LEVEL news

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Great Lakes – St. Lawrence River Water Levels

The Entire Great Lakes Basin experiences very dry conditions throughout September

During September, the Great Lakes Basin experienced the following:

- The mean monthly water levels of all the Great Lakes were above average.
- Lakes Superior and Michigan-Huron experienced dry water supply conditions in September (a combination of the precipitation, evaporation, and runoff). Additionally, Lakes Erie and Ontario experienced very dry water supply conditions during the month.
- September precipitation amounts were well below average for the entire Great Lakes Basin.
- Lakes Superior, Michigan-Huron, and Erie experienced greater than average monthly declines, while Lake Ontario experienced its seventh largest September decline on record.

Great Lakes water level information:

September 2023 monthly mean levels

Lake	Level[a]	Compared to September monthly average (1918–2022)	Compared to September 2022	Compared to record high (1918-2022)	Notes
Superior	183.63 m	9 cm above	2 cm below	23 cm below	-
Michigan–Huron	176.64 m	11 cm above	8 cm below	74 cm below	-
St. Clair	175.43 m	31 cm above	2 cm above	45 cm below	-
Erie	174.54 m	34 cm above	8 cm above	33 cm below	-
Ontario	74.88 m	14 cm above	33 cm above	53 cm below	-

[a]Water levels are referenced to International Great Lakes (Vertical) Datum 1985 (IGLD85). For more information, please visit International Great Lakes Datum Update – Great Lakes Coordinating Committee at https://www.greatlakescc.org/en/international-great-lakes-datum-update/

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At this time of year, all the lakes are continuing their seasonal declines.

With water levels remaining above average in all lakes, and the possibility of large storms and winds, low-lying areas are at risk for accelerated coastline erosion and flooding. For current information and forecasts, please refer to the sources listed below.

As all the Great Lakes have experienced their 2023 peak, we can take a look at how their seasonal rises compared to the average levels. Read more about it below.

Great Lakes water level information:

September lake level changes[a]

Lake	September lake level change	September monthly average change (1918-2022)	Compared to average September change (1918-2022)	Notes
Superior	5 cm decline	1 cm decline	greater than average decline	-
Michigan–Huron	8 cm decline	6 cm decline	greater than average decline	-
St. Clair	17 cm decline	7 cm decline	much larger than average decline	-
Erie	15 cm decline	9 cm decline	greater than average decline	-
Ontario	24 cm decline	15 cm decline	much larger than average decline	seventh largest decline on record

[a] Lake level changes are based on the differences in levels at the beginning of the months and not the monthly average levels.

Great Lakes water level information: Beginning-of-October level[a]					
Lake	**Level[a,b]**	**Compared to October beginning-of-month average (1918–2022)**	**Compared to October 2022**	**Compared to record high (1918-2022)**	**Notes**
Superior	183.60 m	6 cm above	4 cm below	28 cm below	-
Michigan–Huron	176.60 m	11 cm above	6 cm below	89 cm below	-
St. Clair	175.36 m	30 cm above	3 cm below	60 cm below	-
Erie	174.47 m	32 cm above	6 cm above	42 cm below	-
Ontario	74.75 m	7 cm above	27 cm above	55 cm below	-

[a] At the beginning of October, all of the Great Lakes were at least 40 cm above their chart datum level. Chart datum is a reference elevation for each lake that provides more information on the depth of water for safe boat navigation on the lakes. For more information, please visit Low Water Datum – Great Lakes Coordinating Committee at https://www.greatlakescc.org/en/international-great-lakes-datum-update/low-water-datum/

[b] Water levels are referenced to International Great Lakes (Vertical) Datum 1985 (IGLD85). For more information, please visit International Great Lakes Datum Update – Great Lakes Coordinating Committee at https://www.greatlakescc.org/en/international-great-lakes-datum-update/

Water levels forecast

Lake Superior is currently above its average level but is expected to approach average under typical water supply conditions. If there are very wet water supply conditions, lake levels could remain above average, while very dry conditions could result in lake levels falling below average within the next few months.

Lake Michigan-Huron is expected to remain above average under most water supply conditions. It would take very dry conditions to bring the level below average by late fall.

Lake Erie is also expected to stay above average under most water supply scenarios.

Lake Ontario is above average but may come close to an average level by late fall under typical water supply conditions. Wetter than average conditions may result in the level remaining above average, while drier than average water supply conditions would result in the level moving below average.

For more information on the probable range of water levels, consult https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/great-lakes-levels-related-data/levelnews-great-lakes-st-lawrence.html#projection.

For a graphical representation of recent and forecasted water levels on the Great Lakes, refer to https://www.tides.gc.ca/en/monthly-water-level-bulletin-great-lakes-and-montreal-harbour.

September basin statistics			
Lake	**Precipitation (percentage of LTA) [a,b]**	**Net basin supply (probability of exceedance) [c,d]**	**Outflows (percentage of LTA)[a]**
Superior	57%	72% (dry)	111%
Michigan-Huron	43%	71% (dry)	108%
Erie (including Lake St. Clair)	34%	89% (very dry)	109%
Ontario	25%	81% (very dry)	112%

