



International Lake Ontario-St. Lawrence River Board



Quarterly Newsletter: Fall 2021

What could a La Niña mean for the Great Lakes Region?

Seasonal weather predictions indicate a 70 to 80 percent chance that a La Niña may be present in winter 2021/2022. La Niña develops when water temperatures in the central and eastern Pacific Ocean are cooler than average. The cooler water temperatures can impact atmospheric conditions and the weather patterns across North America. During a typical La Niña winter, the polar jet stream is more variable, which could lead to arctic air entering parts of the Great Lakes region, resulting in colder than average temperatures. Also, this weather pattern could lead to wetter than average conditions in the southern and eastern portions of the Great Lakes. However, as with any weather forecast, there are other variables that can impact the duration and intensity of the La Niña. Remember that La Niña is just one of many atmospheric phenomena that can influence the weather over the Great Lakes.

For additional information on La Niña, visit:

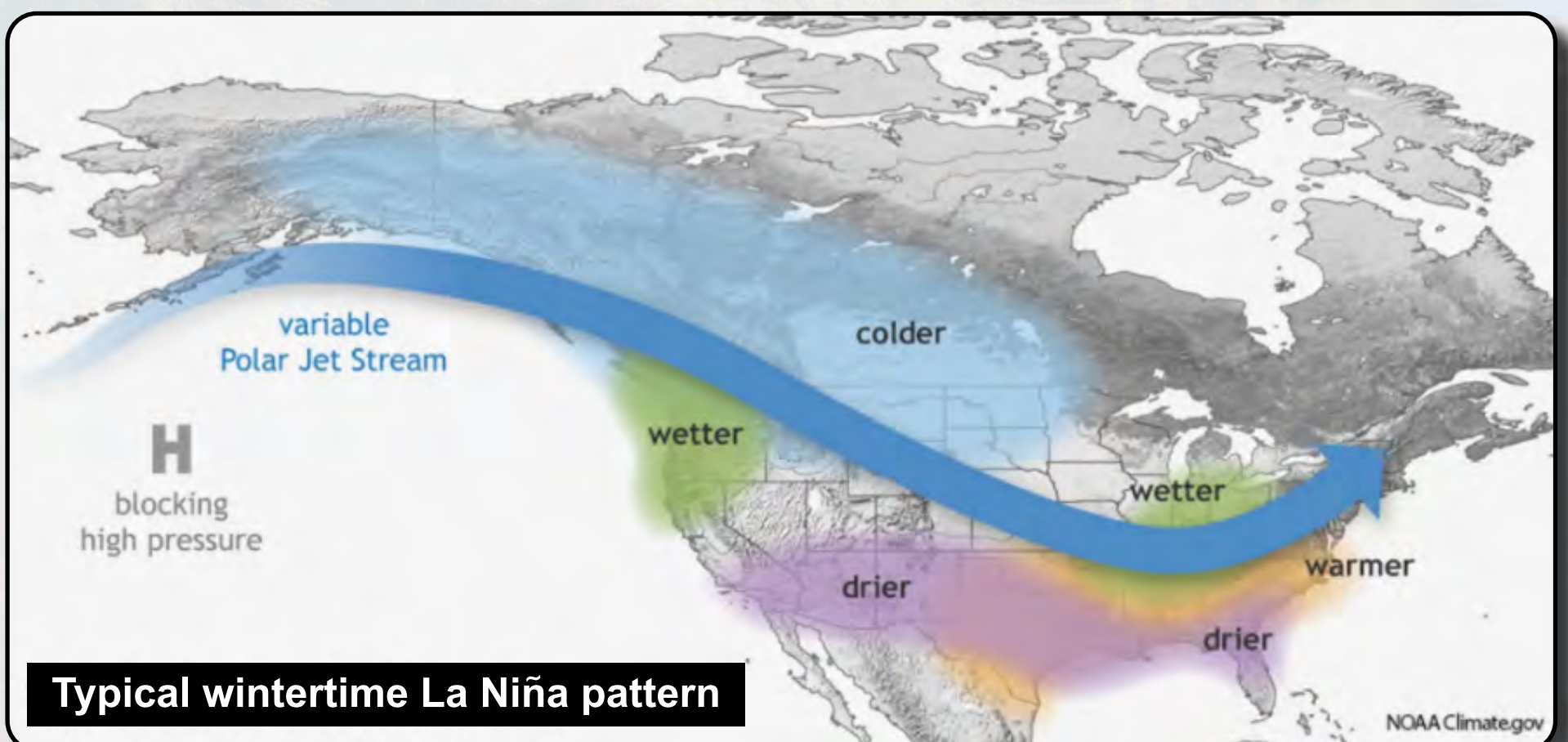
Monthly Update from the Climate Prediction Center

https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/

Environment and Climate Change Canada

<https://www.canada.ca/en/environment-climate-change/services/weather-general-tools-resources/la-nina.html>

