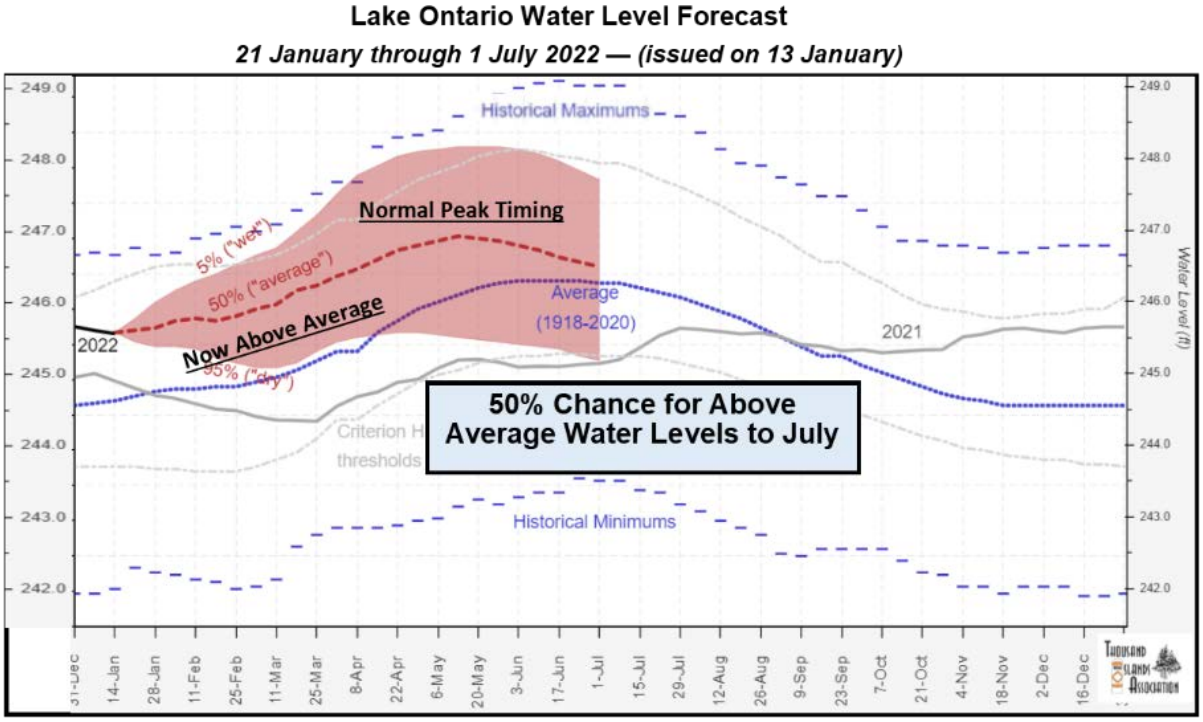
Water Levels 2022 Mid-Winter Update, Ice Formation Status & 6-Month Forecast
Full Article by *TIA Water Levels Committee (1/31/22)*

During the winter the IJC's ILOSLR Board has two major jobs:

1. Regulate water levels on Lake Ontario & SL River according the regulation Plan 2014, balancing interests across the water basin. Ideally levels would be low enough to handle high spring flows, yet high enough so we emerge at or above average after the "spring uncertainty mist clears"
2. River housekeeping to ensure formation (and survival) of stable, smooth ice sheets so flows can be adjusted at will, while preventing ice jams and flooding.



https://ijc.org/en/loslrb/watershed/forecasts Edits by TIA

Flow reductions began on January 10th, from 8100 m3/sec with the Lake Ontario Outflow (Week Ending Fri, Jan 28 2022) reaching a minimum of ~6200 m³/s, a 23% reduction. The Lake Ontario outflow is now returning toward normal as ice formation has benefitted from extremely cold January temperatures.

See this month's special feature titled ***Learning about Ice Formation,*** *beginning on the next page.*

Observations

- January began as a dry month, however with the significant storm that developed over the region January 16th, the monthly precipitation appears to be on par with January averages. The rest of the Great Lakes remain dryer than average.
- Lake Erie/Huron and Michigan continue to have average water levels trending down. In fact Lake Erie is a full two feet lower than in 2020. Ultimately this means lower flows into Lake Ontario and thus lower levels in the Thousand Islands.

