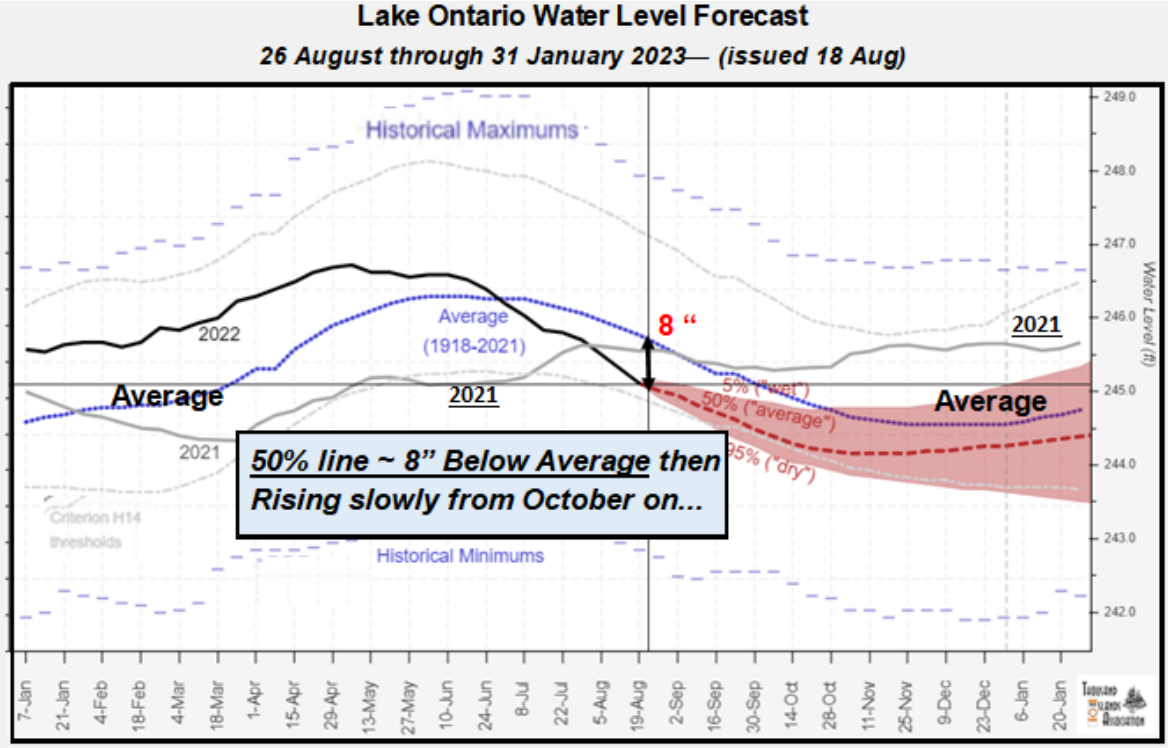
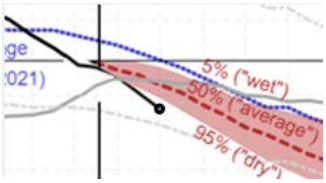
Water Levels – Dropped 4” More than Predicted in August’s 6-Month Forecast

TIA Water Levels Committee (8/26/22 updated 9/9/22) – by Barton, Stewart & White



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

In the last month, levels dropped rapidly below 50%, beyond the low chance 95% “Dry” line. *This situation has less than a 5% chance to occur*. **We’re 8” below the 100 year average.**