National Oceanic and Atmospheric Administration <https://www.climate.gov/enso>



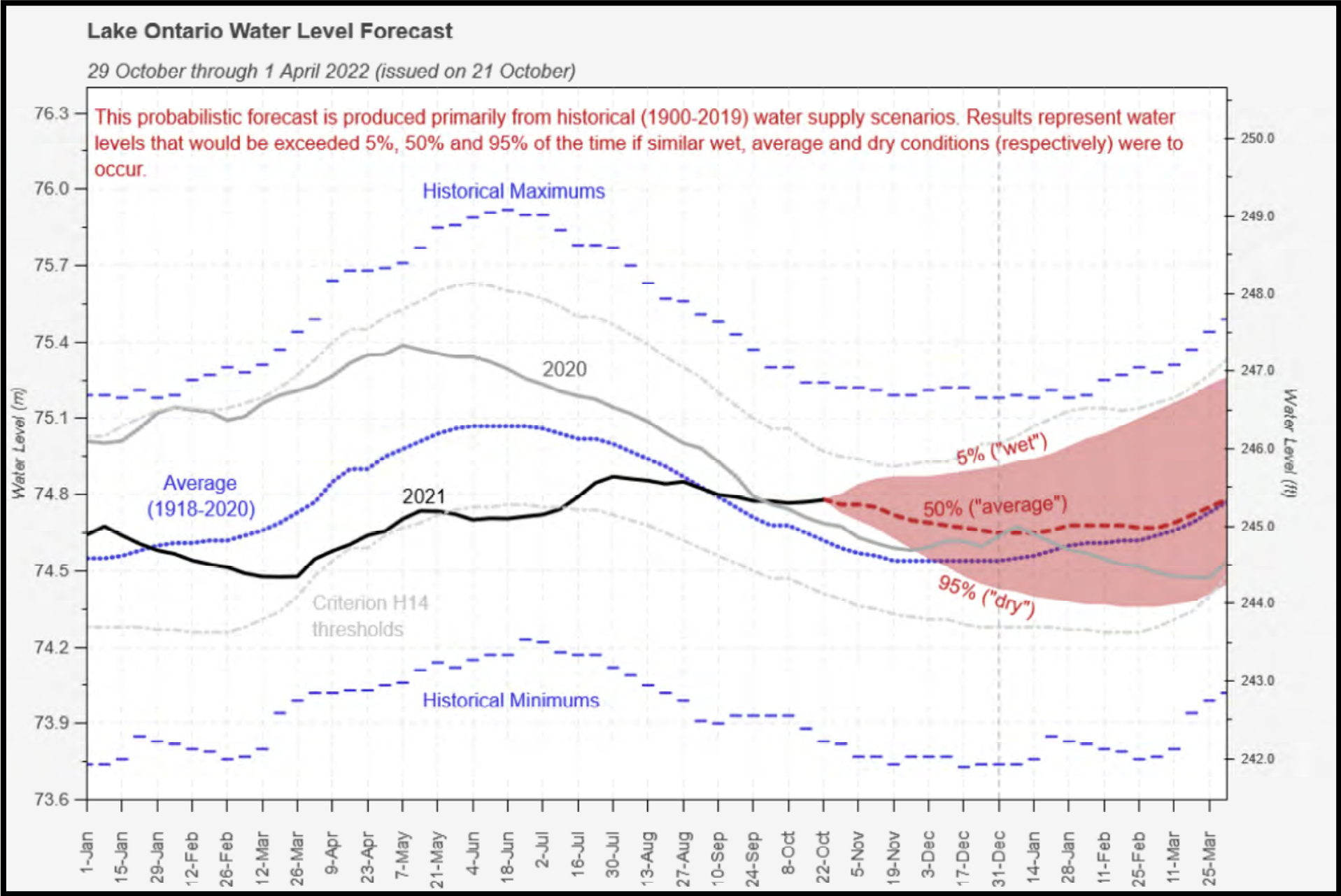
A typical wintertime La Nina pattern across North America. While the Pacific Northwest tends to be wetter-than-average, the southern tier of the U.S. is often dry. NOAA

Autumn and Winter Forecast

Lake Ontario

The water level of Lake Ontario rose approximately 3 cm (1.2 in.) following significant rainfall in the region in late September. Since then, the level has resumed a slow, seasonal decline which is the typical pattern for this time of year. Weather conditions, including temperatures and precipitation, will primarily determine the rate and magnitude of water level fluctuations throughout the Lake Ontario – St. Lawrence River system.

Lake Ontario’s water level is very close to the level observed at this time last year. The lake level is forecast to be within 20 cm (7.9 in.) above or below long-term average over the next six months unless weather and water supply conditions are exceptionally wet or exceptionally dry.



The forecast is based on current levels of Lake Erie and Lake Ontario, an ensemble of historical water supplies, short-term weather predictions, and the current outflow strategy. For the most up to date information, please visit: <https://ijc.org/en/loslr/watershed/forecasts>.

It is important to remember that the Great Lakes are a natural system and the major factors affecting water supply to the Great Lakes are precipitation, evaporation, and runoff. None of these can be controlled and all are difficult to accurately predict. Due to the variability of long-range forecast predictions, and the limited accuracy of short and long term forecasts, the International Lake Ontario-St. Lawrence River Board shares long range seasonal predictions but also updates forecasts weekly to show current water levels and a range of potential water level conditions for the weeks and months ahead.

It is our hope that these weekly updates help property owners, businesses, and recreational users plan for and anticipate the range of possible circumstances caused by the natural variability of the Great Lakes.

News from the GLAM Committee

The Great Lakes-St. Lawrence River Adaptive Management (GLAM) Committee is a subcommittee to the Lake Superior Board of Control, Niagara Board of Control, and Lake Ontario-St. Lawrence River Board (Board). The GLAM Committee supports ongoing evaluation of the outflow regulation strategies, and reports findings to the respective boards.

Review of Plan 2014

The GLAM Committee is conducting a review of Plan 2014. The review has been divided into Phase I scheduled to occur February 2020 through October 2021 and Phase II scheduled to occur from November 2021 through 2024, pending available funding.