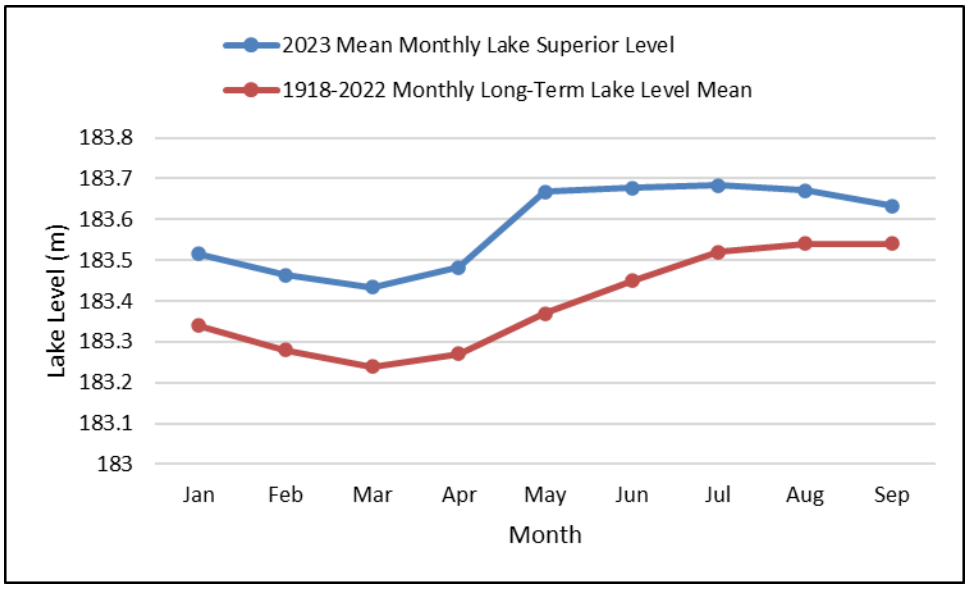
[a] As a percentage of the long-term average (LTA).
[b] Environment and Climate Change Canada – Canadian Precipitation Analysis System
[c] <5% extremely wet; <25% very wet; <45% wet; 45-55% average; >55% dry; >75% very dry; >95% extremely dry.
[d] Please refer to the LEVELnews "What is net basin supply" (https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/great-lakes-levels-related-data/levelnews-great-lakes-st-lawrence.html#projection) for a description of net basin supply.
Note: The figures contained in this report are provisional and are subject to change. Data are calculated from the best available observations at the time of posting.

Summary of the 2023 seasonal rise

The timing of the seasonal rise varies from lake to lake. Lake Superior typically experiences its peak in late summer or early fall, whereas Lakes Michigan-Huron, Erie, and Ontario peak slightly earlier in mid-summer (June or July). Lake Superior has now likely seen its highest level of the season, with the other lakes continuing their seasonal descent. So, with all the lakes past their peaks, we can now look at how the seasonal rise through the spring and summer in the lakes compared to their averages.

Lake	Average seasonal rise (1918–2021)	2023 seasonal rise
Superior	31 cm	23 cm
Michigan–Huron	32 cm	29 cm
Erie	44 cm	45 cm
Ontario	59 cm	77 cm

Lake Superior experienced less than it's typical rise this year, which an interesting seasonal pattern. Rather than its typical peak in August or early September, it reached its annual maximum level in late May and stayed relatively constant until late August, as illustrated in the following figure. This is a result of predominantly dry conditions throughout the summer in the basin.



Lake Michigan-Huron experienced close to its typical rise and peaked in May, while it typically peaks in July.

Lake Erie saw a close to average seasonal rise and started the year above average, peaking in April. Again, this was about a month or so earlier than average. The lake levels have remained above average throughout 2023.

The rise of Lake Ontario was larger than average for the 2023 season, owing to very wet water supply conditions during the spring.

Overall, all of the lakes saw their seasonal peaks earlier than they typically do, and then slowly have descended from their peaks, with the exception of Lake Ontario, which has experienced a rapid decline since the Spring.

Flood information

With water levels remaining high on some lakes, there is a high risk of flooding. Great Lakes water levels are difficult to predict weeks in advance due to natural variations in weather. To stay informed about Great Lakes water levels and flooding, visit the Ontario flood forecasting and warning program website at https://www.ontario.ca/flooding.

Additional information can also be found at https://www.ijc.org/en/lsbc, and https://ijc.org/en/loslrb.

Information on current water levels and marine forecasts

Monthly levels: A monthly water level bulletin, produced by Fisheries and Oceans Canada is available at https://www.tides.gc.ca/en/monthly-water-level-bulletin-great-lakes-and-montreal-harbour and click on the link "Full Monthly Water Level Bulletin for the Great Lakes and Montréal Harbour (PDF)". This publication is intended to complement the information provided by LEVELnews on a monthly basis.

Daily levels: Current daily lake-wide average levels of all the Great Lakes are available at https://lre-wm.usace.army.mil/reports/greatLakes/greatLakesLevelsThisMonth/greatLakesLevelsThisMonth.html. The daily average water level is an average taken from a number of gauges across each lake and is a good indicator of the overall lake level when it is changing relatively rapidly due to recent high precipitation.

Hourly levels: Hourly lake levels from individual gauge sites can be found at the Government of Canada Great Lakes Water Level Gauging Stations website at https://canada-preview.adobecqms.net/en/environment-climate-change/services/water-overview/quantity/great-lakes-levels-related-data.html. These levels are useful for determining real-time water levels at a given site, however, it should be noted that they are subject to local, temporary effects on water levels such as wind and waves.

Marine forecasts: A link to current Government of Canada marine forecasts for wave heights for each of the Great Lakes can be found at https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/great-lakes-levels-related-data.html under the "Wave and wind data heading". Current marine forecasts for Lakes Superior, Huron, Erie and Ontario are available by clicking on the link of the lake in which you are interested. To view a text bulletin of recent wave height forecasts for all of the Great Lakes, click on the "Text bulletin wave height forecasts for the Great Lakes and St. Lawrence River" link.

FOR MORE INFORMATION:

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