ILOSLR Board's 'Weekly Regulation Summary' *(the last two weeks' statements)*

~ Jan 22nd – Jan 28th ~

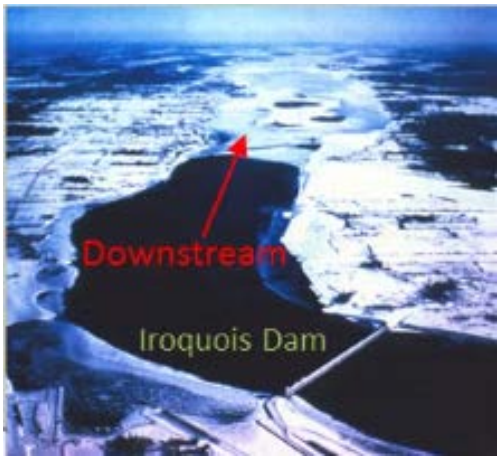
"Ice continues to form in the critical sections of the St. Lawrence River, and Lake Ontario's outflow will continue to be operationally adjusted to assist the formation of a stable ice cover."

Lake Ontario Outflow for Week Ending Fri, Jan 28 2022 was 6200 m³/s, a 23% overall decrease. https://ijc.org/en/loslrb/watershed/outflow-changes (flow changes listed here)

~ Jan 29th – Feb 4th ~

"Lake Ontario's outflow will continue to be carefully and gradually adjusted **to maintain stable ice conditions in the critical sections of the St. Lawrence River**. As ice conditions stabilize, Lake Ontario's outflow will be increased."

Learning about Ice Formation



This is a special emphasis section, covering some amazing facts about the importance and process of ice formation in the critical areas of the St. Lawrence River. This Full Article, referenced in the Jan/Feb 2022 issue of TIA's ***River Talk*** magazine, is available at TIA's website https://www.thousandislandsassociation.com/water-levels/ or directly from **HERE**

The first step is to learn how to pronounce Beauharnois Canal, as that's usually where mention of ice formation first begins, and second is to know its location…*keep reading*.

Simply say bow·**haarn**·waa *(emphasis on* **haarn***)*

To hear it https://www.howtopronounce.com/beauharnois then press

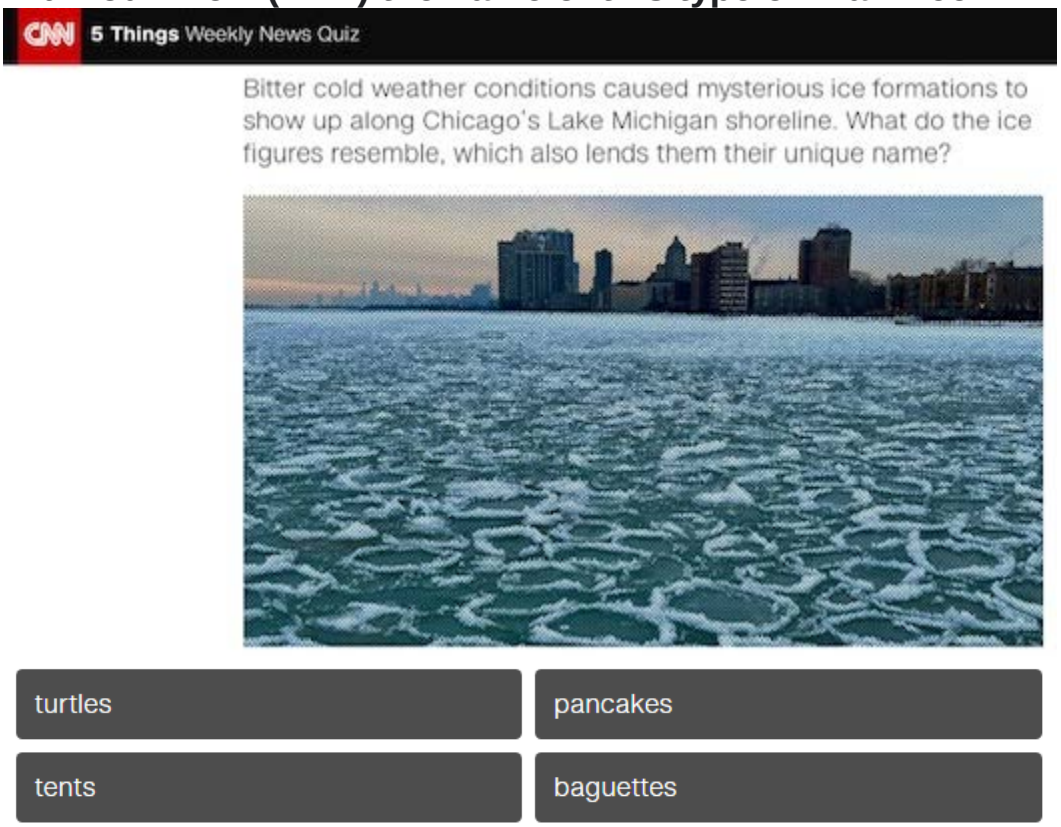
The Basic River Winter Need: A solid ice sheet is a must, as Frazil Ice is "fragile" ice, prone to ice jams, and will not accommodate the high flowrates necessary during cold winter months into the spring.

