comes first. As of November 30, the water temperature of Lake Erie at Buffalo, NY was 8°C (47°F). The International Niagara Board of Control, and power entities who operate and maintain the ice boom, will continue to monitor the water temperature, so the team is ready when conditions permit installation. Once it is determined that the criteria of the IJC Order of Approval will be met, and working conditions on Lake Erie will be safe for power entity crews, the Board issues a press release to announce the planned installation date. The press release will be available on the Board's website and local news media are also informed. Visit the Frequently Asked Questions about the ice boom to learn more.

International
Niagara
Board of Control

Conseil de contrôle
international du Niagara

Did You Complete the Questionnaire?

The Great Lakes–St. Lawrence River Adaptive Management (GLAM) Committee is seeking to better understand how changing water levels impact people that live and work along the Great Lakes–St. Lawrence River shoreline as well as the ecosystem. The GLAM Committee has developed a short questionnaire to enable impacted shoreline property owners to report on their direct experiences for 2022 and 2023. Responses to the questionnaire will only be reported in a summarized format to ensure the privacy of respondents and your participation is completely voluntary.

2022 Water Level Impacts Questionnaire

2023 Water Level Impacts Questionnaire

International Lake Superior Board of Control

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Each month, the Board issues a press release to announce gate settings in the Compensating Works at the head of the St Marys Rapids and flows from Lake Superior for that month. However, in winter, ice conditions prevent movement of the gates at the Compensating Works. As a result, the gate settings in December are set for the entire winter season. In most winters, the gates will be set until the ice clears in April. Plan 2012 (regulation plan for Lake Superior) maximizes winter flows while minimizing the risk of ice jam flooding in the St Marys River. Unless all 16 gates need to be fully opened, Gate #1 of the Compensating Works remains partially open to release approximately 15 cubic metres per second (m^3/s) of water to continuously feed the Fishery Remedial Works located downstream. This is an area of enhanced fisheries habitat located along the south shore of Whitefish Island and to the north of the Fishery Remedial Works dike. Outflow settings are intended to maintain much of the natural variability in lake levels that is important for ecosystem health, while remaining consistent with the capacities of the current discharge structures at Sault Ste. Marie.

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international du Niagara

Located 1.0 kilometer (approximately 0.6 miles) upstream of the Horseshoe Falls, and at the downstream end of the Chippawa Grass Island Pool, is the International Niagara Control Works. This structure does not regulate the water level or outflow from Lake Erie. In fact, the International Niagara Control Works does not extend across the entire river. The structure is used to raise and lower the 4.8 kilometers (3 miles) CGIP to adjust the flow over Niagara Falls. The elevation of the Chippawa Grass Island Pool also affects the amount of water that can be diverted through the tunnels and open channels operated by the power entities in Canada and the United States. The International Niagara Board of Control makes sure that the operation of the Chippawa Grass Island Pool is within the limits of the Board's Directive to the power entities.

International Lake Ontario-St. Lawrence River Board

International
Lake Ontario -
St. Lawrence River Board

Conseil international
du lac Ontario
et du fleuve Saint-Laurent

The construction of the Moses Saunders Dam and adjacent dikes in the 1950s enabled the level of the St. Lawrence River immediately upstream of the dam to be raised by approximately 25 meters (80 feet) to concentrate the drop in water level necessary to generate hydropower at the dam. This created the needed power pool or forebay upstream of the dam to enable the generation of power. The raising of the water level at the dam caused the river level to be raised above its natural level as far upstream as about Cardinal, Ontario, creating a widening of the river known as Lake St. Lawrence. Lake St. Lawrence covers an area of about 259 square kilometers (100 square miles). Being directly upstream of the hydropower dam, and downstream of a relatively narrow section of the river, Lake St. Lawrence experiences more immediate and pronounced water level fluctuations because of changes in outflow from the dam and changing winds, with the largest fluctuations being closest to the dam.

In the decades since construction of the dam, Lake St. Lawrence has become a local recreational destination in addition to a key part of the hydropower infrastructure required for electrical power generation.To better understand the effects on Lake St. Lawrence water levels, please view Module 2 - Lake Ontario-Upper St. Lawrence Rivers Levels and Outflows.

Plan Simulation and Formulation Subcommittee

The Great Lakes-St. Lawrence River Adaptive Management (GLAM) Committee includes many supporting staff that focus on specific research. This season, we feature the team that works on simulating and formulating alternative outflow management rules or "regulation plans".

Adaptive management is a planning process that can provide a structured, iterative approach for improving actions through long-term monitoring, modeling, and assessment. Through adaptive management, decisions can be reviewed, adjusted, and revised as new information and knowledge becomes available or as conditions change. Plan simulation and formulation is a particular way of searching for and exploring potential alternative rules for managing flow.