Phase I of the adaptive-management study of Plan 2014 was in direct response to extremely high-water levels that occurred in 2017 and again in 2019 and intended to provide the International Lake Ontario-St. Lawrence River (ILOSRL) Board with information to help explore alternative high-water deviation decisions. The committee gathered additional data on high-water impacts and built a Decision Support Tool (DST) to further support the Board in assessing impacts throughout the lake and river system when making deviation decisions. The tool includes navigation metrics, upstream and downstream inundation metrics, forecast data, and summaries of impacts to regions that are likely experienced when water levels reach a certain range. The GLAM Committee is preparing its final Phase I report which will be made publicly available for review and comment during a 60-day period after it is submitted to the IJC for review.

Phase II is a three-year effort that builds upon Phase I by looking more broadly at the regulation plan rules, limits and triggers to determine whether modifications are warranted. Some Phase II activities include:

- Further assessment of potential impacts to all interests and regions under both high and low water level conditions
- Developing tools to compare and evaluate potential outcomes from alternative regulation plans under a wide range of water supply conditions, including climate changes
- Ongoing collaboration with Indigenous communities

Planting a Relationship and Learning Towards Action with Indigenous Communities

The GLAM Committee is working to engage with representatives from First Nations, Tribal Nations, and Métis Nations that were impacted by fluctuating water levels, particularly from the high-water events of 2017 and 2019. The objective is to initiate a relationship with these Nations through a series of coordinated Listening Sessions to foster meaningful relations for a better future together, understand the impacts of fluctuating water levels and inform the new adaptive management approach to outflow management through active and sustained Indigenous participation. Living respectfully in the spirit of reconciliation means taking responsibility for developing an understanding of Indigenous cultures, worldviews, traditions, challenges, and goals. These listening sessions represent a positive step in continuing relationship development with Indigenous Peoples and Nations along the Lake Ontario and St. Lawrence River shoreline within the context of the adaptive management effort.

Public Advisory Group

The Public Advisory Group (PAG) includes 18 individuals representing the diverse interests and issues across the Lake Ontario-St. Lawrence River system, spanning the shorelines of Lake Ontario in Ontario and New York downstream to Lake Saint Pierre on the lower St. Lawrence River in Quebec. In May 2020, the IJC established the PAG as a voice representing the public and all interests within the system, and to work closely with the GLAM Committee during Phase I of the Plan 2014 review process.

As work transitions into Phase II of the expedited review of Plan 2014, the GLAM Committee looks forward to working with the IJC to implement recommendations from the PAG for ongoing public involvement throughout Phase II of the Plan 2014 review.

Nomination for the Great Lakes Ontario National Marine Sanctuary

The National Oceanic and Atmospheric Administration (NOAA) has published a draft Environmental Impact Statement and Draft Management Plan to designate a national marine sanctuary in eastern Lake Ontario and the Thousand Islands region within the St. Lawrence River. The proposed sanctuary would celebrate the history of the region, enable NOAA to manage, research, interpret, and improve public access to maritime heritage resources including shipwrecks, and promote recreation and tourism. The national marine sanctuary system includes over 600,000 square miles (1.5 million square kilometers) along the west and east coast of North America, as far north as Lake Huron, and south to American Samoa.

Additional details of the nomination for the Great Lakes Ontario National Marine Sanctuary are available at <https://sanctuaries.noaa.gov/lake-ontario/>

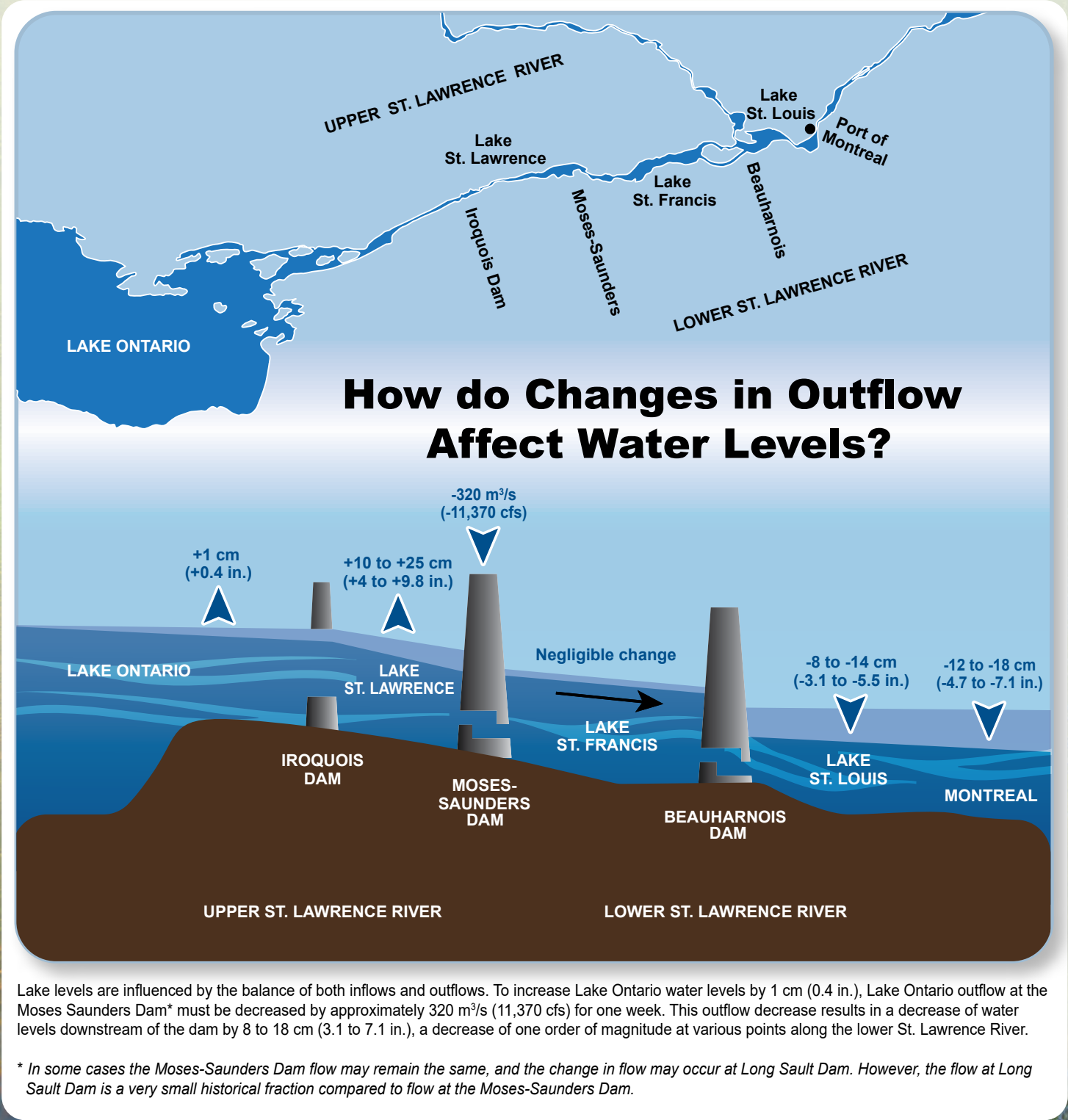
Why Does Boat Haul Out Only Benefit Lake St. Lawrence?