See the black line & round dot added to last month’s graph. ➔

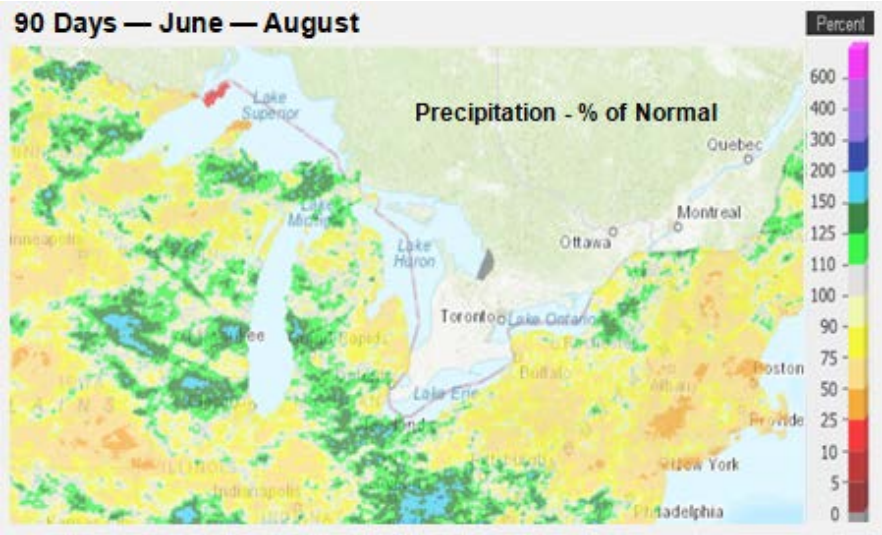
The actual level decrease went from the projected ~4" to ~8". The magnitude of this drop is better seen when August’s changes are plotted on July’s small forecast graphic above. **Given the amount of water that disappeared, it makes sense why folks are worried.**

There’s a LOT going on right now, so we have chosen to write a full article with more graphics to keep our readers informed, but not worried.

Click **HERE** to view the **Full Article PDF** briefly covering the following discussion items:

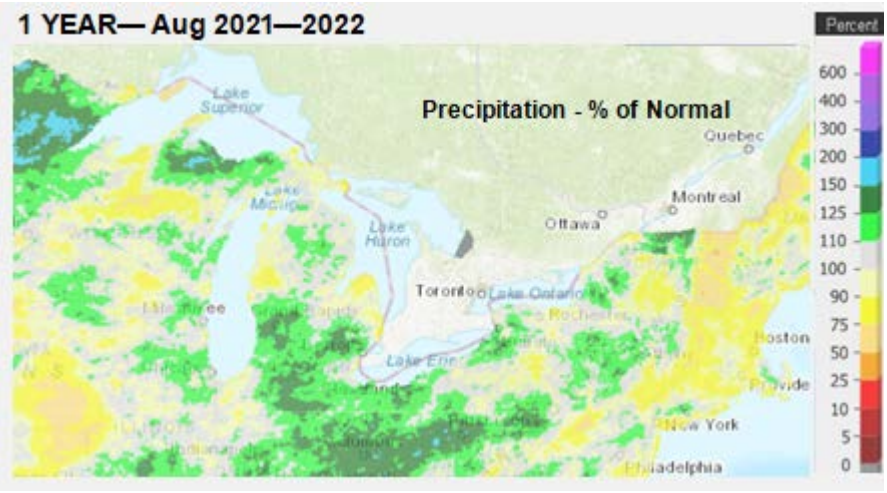
- Great Lakes Precipitation in the last 90 days – 30 days – 14 days – 1 year
- Why outflows are so high when this year we want to conserve water levels
- How wind temporarily drove levels even lower – but gave the water back
- The impact of the recent drought relieving 4+ inches of rain August 21 – 30
- Vince’s helpful definition of the ‘high-highs’ & ‘low-lows’ basis of Plan 2014
- Plan 2014 appears to have overcorrected making the low levels slightly worse
- The GLAM Adaptive Management Plan 2014 review can recognize this problem
- Downstream Lake St. Lawrence pix, where levels are barely enough for shipping

Great Lakes <u>Precipitation</u> in the last 90 days - 30 days – 14 Days – 1 year
(Source https://water.weather.gov/precip/)



