LEVEL news

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Great Lakes – St. Lawrence River Water Levels

Lake Michigan-Huron Basin Experiences Very Wet October, While the Other Basins Were Dry

During October, the Great Lakes Basin experienced the following:

- The mean monthly water levels of all the Great Lakes were above average.
- Lake Superior experienced very dry water supply conditions (a combination of the precipitation, evaporation, and runoff), while Lake Michigan-Huron received very wet water supply conditions. Lakes Erie and Ontario experienced very dry and dry conditions, respectively.
- October precipitation amounts were well below average for Lake Superior, approximately 50% above average for Lake Michigan-Huron, average for Lake Erie, and well below average for Lake Ontario.
- Lake Superior experienced its fifth largest decline on record, Lake Michigan-Huron experienced less than its average decline. Lakes Erie and Ontario experienced close to their average October declines.

Great Lakes water level information:

October 2023 monthly mean levels

Lake	Level[a]	Compared to October monthly average (1918–2022)	Compared to October 2022	Compared to record high (1918-2022)	Notes
Superior	183.55 m	3 cm above	5 cm below	36 cm below	-
Michigan–Huron	176.56 m	9 cm above	4 cm below	94 cm below	-
St. Clair	175.28 m	26 cm above	3 cm above	68 cm below	-
Erie	174.39 m	29 cm above	7 cm above	55 cm below	-
Ontario	74.66 m	4 cm above	25 cm above	56 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. Additional information of fall and winter storm safety is provided below.

Great Lakes water level information:

October lake level changes[a]

Lake	October lake level change	October monthly average change (1918-2022)	Compared to average October change (1918-2022)	Notes
Superior	10 cm decline	4 cm decline	greater than average decline	fifth largest decline on record
Michigan–Huron	4 cm decline	7 cm decline	less than average decline	-
St. Clair	12 cm decline	10 cm decline	greater than average decline	-
Erie	13 cm decline	10 cm decline	greater than average decline	-
Ontario	18 cm decline	11 cm decline	greater than average decline	-

[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-November level[a]					
Lake	**Level[a,b]**	**Compared to November beginning-of-month average (1918–2022)**	**Compared to November 2022**	**Compared to record high (1918-2022)**	**Notes**
Superior	183.50 m	same	7 cm below	37 cm below	-
Michigan–Huron	176.56 m	14 cm above	2 cm below	91 cm below	-
St. Clair	175.24 m	28 cm above	2 cm above	66 cm below	-
Erie	174.34 m	29 cm above	6 cm above	56 cm below	-
Ontario	74.57 m	same	19 cm above	65 cm below	-

[a] At the beginning of November, all of the Great Lakes were at least 30 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 close to its average level and is expected to remain close to 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 by early winter.

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 mid-winter.

Lake Erie is also expected to stay above average under most water supply scenarios, although very dry water supply conditions could result in lake levels falling below average by early winter.

Lake Ontario is close to average and is expected to remain so 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.

October basin statistics			
Lake	**Precipitation (percentage of LTA) [a,b]**	**Net basin supply (probability of exceedance) [c,d]**	**Outflows (percentage of LTA)[a]**
Superior	70%	89% (very dry)	116%
Michigan-Huron	144%	19% (very wet)	108%
Erie (including Lake St. Clair)	101%	83% (very dry)	108%
Ontario	65%	71% (dry)	110%

[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.

Fall and winter storms

The fall and winter can bring higher waves and storm surges on the Great Lakes. Winds blowing across long open water sections, or fetch, can cause large waves and push water levels up on the downwind side of the lakes creating a storm surge.

The largest waves occur on Lake Superior, where wave heights in the historical record have approached 9 m. The largest storm surge occurs on Lake Erie, with the largest being about a 2.5 m rise. Although waves and storm surges are usually well below these maximums, they can create rapid changes in water levels that should be considered when undertaking activities on the shores of the Great Lakes.

In the coming months, wind and waves combined with above-average levels, especially on lakes Michigan–Huron and Erie could increase the potential for erosion of some shorelines, especially steep shoreline bluffs made up of silts, sands, gravels and cobbles that are exposed to waves. Although erosion around the Great Lakes can cause significant changes to the shoreline that can impact property and activities around the lakes, it is also a naturally occurring process that helps support shoreline dynamics such as beach building and the natural ecosystem of the Great Lakes.

Keep in mind that conditions can change quickly along the shores of the lakes and this can lead to dangerous conditions, especially if you are not prepared. Check the local forecasts and always keep a safe distance from the shoreline edge.

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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