Lake St. Lawrence is located in the International Section of the St. Lawrence River shared by Canada and the United States and is the forebay of the Moses-Saunders Power Dam. The St. Lawrence River is the hydraulic outlet of Lake Ontario that discharges water from the Great Lakes to the Atlantic Ocean.

The Saint Lawrence Seaway Project began construction in 1954. A navigable channel through the Long Sault rapids needed to be created, along with dams, locks, and other control structures. This included the Moses-Saunders Power Dam constructed near Cornwall, Ontario and Massena, New York. Once the power dam was constructed, the area upstream was flooded and resulted in the formation of an artificial widening and deepening in the river which was named Lake St. Lawrence. Inundation of the river and creation of the lake caused a dozen villages in Ontario, known as “The Lost Villages”, to be flooded. There was also inundation on the New York side, but no communities were as widely impacted.

Since Lake St. Lawrence was a direct result of project construction, and water levels on the lake are directly impacted by outflow management and Treaty requirements, the Board has the authority to conduct a minor deviation to assist with boat haul out if a benefit to recreational boaters can be achieved without negative consequences elsewhere in the system. It is important to note that boat haul out assistance is not something that is done every year. This is a discretionary action that the Board considers pending current and forecast water levels throughout the Lake Ontario-St. Lawrence River system at the end of a given boating season and it is conducted in accordance with the IJC’s Directive (<https://ijc.org/en/loslr/who/directives/deviations>).

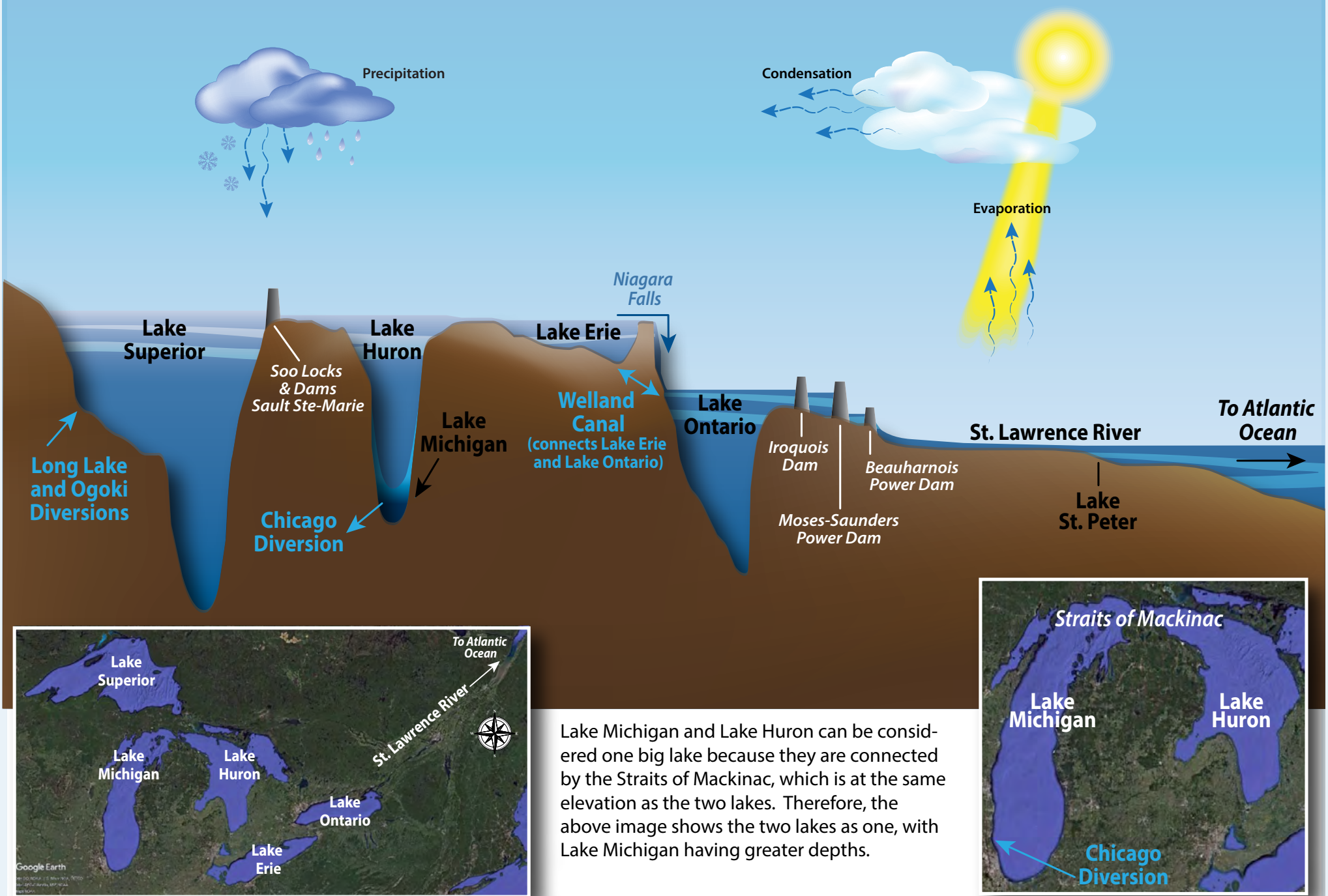
The image below shows how greatly impacted Lake St. Lawrence water levels are affected by a change in outflow that would impact water levels on Lake Ontario by a mere 1 cm (0.4 in.).