The overall goal is a solid ice sheet in high flow zones (at manmade structures or in restrictive narrow channels), smoothed on the bottom so flows are laminar (parallel), rather than rough on the bottom, which produces swirling turbulence. **No Frazil Ice!**

Frazil Ice is a collection of loose, randomly oriented, plate or large free floating chunks & disk shaped ice crystals notorious for bunching together, blocking flows with flooding.

Frazil Ice can make the ILOSLR Boards nerves “frazzled”. (mentally exhausted). Or, worse yet, drive them “Cactus & Frazzled” (Cactus, in Australian slang, means: beaten, finished, ruined, and kaput). See https://en.wikipedia.org/wiki/Frazil_ice

Did You Know (DYK) the name of this type of Frazil Ice?



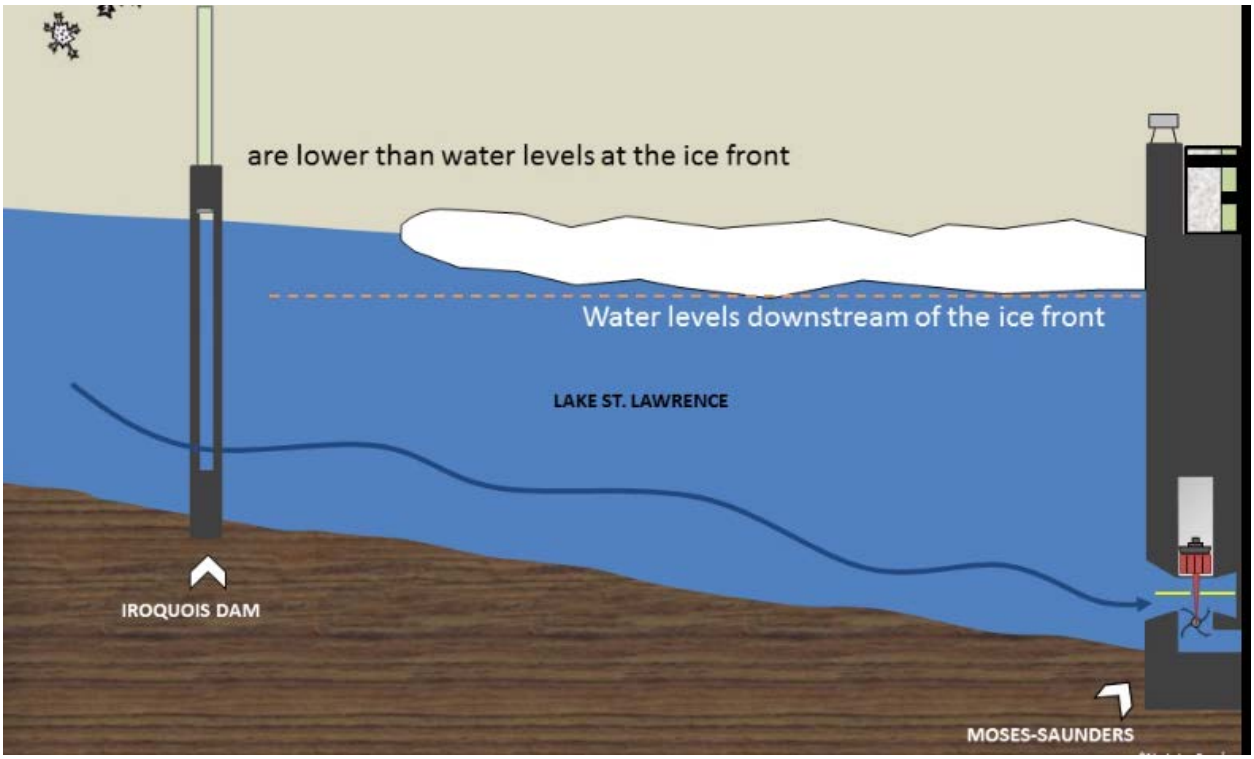
DYK the correct answer? It is ‘ice pancakes’ – round flat discs made of ice. These were found at Roger’s Park, which is about 10 miles north of downtown Chicago.
https://www.cnn.com/interactive/2022/01/us/cnn-5-things-news-quiz-january-28-sec/