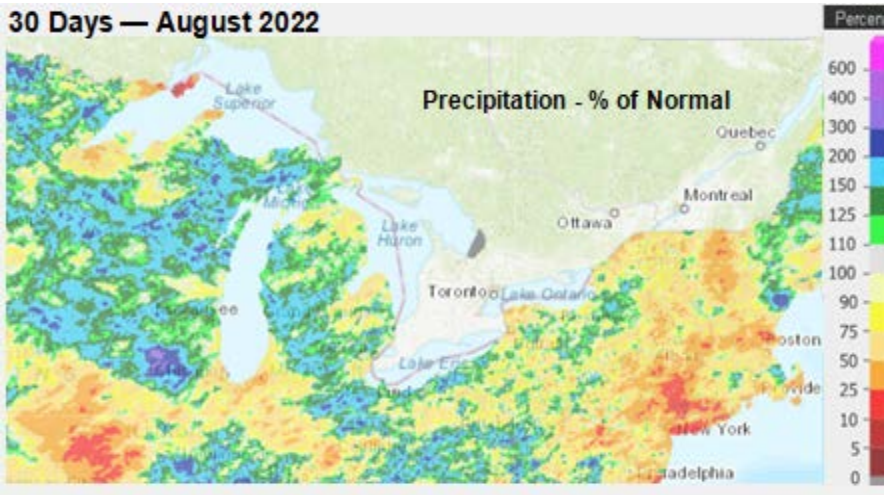
For the last year since summer 2021, the Lake Ontario Basin's precipitation had been running slightly above average. *(see 1 year)*

Suddenly we had <u>3 very dry months</u>, shown by the tan through yellow colors for **50 to 90 % Percent of Normal Precipitation.**



For this full year chart you'll notice lots more light and dark green colors and a bit of yellow on the south side of Lake Ontario. North of the lake experiences were similar.

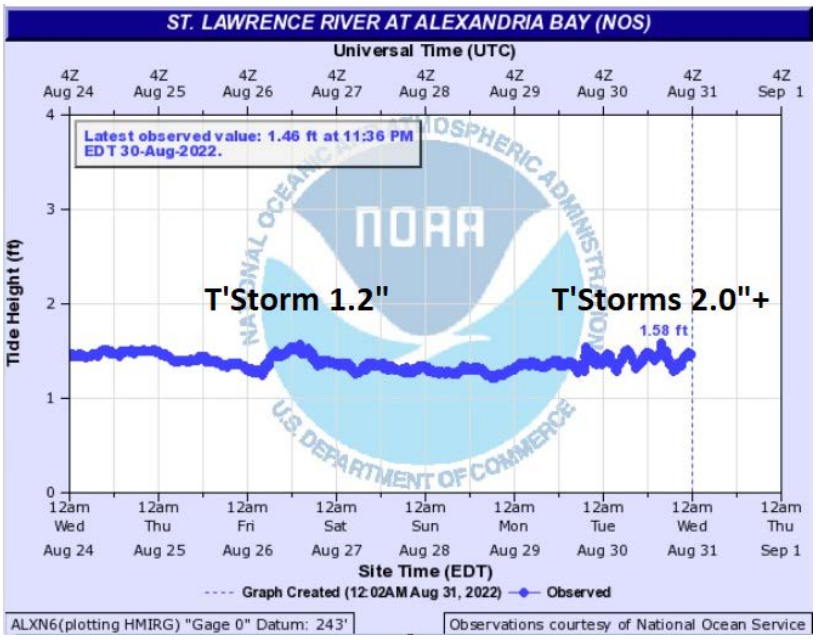
The US Army Corps of Engineers determined the <u>LO Basin received 97% of average precipitation</u>.



From <u>late July through the 21st of August, there was **practically no rain**</u> in the River region and not much of significance elsewhere to flow into the Lake Ontario Basin.

<u>Plants and trees were showing severe distress.</u> Note all the dark yellows and tans with a few reds in the Northeast. Folks were saying **drought.**

How <u>wind</u> temporarily drove levels even lower – but gave the water back



Alex Bay levels tracked just below the 2 foot (above chart datum = 0 = 243 ft) through Aug 8th, and then fell for the next week, leveling out on Aug 16th down 6" more.

Levels vary 2-3" in any given day, and we're all far <u>more sensitive to these changes since our boats are now so low.</u>

The **seiche** on Aug 26th caused a 4"+ swing thanks to winds from a drenching cold front.