For more information about the formation of Lake St. Lawrence, how water levels are uniquely impacted by Lake Ontario conditions and outflow management, please visit <https://ijc.org/en/loslr/lake-st-lawrence>.

Hydrologic Components of the Great Lakes

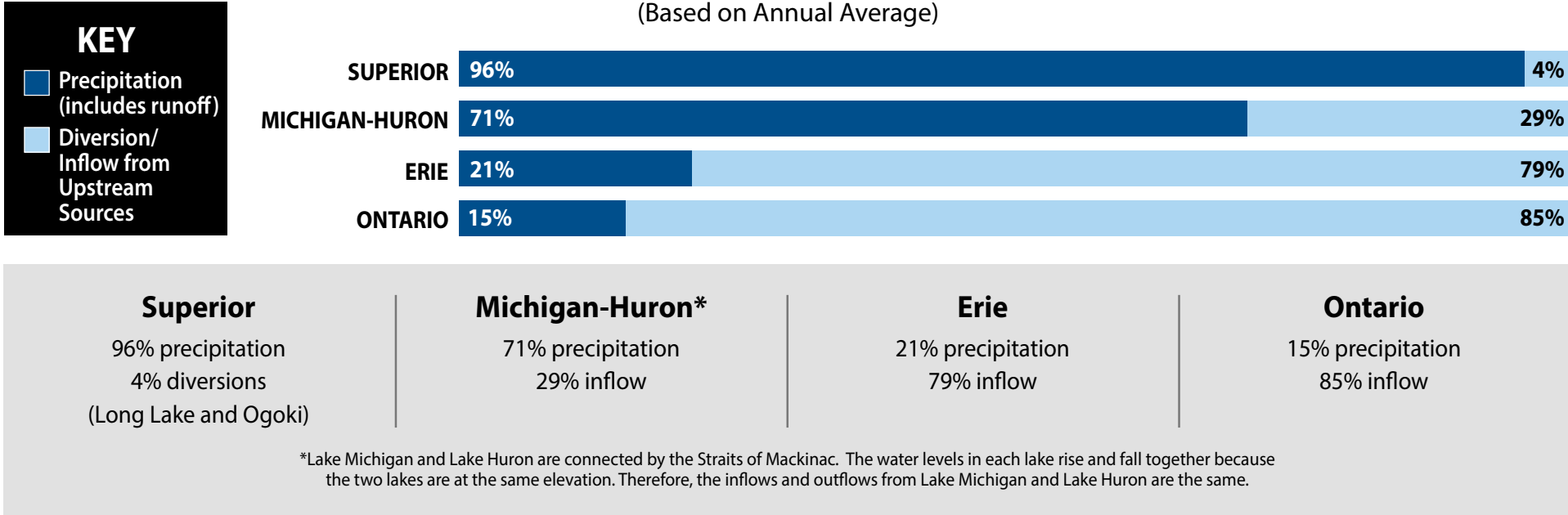
Flow from upstream lakes, evaporation, and precipitation onto the lake and surrounding land surface influence lake levels. This illustrates the relative influence of each of those factors on the Great Lakes and St. Lawrence River system.



Lake Michigan and Lake Huron can be considered one big lake because they are connected by the Straits of Mackinac, which is at the same elevation as the two lakes. Therefore, the above image shows the two lakes as one, with Lake Michigan having greater depths.

