International Lake Ontario-St. Lawrence River Board

International Lake Ontario - St. Lawrence River Board
Conseil international du lac Ontario et du fleuve Saint-Laurent

FINAL EDITION Newsletter: Winter 2022

Final Edition

The International Lake Ontario-St. Lawrence River Board (ILOSLRB) began this quarterly newsletter in 2019 to provide forecast conditions for the upcoming season, share articles and information relevant to the region, and when available provide updates from the Board and various committees. As we move forward, we want to expand the scope of this publication and look at the Great Lakes and St. Lawrence River system as a whole and recognize the interconnectedness of the five lakes and connecting tributaries. Therefore, this edition of the ILOSLRB newsletter will be the last publication in the current format.

In spring 2022 the Great Lakes Water Levels Boards, which includes the International Lake Superior Board of Control, International Niagara Board of Control, and International Lake Ontario-St. Lawrence River Board will unveil a new quarterly newsletter! The joint newsletter will share information and articles related to the entire Great Lakes and St. Lawrence River basin and provide opportunity for each Board to share regional updates.

Did you know the Great Lakes and St. Lawrence River include 22,530 kilometers (14,000 miles) of shoreline along 8 US states, 2 Canadian provinces, and approximately 120 Indigenous Communities? There are 30,000 islands in Lake Huron and over 1,800 islands in the St. Lawrence River! The Great Lakes form the largest group of freshwater lakes on Earth and hold 20 percent of the Earth's surface freshwater! We want to share information with you that captures the expansiveness of the entire system.

See the articles on pages 4 and 5 of this final edition of the ILOSLRB newsletter for a preview of the type of information that will be shared in the International Great Lakes Water Levels Boards quarterly newsletter.