In support of the Expedited Review of Plan 2014, the Plan Simulation and Formulation subcommittee is completing simulations of alternative methods for managing the outflow from Lake Ontario through the St. Lawrence River. The team is experimenting with different formulations of the components of Plan 2014 including the Rule Curve and the various maximum and minimum outflow limits (i.e. I Limit, F Limit, L Limit, M Limit and J Limit).

For the upper Great Lakes, supporting staff are planning for the review of Plan 2012 which governs outflows from Lake Superior into Lake Michigan-Huron. Observed St. Marys River flows as well as Lake Superior and Lake Michigan-Huron water levels will be compared to simulated conditions under Plan 2012, Plan 1977-A (the previous regulation plan), and pre-project conditions that would have existed in the natural state of the system. These analyses will help the GLAM Committee and Board verify whether the intended benefits of Plan 2012 were attained or achieved.

Visit the GLAM Committee website to learn more.

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Great Lakes Ecosystem and Regulation Plans - Then and Now

The Great Lakes ecosystem provides aquatic, forest, wetland, and dune habitat for more than 3,500 species of terrestrial and aquatic plants and animals. Thriving wetland habitats support recreational opportunities, filter polluted run-off, and provide nurseries for fisheries and wildlife. More natural year-to-year variations in water levels improves coastal health. Admittedly, ecosystem health was not considered when the control structure in the St. Marys River (at the outlet of Lake Superior) and the hydropower dam in the St. Lawrence River were built, but is now recognized as a key matter in the regulation of flows.

Then

The St. Marys River and St. Lawrence River control structures were constructed in the 1920s and 1950s, respectively. The focus at the time was on the benefits to hydropower production and commercial navigation. The effects on coastal and riverine ecosystems were not fully understood or considered.

Now

Regulation Plan 2012, which governs outflows from Lake Superior into Lake Michigan-Huron, and Regulation Plan 2014 which governs outflows from Lake Ontario through the St. Lawrence River, are designed to provide more natural variations of water levels that are needed to restore ecosystem health. Development of these plans included a longer period of water supply data than what was available during development of the original regulation plans. However, even more extreme weather events related to accelerated climate change have occurred since these plans have been implemented. As a result, both plans are being reviewed through the adaptive management process to incorporate impacts associated with accelerated climate change, and other improvements in knowledge and analytical techniques. Robust coastal ecosystems are recognized as essential, and the effects of water levels and flows on ecosystems are being considered along with effects to other interests and uses as it relates to regulation plans. Ultimately, it is the intent that outflow management, to the extent possible and in consideration of other interests throughout the system, will continue to support the overall restoration and resilience of the Great Lakes ecosystem.

Connections with the Ottawa River – Two Boards Share Knowledge and Data

International
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Water from the Ottawa River flows into the St. Lawrence River at a widening known as Lake St. Louis near Montreal, Quebec. Flows from the Ottawa River affect the management of flows in the Lake Ontario-St. Lawrence River system year round:

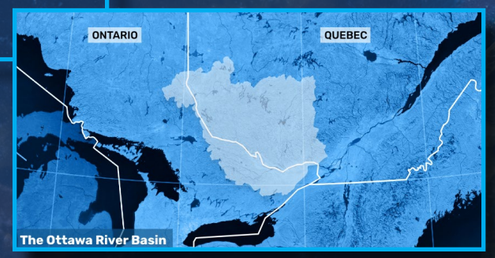
- Forecast flows from the Ottawa River into Lake St. Louis are computed in the first step of Plan 2014 flow.

B3.1 Procedure

1. For each of the next four weeks (quarter months), calculate the Lake Ontario annual net total supply index, forecast the weekly (quarter-monthly) Lake Erie inflow and Lake Ontario net basin supply, Ottawa River and local tributary flows to Lake St. Louis, and ice roughness.

- Ottawa River Regulation Planning Board spring flow forecasts are used in the International Lake Ontario-St. Lawrence River Board's Lake Ontario forecasts. During the spring, when the snow melts in the Ottawa River basin, a rule within Plan 2014 known as the F Limit is often implemented, particularly when water supply conditions are above average.

- When water supply conditions are below average, a rule within Plan 2014 known as the M Limit may apply.



The two Boards (International Lake Ontario – St. Lawrence River Board and Ottawa River Regulation Planning Board) are in touch frequently. As a recent example, technical staff that support the two Boards met face-to-face in Cornwall, Ontario in October 2023 to share and discuss recent improvements to their forecast models. It is important to remember that the Ottawa River Regulation Planning Board is not an IJC Board.

Contact Us

International Lake Superior Board of Control

Website: https://www.ijc.org/en/lsbc

Facebook: https://www.facebook.com/InternationalLakeSuperiorBoardOfControl

Web form: https://www.ijc.org/en/contact/contact_the_international_lake_s

International Niagara Board of Control

Website: https://www.ijc.org/en/nbc

Web form: https://www.ijc.org/en/contact/contact_the_international_niagar

International Lake Ontario-St. Lawrence River Board

Website: https://www.ijc.org/en/loslrb

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