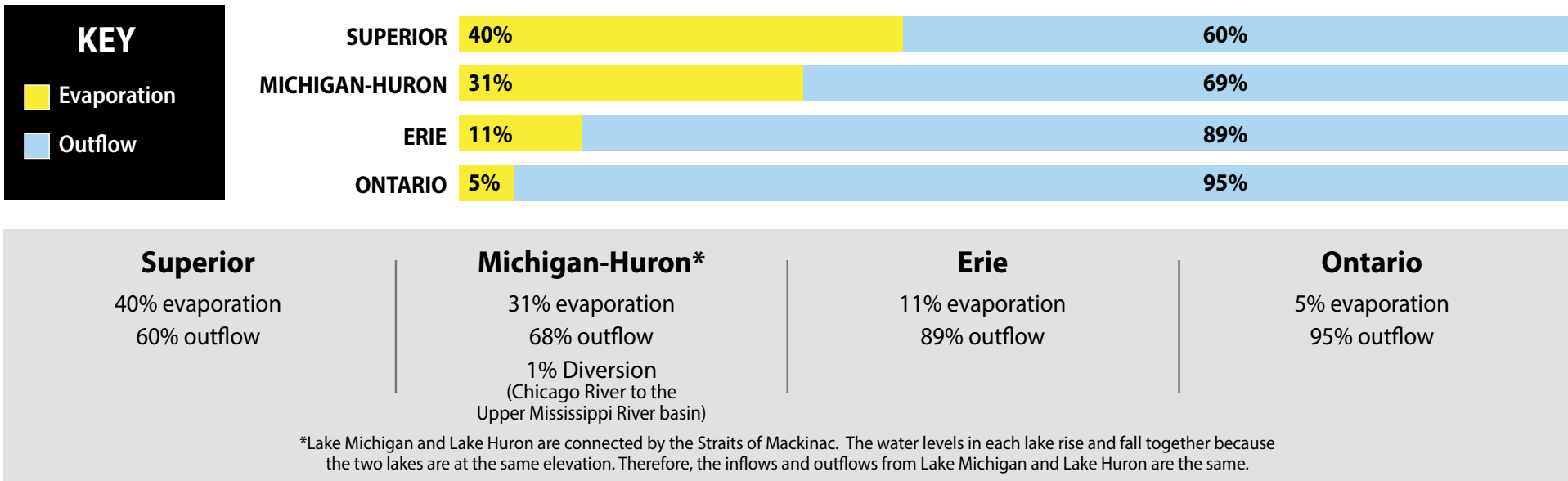
Water In

(Based on Annual Average)



Water Out

(Based on Annual Average)



The Ups and Downs of Great Lakes Water Levels

Dr. Andrew Gronewold presented 'The Ups and Downs of Great Lakes Water Levels' to Save the River in August 2021. Save the River is a not-for-profit environmental organization located in the Thousand Islands Region along the St. Lawrence River. The organization's mission is to educate the public and advocate to protect, restore, and preserve the ecological integrity of the St. Lawrence River (www.savetheriver.org).

Dr. Gronewold is an Associate Professor with the School for Environment and Sustainability at the University of Michigan. Much of his recent research has focused on monitoring, analyzing, and forecasting the long-term water budget and water levels of the Great Lakes. Dr. Gronewold was joined by Jim Howe and Tom Brown during the question-and-answer session. Jim is the Director of The Nature Conservancy's Central and Western New York Chapter, and member of the 18-person Public Advisory Group working with the Great Lakes Adaptive Management Committee that supports the Intentional Lake Ontario-St. Lawrence River Board (ILOSLRB) who are currently reviewing Plan 2014. Tom Brown is a retired environmental scientist and former adjunct professor at the school of State University of New York Environmental Science and Forestry and serves as one of six binational voting board members of the ILOSLRB.



A video of the 45-minute presentation and 45-minute question and answer session is available at <https://www.savetheriver.org/events/2021-wl-gronewold>.

Interesting facts and information shared by Dr. Gronewold about the Great Lakes:

There are 100 million lakes across the world and 80 percent of the Earth's freshwater surface water is in the ten largest lakes worldwide.

All five of the Great Lakes are in the top ten list!

The Great Lakes basin is included in the top 20 largest freshwater basins on Earth! That means the Great Lakes basin is comparable to other basins worldwide including:

- Mississippi River Basin, Midwestern United States
- Colorado River Basin, Southwestern United States and Northwestern Mexico
- Columbia River Basin, Southeastern British Columbia Canada, and Northwestern United States
- Amazon River Basin, South America
- Congo River Basin, Central Africa

The St. Lawrence River is the second largest river in North America based on annual average discharge; it is second only to the Mississippi River and ahead of the Columbia River which originates in British Columbia Canada and flows through seven states in the United States, and the Yukon River located in Alaska, and Northwestern British Columbia!

In 2013, the future of the Great Lakes was predicted to be arid, drought, and have continued low water levels throughout the basin. But like the swing of a pendulum, conditions changed quickly. From 2014 through 2021, there have been some impactful weather phenomena.

- 7 years of greater than average precipitation resulting in the wettest decade in history for central north America.
- More than once in the last seven years, a polar vortex has impacted the Great Lakes. Cold air masses can cause increased ice cover and slow evaporation, contributing to below average water loss.
- These two factors combined (off-the-chart precipitation and below average evaporation) resulted in a water level surge within the entire Great Lakes – St. Lawrence River system in recent years.

But, as the pendulum swung quickly from 2013 to 2014, moving from drought conditions to extremely wet conditions, the pendulum swung again in late 2020. From October 2020 through late spring 2021, there was again concern about low water levels.