DYK that before “The Project” (construction of the Seaway), ice jams and flooding were frequent occurrences in several critical areas upstream of Montreal region?

DYK “ice jams” are often called “ice dams”. They can occur on either side of winter… “Ice jam floods are less predictable and potentially more destructive than open-water flooding and can produce much deeper and faster flooding.” https://en.wikipedia.org/wiki/Ice_jam *(this is a fascinating reference)*

For a worthwhile video overview, go to the IJC’s ILOSLR Board Module 5 (3 ½ minutes) at https://ijc.org/en/loslrb/library/modules, scroll down to Module 5 – Ice Formation, then play the video by clicking the Vimeo play triangle. *(or keep reading for now)*

The short video explains how a stable ice sheet is built from downstream to upstream, in critical areas using the example below from the Morris-Saunders Power Dam upstream toward the Iroquois Dam, which was built to aid in this process.



Ice formation on Lake St. Lawrence and the potential for frazil ice generation can have a major effect on regulation of outflows in the St. Lawrence River (see Update below). Temporary outflow reductions are often required to ensure the formation of a safe and stable ice cover, but modern ice management practices have significantly reduced the frequency and magnitude of ice jams as localized flooding was a frequent occurrence along the river historically. https://ijc.org/en/loslrb/lake-st-lawrence/levels

UPDATE Details: **Flow reductions began** on January 10th 2022, dropping -19% from 8100 m3/sec downward to 6600 m3.sec on Jan 17th and up to 7000 on Jan 19th to a minus 14%. **Outflow for Week Ending Fri, Jan 28 2022 was then reduced to 6200 m³/s, a 23% overall decrease.**

Now that stable ice is forming, **Outflow for the Week Ending Fri, Feb 04 2022 will increase to 6900 m³/s vs 6200 the week before. Therefore the flow is now at -15% of the Plan 2014 seasonal level target.** Without a major thaw producing ice sheet damage, flows should return to normal the week thereafter.

Recent Ice Photos of Interest

These Ice Photos are compliments of former TIA Board member Pete Medcalf. They depict some sheet ice, frazil ice & other artful ice formations. All are from the Rockport area and current except the one with sunset reflections from west of Hill Island's upstream tip.