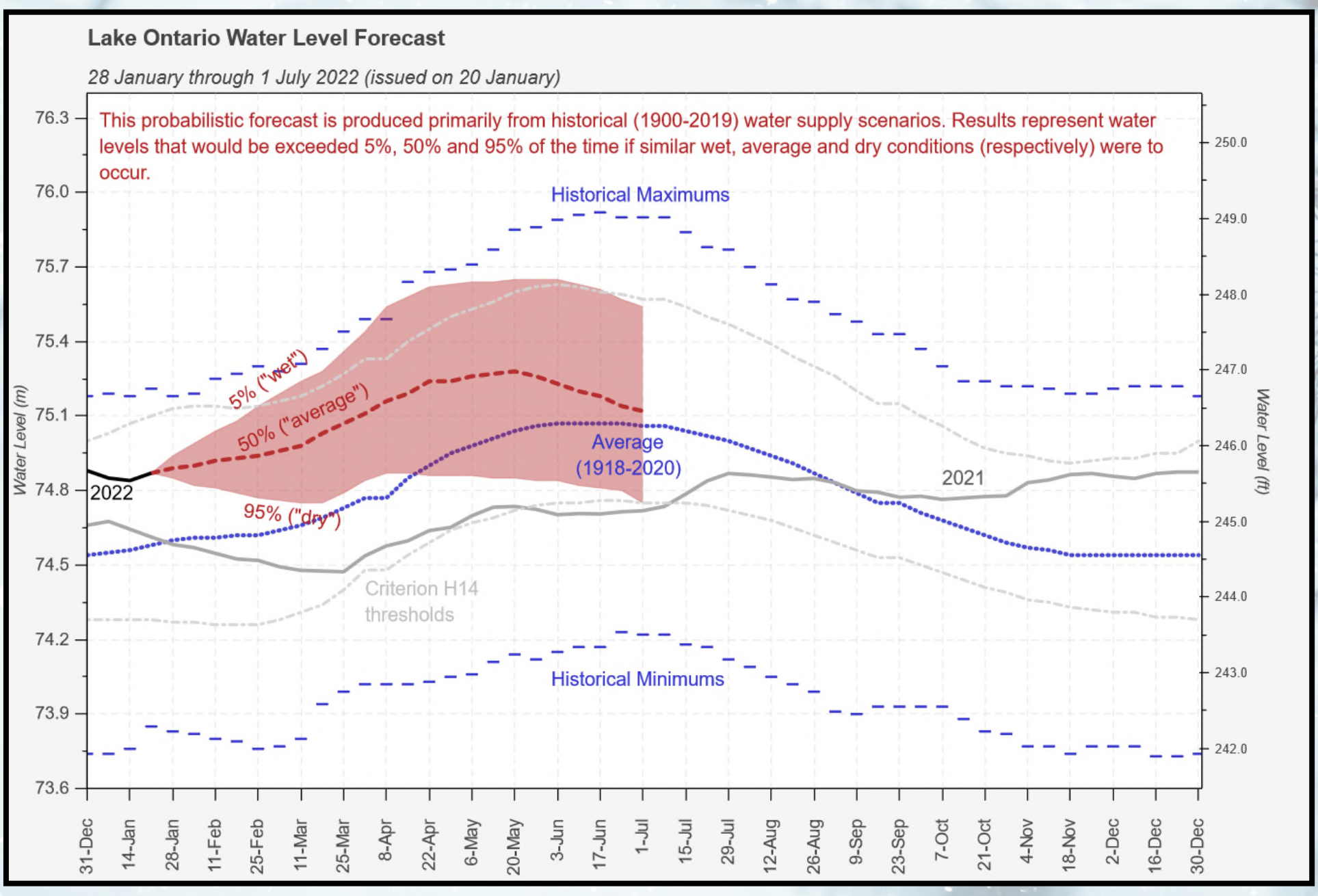
Forecast

Lake Ontario

Under most potential water level supply scenarios, it is likely that Lake Ontario will be relatively stable over the next couple weeks. Weather conditions, including temperature, ice conditions and precipitation, will primarily determine the rate and magnitude of water level fluctuations throughout the Lake Ontario – St. Lawrence River system.

Ice began to form in the Beauharnois Canal and Lake St. Lawrence earlier this month as water temperatures quickly dropped due to several bouts of winter weather. When necessary, Lake Ontario's outflow will be adjusted to ensure the stability of the ice cover. A stable ice cover lowers the risk of ice break up during high winds and winter storms, if the ice breaks up it can lead to ice jam flooding. Updates on the current conditions are provided at

https://ijc.org/en/loslrb/watershed/outflow-changes.



It is important to remember that the Great Lakes are a natural system and the major factors affecting water supply to the Great Lakes and St. Lawrence River are precipitation, evaporation, and runoff. None of these can be controlled and all are difficult to accurately predict more than a few weeks in advance. Due to the uncertainty of long range forecast predictions, and the limited accuracy of short and mid 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.

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/loslrb/watershed/forecasts.

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

Great Lakes Winter Ice Cover

The United States National Oceanic and Atmospheric Administration (NOAA), Great Lakes Environmental Research Laboratory (GLERL) published An Electronic Atlas of Great Lakes Ice Cover Winters: 1973 – 2002 and has compiled Great Lakes ice coverage data that provides dates of first ice, last ice, and total number of days with ice cover for each winter season. Typically, ice begins to form and accumulate in shallow bays and inlets along the shoreline of the Great Lakes in December and by January, these areas often have significant ice accumulation. It often takes until February before ice will form away from the shores toward the middle of some of the lakes. However, it is rare to see certain lakes such as Lake Michigan and Lake Ontario to completely freeze over their surface. The table below shows ice coverage concentrations from 2017 through 2021.

Ice Concentration (%) on January 1st

Year	Superior	Michigan	Huron	Erie	Ontario	St. Clair	Great Lakes
2017	1.2	2.3	4.0	1.5	0.8	7.6	2.2
2018	7.7	19.2	30.7	39.5	15.9	99.0	19.7
2019	2.9	3.3	8.7	0.0	0.9	0.0	3.9
2020	1.9	1.4	1.7	0.0	0.5	0.0	1.5
2021	2.8	1.8	5.6	0.1	0.6	0.3	2.8
2022	2.2	3.2	2.5	0.0	2.9	0.0	2.4

Data Source: National Oceanic and Atmospheric Administration.

Ice conditions early in the season are not an indicator of the type of spring that will be experienced in the Great Lakes. Weather forecasts are not reliable more than a few weeks into the future and cannot accurately tell us what the regional ice formation and snowfall will be for the remainder of winter, or how much rainfall might occur this coming spring. Early January weather has brought cold temperatures to the Great Lakes region and it is expected that water temperatures in each of the lakes will decrease rapidly.

The Great Lakes do not always completely freeze which allows for continued evaporation throughout the winter. The long-term average for maximum ice cover in the Great Lakes is 53.3 percent. The record high was set in 1979 when 94.7 percent of the Great Lakes were covered in ice. The record low maximum ice cover was set in 2002 with just 11.9 percent ice cover.

Let's bundle up and see how much ice forms this winter!

For more information visit https://www.glerl.noaa.gov/data/ice/ and https://www.canada.ca/en/environment-climate-change/services/ice-forecasts-observations/latest-conditions/products-guides/chart-descriptions.html#daily_ice

Status of La Niña 2021/2022

La Niña is a natural phenomenon in the climate system that has been occurring for many years.

La Niñas appear approximately every 3-5 years and typically last 1-2 years. Historical El Niño and La Niña patterns have been recorded since 1950. During a La Niña cycle, the Great Lakes usually experience colder than average temperatures and wetter than average conditions. However, there are no obvious water level trends for back-to-back La Niña years as shown in the January 2022 publication of the Great Lakes Water Levels Future Scenarios bulletin published by the U.S. Army Corps of Engineers, Detroit District (https://lre-wm.usace.army.mil/ForecastData/12MonthSimulation/WLOutlookSummary.pdf).