- October 2020 through May 2021 resulted in a mini drought throughout the Great Lakes that could not be predicted. According to Dr. Gronewold, the probability of the dry sequence that occurred is extraordinarily unlikely.
- During this time, and a first in recorded history, Lake Michigan and Huron did not have a spring rise due to limited snowpack and limited precipitation.

Changes in temperature and precipitation are major factors that affect water levels:

- most of the water that comes into Lake Ontario comes in from outside the basin, namely from the four upper Great Lake basins.
- As the earth is warming, the stability of the polar vortex is impacted. It wobbles causing extreme cold arctic air to reach the Great Lakes. These cold air masses can contribute to reduced evaporation but are not possible to predict.

Understanding and forecasting how water enters and leaves the Lake Ontario basin is a major challenge on a global scale.

- The St. Lawrence River is the second longest river in the United States.
- The Great Lakes are so large that scientists must factor the amount of precipitation that falls on the lakes, not just on the land that surrounds the lakes.
- Lake Ontario must also account for inflow from the watersheds of all the upper Great Lakes: Superior, Michigan, Huron, and Erie.
- Changes in precipitation and land use affect the amount, quality, and rate of flow of water that comes into the lake.
- The Ottawa river basin also affects how Lake Ontario's outflows are managed and must be factored into the amount of water that leaves Lake Ontario to avoid unnecessary impacts downstream in the St. Lawrence River basin.

The air masses that change temperature and bring moisture to the Great Lakes basin are moving around the continent at a major scale that is really hard to predict, which causes seasonal forecast challenges. Overall, the Great Lakes basin is a massive and complex hydrologic system.

Great Lakes Water Levels Boards Host Tri-Board Webinars

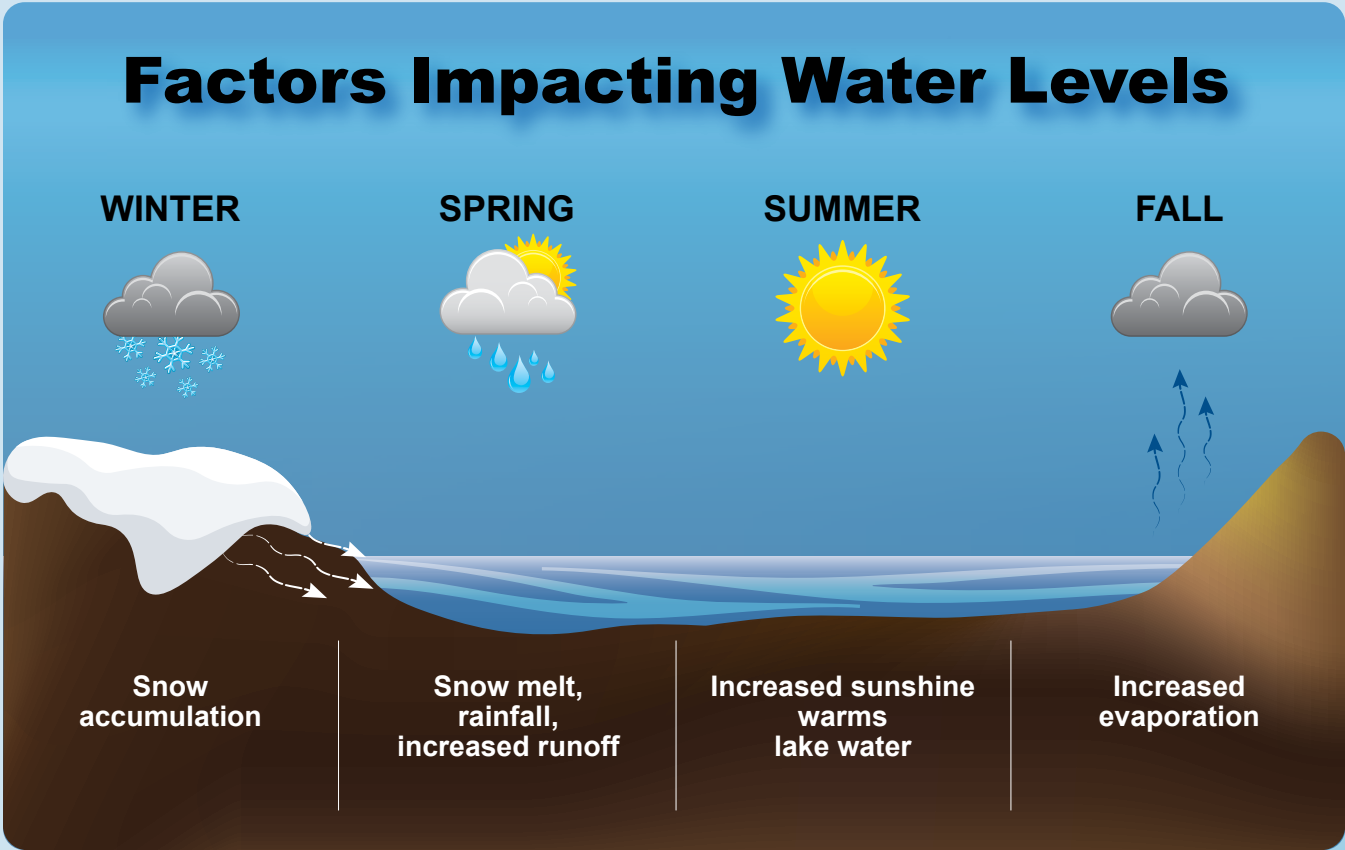
The three IJC Great Lakes water levels boards hosted joint webinar sessions in English and French on August 27 and September 8, respectively.