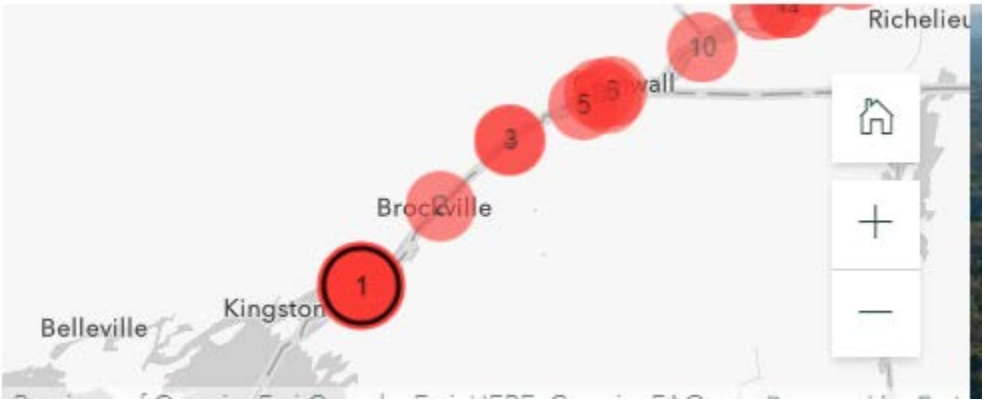
Photo UPDATE: The latest aerial photos showing the results of 2022 Ice Formation can be found at the end of this article…

Geographically Challenged? Tale a Quick Tour! *(or continue reading)*
Like most of we Upper St Lawrence River folks, IF you are unfamiliar with the order of downstream Seaway facilities in the Lower St Lawrence, we highly encourage you to take the excellent photo tour developed by the IJC & the ILOSLR Board.

Lake Ontario & SLR Tour – https://ijc.org/en/loslrb/watershed/tour-storymap

The Tour begins at Niagara. Either start there and tour Lake Ontario first, or scroll down (on the right of all the photos) to the section titled "The St. Lawrence River" (or click on the St Lawrence River section in the menu at the top of the page).

Beginning with Circle #1, the Thousand Islands area is shown in the interactive map graphic below. FYI, clicking on any circle will move to its specific photo & information. *This is a great feature for "touring"!*

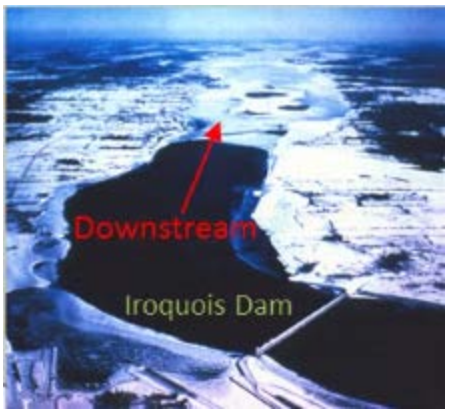


As a point of geographic reference, **Lake** St. Lawrence is the forebay feeding the Moses-Saunders Hydro Dam. It is the main control structure used by the ILOSLR Board to control outflows from the Lake Ontario Basin through the St Lawrence River. The dam discharges into Lake St. Francis, which eventually feeds two old Hydro-Quebec facilities 15+ miles upstream of Montreal.

Most of this water passes through the **Beauharnois Canal**, which along with the Beauharnois Generating Station and the smaller Cedars Generating Station, were constructed in the 1930s prior to the Seaway Project.

Both discharge below the 24 m (79 ft) steep drop and transit the 24.5 km (15.2 mi) between Lake St. Francis and eventually into Lake St. Louis. Not much further downstream the Ottawa River's outflows join with the St. Lawrence River and the total passes by Montreal.

A stable ice sheet is needed upstream of all of these facilities (and a few other places) to prevent ice jam damage and flooding.



NOTE: As a background supplement to this report and to the IJC's ILOSLR Board's Learning Module 5 on Ice Formation, we have included the full contents of their FAQs 2.7 and 4.8.4.

These details provide further insight and a great summary as we wrap up this month's special Ice Formation feature.

2.7 What actions does the ILO-SLRB take to manage ice conditions in the St. Lawrence River during the winter? https://ijc.org/en/loslrb/watershed/faq/2

Regulation of Lake Ontario outflows has greatly reduced the incidence of ice jams in the St. Lawrence River, both upstream and downstream of the Cornwall/Massena area. Prior to regulation, the frequent occurrence of ice jams in the river was a major cause of extreme fluctuations in water level and flooding of adjacent shoreline properties.