La Niña is expected to continue in the Great Lakes region through winter and into spring 2022. It is predicted that the weather patterns associated with La Niña will transition to more seasonal patterns (also referred to as El Niño Southern Oscillation (ENSO) neutral) April through June 2022. However, it must also be remembered that ENSO is just one of many factors that affect the weather in the Great Lakes region and will not solely dictate the future conditions. For instance, both the Arctic Oscillation and North Atlantic Oscillation have large effects on the Great Lakes weather patterns, but these can only be accurately forecast a week or two into the future.

Ice Boom Installation in Lake Erie

Installation of the ice boom for the 2021-2022 ice season began December 10, 2021 and was completed December 15, 2021. In accordance with the International Joint Commission (IJC) 1999 Supplementary Order of Approval, placement of the ice boom may begin December 16 or when the water temperature of Lake Erie at Buffalo, NY reaches 4ºC (39ºF), whichever comes first. Early installation this year was approved by the IJC in a special Supplemental Order of Approval due to scheduling complexities resulting from the COVID-19 pandemic.

New York Power Authority installs sections of the ice boom in Lake Erie in December 2021. Photo credit: New York Power Authority.

Ownership, as well as the cost of operating and maintaining the boom, is shared equally by New York Power Authority (NYPA) and Ontario Power Generation (OPG). While NYPA is responsible for installing, operating, and removing the boom, both NYPA and OPG are responsible for meeting any other United States or Canadian laws that may pertain to use of the boom. The IJC authorizes use of the boom within its mandate, through the Order of Approval; the International Niagara Board of Control administers the Order on behalf of the IJC and monitors the power entities operation of the boom and ice conditions throughout winter.

The ice boom is 2.7 kilometers (1.7 miles) in length and is installed each year to accelerate the formation and stabilization of the natural ice arch that forms at the outlet of Lake Erie near the head of the Niagara River. An ice arch is a block of ice that prevents other pieces of ice from moving further downstream. The ice boom is installed to reduce the frequency and duration of heavy ice that could enter the Niagara River and cause ice jams, damage shoreline property, and reduce hydropower diversions. The ice boom is designed to submerge during intense storms to allow some ice to flow downstream to prevent upstream flooding. After the storm, the ice boom sections re-emerge to allow the ice arch to reform. The ice boom does not inhibit the flow of water from the lake into the Niagara River.

A study completed by the National Academy of Science in 1983 found no evidence that the ice boom affects the temperatures in the Niagara area. In 2005 a publication in the Journal of Great Lakes Research titled 'A Re-examination of the Climatological Impact of the Lake Erie-Niagara Ice Boom on Buffalo, New York' by Mark LaRussa and Stephen Vermette reaffirmed that the ice boom has had no statistically significant impact on water or air temperatures in the vicinity of Buffalo, NY. Furthermore, the noted changes in water and air temperature were warming trends, not cooling trends, and have been attributed to regional climatic changes experienced throughout the Great Lakes.

For more information regarding the ice boom visit https://www.ijc.org/en/nbc/watershed/faq/6

Seaway's 2021 Navigation Season Ended in the Final Hours of the Year

The navigation season for the St. Lawrence Seaway closed at 1:15 pm on December 31, 2021 as the Helena G bulk carrier moved through the St. Lambert Lock in Montreal, Quebec while carrying steel en route to Trois Rivieres, Quebec. It is important to note, the ILOSLRB has no oversight over navigation, and the opening and closing dates of the Seaway are determined by the Seaway entities.

The Helena G was the last vessel to move through the St. Lambert Lock and marked the close of the 2021 navigation season along the St. Lawrence Seaway. Photo credit: Great Lakes St. Lawrence Seaway Development Corporation.

Dewatering the MacArthur Lock of the Soo Locks

The Soo Locks are operated and maintained by the U.S. Army Corps of Engineers, Detroit District and have two operational locks that accommodate commercial vessels: MacArthur and Poe. The size of the ship determines which lock will be used. Vessels larger than 730 feet long and 76 feet wide are too big for the MacArthur Lock and must use the Poe Lock. The Poe Lock can accommodate vessels up to 1,000 feet in length.

The MacArthur Lock was dewatered at the end of December 2021 for winter maintenance. Maintenance crews will complete hydraulic steel structure inspections, repair miter gate 5 sill, and complete tainter valve machinery replacement. Crews will also complete timber replacements on the piers, and inspections and preventative maintenance on electrical and mechanical systems to ensure the lock is operational before reopening in March 2022.

The Poe Lock closed for navigation at 11:59 p.m. January 15, 2022. The operating season is fixed by federal regulation and is driven in part by ice conditions and the ability for vessels to continue to safely transit throughout the Great Lakes.

The MacArthur Lock dewatered in preparation for winter maintenance. Photo credit: US Army Corps of Engineers, Detroit District.

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The Board's website
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