Impact of the recent drought relieving 4+ inches of rain August 21st – 30th

The weather changed on Sunday Aug 21st, breaking a 3+ week lack of precipitation. Nearly 4 days of winds from the NE blowing up the River, only made lowering levels worse. The winds shifted from 4 days of sustained NE winds allowing the water levels to rebound. By Friday the 26th, lots of hit-or-miss showers had blessed the islands region with between 1.8" and 3.5" depending on location. For example, in one hour Friday afternoon, the same thunderstorm dropped 1.1" on the Navy Islands, only 0.1" in Rockport and about 1.4" at the Wellesley Island MESONET station just south of the WISP (State Park's) Campground. ***Local precipitation is a poor indicator of amounts entering the Lake Ontario Basin!***

And the precipitation continued, with another 2.0" in the last few days of August here on the River. Zooming in on Northern NY and Southern Ontario, just the US data alone makes it clear what a **'drought-breaker'** the last 14 days of August have been. <u>Percentages of average range from **110 – 400%** in just under two weeks!</u>

Don’t forget Evaporation’s Effect on Water Levels

By early evening, this plastic food tray was finally filled to overflowing from several thunderstorms. Around noon the next day the significant evaporation is a reminder. *Did you know that the warm water and cold winds of October have the greatest monthly evaporation effect?*

Vince’s helpful definition of the ‘high-highs’ & ‘low-lows’ basis of Plan 2014

I think both the “higher highs” & “lower lows” as well as the tennis ball analogy are often misunderstood. The idea behind higher highs and lower lows is that the new Plan 2014 formula would result in **higher highs** when ‘Wet’ conditions were already occurring - basically a little higher than it would have been under the old plan. The converse is true for **lower lows** during ‘Dry’ conditions. Some people think it means that they'll magically create lows or highs whenever they want. *That's just not the case or intent.*

IJC Plan 2014 pg47

“Based on historical supplies, Plan 2014’s projected maximum level would be 6 cm (2.4 in) higher than the maximum level under 1958DD. By way of comparison, a tennis ball is about 6.7 cm in diameter.”

***Background**: The Boundaries Water Act (1917), makes clear that shipping navigation, hydroelectric production, and municipal water intakes are priorities to protect the integrity of the joint resource. In fact, the old regulation plan (1958DD) does not take into account ecosystem concerns to any great extent. Plan 2014 was to be developed partly to take environmental/ecosystem concerns into account, given our growing knowledge in this area. It is worth noting P2014 also specifies “to the extent possible”, ”priority will be given to riparian stakeholders”*

Ross asked “Is the Plan 2014 a proper balance between ecosystem interest/benefit and riparian interests (i.e. recreation/boating, property)? What should that balance be given our knowledge today?

Ross is of the belief that the *more natural the levels the better*. Then the follow-up question has to be: Are level control results from Plan 2014 (its rule curves and limit controls) truly representative of more of natural conditions? Or has it exaggerated natural conditions? Would we want to immediately pull back outflows when we have two months of drought? Looking at **pre-project** <*before the Seaway*> levels for the 3rd week of August, **levels would be 2.5 ft higher!** Let us know what you think!

Why outflows are so high when this year we want to conserve water levels

TIA's Water Levels Committee is puzzled with continued higher than average outflows from the Moses-Saunders Hydro dam this season. Each month since January 2022, the 6-Month Forecast from the River Board (ILOSLRB) suggested levels would be falling from above to below average in the second half of the year. By late March, forecasts all agreed on below average levels for the rest of the year. If the precipitation turned from 50% forecast line to the "Dry side", we could *really run low before the fall*.

Plan 2014 appears to have overcorrected making low levels slightly worse

Did Plan 2014 overcorrect past and current supplies into the Lake, and make levels the first week of September lower than necessary?

The reality we've seen last year and this year, though, is that the current outflow formula CAN create some pretty (seasonally) severe lows, even when overall conditions would NOT put us low in the first place. Take last year, 2021 - we still had WAY more than average inflows from Lake Erie in May/June (and prior months, of course) - yet we hit the **LOW H14 criteria** in May/June 2021. And we're getting close again…Why?

Was this low water level manufactured? The only reason we were "saved" last year is because last July was one of the wettest Julys on record - and ***caused a never-before-seen rise in Lake Ontario levels in July***. This year, Erie outflows are still higher than average. Sure, it's been drier than average - but not a ton for the longer 1 year term.

August 2021 through July 2022 has the Lake Ontario basin at 97% of average (normal) precipitation. Yes, the more recent months were drier until the last 10 days of August, but not so much that we should expect to see Lake Ontario levels plummeting like they have been. We've gone from 8 ½" above average in early May to now 8" below average in mid-August. 16+" drop relative to average in about 3 1/2 months - at a time that we're still receiving higher than average flows from Erie.