During the winter, the Board, in conjunction with their Operations Advisory Group, monitors ice formation in the St. Lawrence River closely. Outflows from Lake Ontario can be increased or decreased, as conditions require, for ice management purposes. For example, Lake Ontario outflows may be decreased, in accordance with the I-limit rules of Plan 2014, to reduce the flow velocity and accommodate the formation of a stable ice cover.

A stable ice cover helps prevent unconsolidated ice from accumulating at narrow points and obstructions in the river and causing ice jams and associated flooding. A stable ice cover also prevents unconsolidated ice from flowing into and clogging hydropower intakes. Alternatively, in some cases, outflows can be increased to help break up and flush unconsolidated ice that has become caught or that may pose problems at certain locations. After events such as these, outflows from Lake Ontario are adjusted when opportunity arises, to return lake water levels to what they would have been if the outflows had remained as those specified by the regulation plan.

On the St. Lawrence River, the ice formation process usually begins in the lower portion of the river, just upstream of the Montreal area in the Beauharnois Canal, followed by formation upstream of Moses-Saunders Power Dam through the International Section of the river. When a stable ice cover has formed far enough upstream in the International Section, the Iroquois Dam gates may also be lowered slightly to further assist ice formation from this point further upstream towards Lake Ontario. Ice booms are also used in the river to assist in ice formation.

4.8.4 What is the I Limit?

https://ijc.org/en/loslrb/watershed/faq/4

The I-Limit rules set maximum outflows during the winter months to ensure the safe formation of an ice cover (see Q2.9). The maximum flow during ice formation is normally set to 6,230 m^3/s to facilitate the formation of a safe, stable ice cover under most wintry conditions. The maximum flow under an established ice cover is limited to 9,430 m^3/s to protect the integrity of the ice cover. A third rule limits low levels on Lake St. Lawrence to 71.8 m at Long Sault Dam or higher during the non-navigation season (to protect municipal water intakes and the integrity of the ice cover on the forebay). Any flow changes needed to manage ice conditions are considered operational adjustments and do not require offsetting changes at a later time.

News Flash “Ice Has Formed!”

Just in – A great series of photos from the IJC’s International Lake Ontario – St. Lawrence River Board’s Facebook page (January 28 & 29, 2020) Showing elegant results from their Ice Formation effort.
https://www.facebook.com/InternationalLakeOntarioStLawrenceRiverBoard

Scroll down to see aerial photos from six important sites, beginning downriver at the Beauharnois Canal and moving upstream to the Ogdensburg – Prescott Bridge.

These photos are definitely the “icing on the cake” <River> to end this article!!

International Lake Ontario - St. Lawrence River Board
January 28 at 6:06 PM ·

Ice has formed in the critical sections of the St. Lawrence River in the Beauharnois Canal and on Lake St. Lawrence. As ice conditions stabilize, outflows from Lake Ontario will be increased in accordance with the rules of the plan.

IJC.ORG

Lake Ontario Flows 4th Highest on Record in January Despite Plenty of Ice | International Joint Commission

International Lake Ontario - St. Lawrence River Board
19h ·

Ice conditions at Moses-Saunders Dam. January 29, 2022. Photo credit: International Joint Commission.

International Lake Ontario - St. Lawrence River Board
19h ·

Ice conditions at Iroquois Dam. January 29, 2022. Photo credit: International Joint Commission.

International Lake Ontario - St. Lawrence River Board
19h ·

Ice conditions at Long Sault Dam. January 29, 2022. Photo credit: International Joint Commission.

International Lake Ontario - St. Lawrence River Board
19h ·

Ice conditions at the Prescott ice boom. January 29, 2022. Photo credit: International Joint Commission.

International Lake Ontario - St. Lawrence River Board
19h ·

Ice conditions at the Ogdensburg-Prescott Bridge. January 29, 2022. Photo credit: International Joint Commission.