Attendees were welcomed by IJC co-chairs who shared their thoughts related to current and forecast conditions within the Great Lakes basin.

Both events included a joint presentation by the International Lake Superior Board of Control, International Niagara Board of Control and International Lake Ontario-St. Lawrence River Board. The boards shared an overview of current and forecast conditions of the Great Lakes and discussed water levels throughout the system. In addition, the Great Lakes-St. Lawrence River Adaptive Management (GLAM) Committee presented an update on its ongoing review of Plan 2014, and current work being pursued on behalf of the Lake Superior Board of Control.

Nearly 150 people attended the English webinar and more than 80 attended the French webinar. Each webinar included a question-and-answer session that allowed attendees to inquire about topics of interest and seek additional information from members of the boards and committee.

Audience questions related to climate change impacts throughout the Great Lakes, current above long-term average water levels on Lakes Superior, Michigan, Huron and Erie, as well as below long-term average water levels on Lake Ontario and the St. Lawrence River. Additional inquiries were specific to outflow data from the upper basin (Lakes Superior, Michigan and Huron), and interest in learning more about how adaptive management efforts related to the review of Plan 2014.



The screenshot shows a video player for the "Tri-Board Public Webinar" dated 27 August 2021. The interface includes logos for the International Joint Commission, the International Lake Superior Board of Control, the International Niagara Board of Control, and the International Lake Ontario-St. Lawrence River Board. It also features the GLAM (Great Lakes-St. Lawrence River Adaptive Management Committee) logo. A play button icon is visible in the center of the video frame. A note at the bottom states: "Please note that access to the audio and visual presentation could be hindered by local bandwidth restrictions."

Although the three Great Lakes boards preferred to host in-person sessions, the ongoing pandemic and challenges with international travel required the meetings to be hosted virtually.

Until in-person meetings are possible, people are encouraged to visit board and GLAM Committee webpages for additional information, follow the boards on Facebook and submit questions via the respective links below.

Lake Superior Board of Control

Website: <https://www.ijc.org/en/lsrc>
Facebook: <https://www.facebook.com/InternationalLakeSuperiorBoardOfControl>
Contact Us: https://www.ijc.org/en/contact/contact_the_international_lake_s

International Niagara Board of Control

Website: <https://www.ijc.org/en/nbc>
Contact Us: https://www.ijc.org/en/contact/contact_the_international_niagar

International Lake Ontario-St. Lawrence River Board

Website: <https://www.ijc.org/en/loslr>
Facebook: <https://www.facebook.com/InternationalLakeOntarioStLawrenceRiverBoard>
Contact Us: https://www.ijc.org/en/contact/contact_the_international_lake_o

Great Lakes-St. Lawrence River Adaptive Management Committee

Website: <https://www.ijc.org/en/glam>
Contact Us: https://www.ijc.org/en/contact/contact_the_great_lakes_adaptive

On the Level

The U.S. Army Corps of Engineers, Detroit District Great Lakes Hydraulics and Hydrology Office has created a video series to provide monthly information and updates about the Great Lakes including water levels and forecasts. 'On the Level' videos are available on the District's website and YouTube page at: <https://go.usa.gov/xFEWx> and <https://youtube.com/playlist?list=PLqtbMFyAaYYNkKS2wx-dyBsDYSBQXP3HLq>.



Did you get a Blue Heron Award?

Save the River is a not-for-profit environmental organization located in the Thousand Islands Region along the St. Lawrence River. The organization's mission is to educate the public and advocate to protect, restore, and preserve the ecological integrity of the St. Lawrence River, support policies and programs that promote clean water protections, maintain a healthy river that sustains native species, provides safe drinking water, and supports the regional economy (www.savetheriver.org).

Save the River was created in 1978 and within just a few years, the organization started a fairly large program to encourage property owners to monitor their septic tanks. The Kingfisher Septic Tank Monitoring Program was organized by two board members and identified a point of contact, called a captain, on each island from Chippewa Bay up river to Cape Vincent. The captains were responsible for talking to the community and neighbors about the program, and encouraging them to be part of the program by getting their septic tank monitored and tested for compliance. Some properties had just a pipe that extended from the house to the river and discharged raw sewage directly into the river. A personal incentive to be part of the program was once a septic tank passed inspection, the homeowner was awarded a blue heron statue. The Blue Heron Award became the talk of the towns; community involvement coupled with the will and want to protect the environment and health of the river for themselves, their community, and future generations made this program a success. Approximately 350 properties participated in the program that resulted in a cleaner river, educated the community on the importance of proper sewage management, and remains an important component to maintain the health of the river, drinking water supply, and ecosystem.

Forty years later, there has been an update to the Septic Tank Handbook that has caught the attention of property owners that live along many of the islands in the region, and has also garnered the attention of the Canadian Thousand Islands Association. Save the River's Updated Septic Handbook is available online at <https://www.savetheriver.org/wp-content/uploads/2019/11/STR-SepticHandbook.pdf>. Although Save the River is not offering a coveted blue heron award, community efforts to maintain septic systems will keep the blue heron habitat healthy, and experiencing a blue heron in their natural habitat can be more rewarding than admiring a statue on the mantle.



Blue Heron Award that was given to property owners once their septic tank passed inspection.



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The Board's website
(www.ijc.org/loslr.b)

Facebook page
(<https://www.facebook.com/InternationalLakeOntarioStLawrenceRiverBoard>).