Does that seem right?

Sure doesn't to Vince. As to why that's happened: It's because outflows have been cranking away at far-far above average that whole time and still are, even though we're 8" below average (*and about 4" below the 5% Dry forecast the end of July*).

Even now (as of August 23rd), outflows are still 600 m3/s higher than **average** for this time of year. Yet for an interesting comparison, outflows are now more than 1,400 m3/s above what pre-project outflows would have been at the current 245.05' level - because that's what the Plan 2014 formula says. Something's wrong…

It's really a lot like what happened in 1987 when the Board drove levels lower than they should have been, then struggled when there wasn't enough water to bring them back up. That was human decision overcorrection**. So, is what we're now seeing formula-driven overcorrection**? So there's my soapbox... there's a problem here, I'm pretty sure it's recognizable as a problem... Hopefully GLAM can figure out a good way to fix it in Phase 2 relatively soon.

GLAM Adaptive Management Plan 2014 review can recognize this problem

While we think many people are blowing totally out of proportion how low levels are (at least on the upper River, well away from Lake St. Lawrence), we do believe that Plan 2014 has caused this low water for no useful reason. It appears the 52 week lookback in the algorithm, in its current functioning form, is at the heart of this problem.

Despite the multiple months in a row of lower-than-average precipitation and levels that have fallen considerably below average, Plan 2014's algorithm is still pumping out far higher than average outflows. (Now at 7,870 m3/s till Sept 9th) *This is causing **Lake St. Lawrence** to be setting new record lows this summer.* (See photos in next section)

I can't see any good reason they should be suffering like this. Many of the records that are being approached/broken were set back in 1987 - which is when they overcorrected and let out far too much water than needed (at least as it turned out - the IJC even admitted in a document I've read they overdid it).

That's not exactly a good precedent to be lining up with this summer, especially when it appears that just a formula is doing it. We hope that some GLAM folks do realize there's a problem with the 52-week lookback and are looking at it as part of their phase 2 of the expedited review.

Example: The significant drop over the last couple of weeks was rapid, and as Vince says, the 52-week adjustment weighting will not take this into account...certainly not over the short term. Ross commented: Glad it can be addressed by GLAM phase 2. Then it becomes a philosophical discussion on balancing interests.

Downstream: Lake St. Lawrence update – levels barely enough for shipping

Ross points out that there is currently a lot of unhappy sentiment in public forums concerning low water levels. Most of us in the Upper St. Lawrence find the low levels at the end of the season okay and acceptable, yet are hoping they don't go much lower.

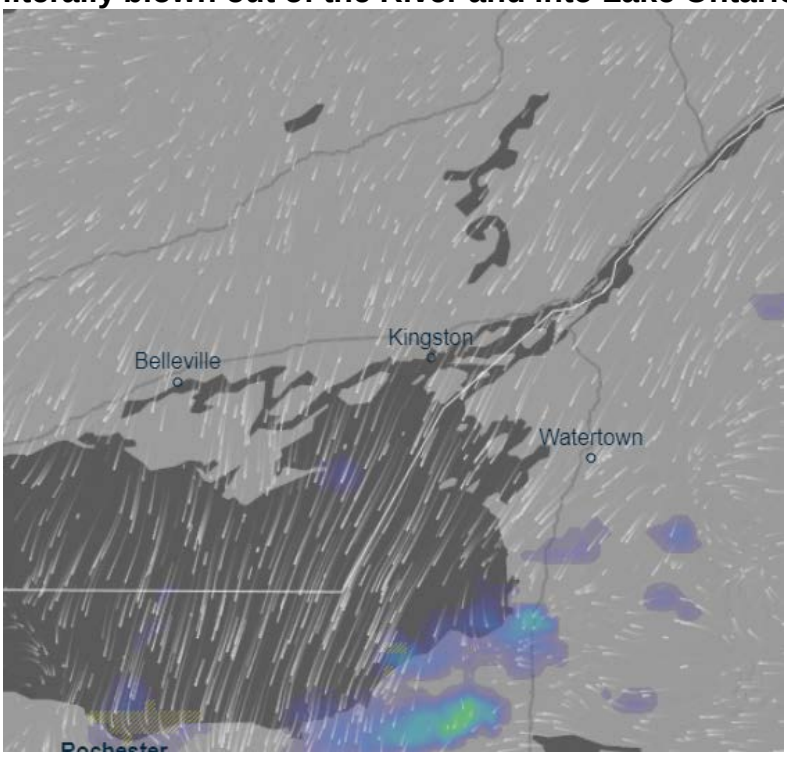
This is not the case, however, for those downstream in Lake St. Lawrence. Levels there have been very low for a number of years and records are being set now in 2022. Why does this happen? In simple terms, water inflow into Lake St. Lawrence is somewhat restricted from entering. For a given Lake Ontario/Upper SL River level, certain higher outflows downstream via the Moses-Saunders Dam can drain Lake St. Lawrence faster than Lake water can enter to fill it. *The inflows are restricted by the 'channel capacity'.*

This very low water is a normal phenomenon within **shallow** forebays (flooded areas) upstream of large dams around the globe. The ongoing high outflows exasperate this condition.

On Sunday August 17th, a follower of St. Lawrence Ship Watchers group on Facebook posted the following:

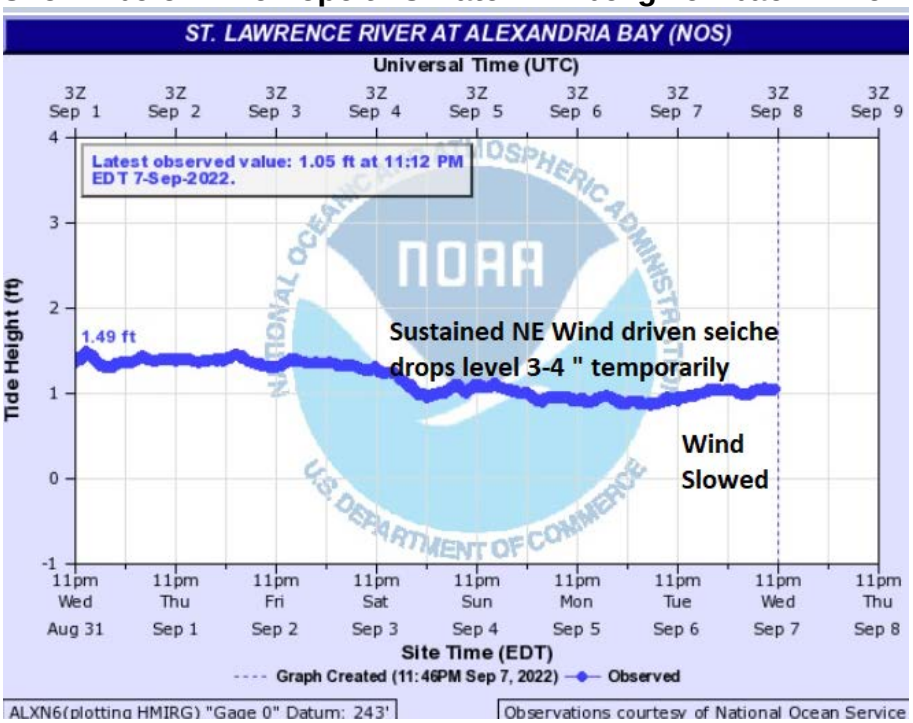
Today is another day of low water here on Lake St Lawrence. Leaving boats stranded on lifts and water levels at 72.63 just .03 m above shipping safe levels. East wind could bring this lower making shipping unsafe. Please contact IJC to voice issues at: ILOSLRB-USSection@usace.army.mil If you care send info on your situation.

<u>Last News Byte</u> – Five consecutive days of NE wind blowing 'up-river' dropped levels 4 inches more, down to the 1 foot above chart datum mark. Water is literally blown out of the River and into Lake Ontario, pushed by the NE wind



Wed 9/7/22 11:30pm – NE winds about to end

The results of the NE wind driven seiche are evident at the Alex Bay level gauge, shown below. We hope this water will be 'given back' when the seiche subsides



We hope you enjoyed this expanded Water Levels Full Article and found it useful.

You are encouraged to pass on this link to others who could benefit and expand their perspectives on these important topics.
https://www.thousandislandsassociation.com/water-levels-sept-oct-2022-river-talk-full-article/

Vince Barton – Ken White – Ross Stewart