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LEVELnews

Great Lakes — St. Lawrence River Water Levels

Lakes Superior, Michigan-Huron, and Erie remain well above average to start December

Aside from Lake Ontario, the rest of the Great Lakes continue to be well above average and will remain high through to the early winter. Lake Superior's level was the ninth highest November level ever recorded, 10 cm below last year's level and Lake Michigan-Huron experienced its third highest level for the month and was 6 cm below last year. The level of Lake Erie was its fourth highest for the month of November, 3 cm lower than last year. Lake Ontario was only 6 cm above its average value and 44 cm lower than last year. Both Lakes Michigan-Huron and Erie start December at their fourth highest levels in the period of record (1918-2019).

Precipitation in November was below average for all the lakes. Despite drier conditions, with the levels so high, the outflow from Lake Michigan-Huron was the second highest November outflow on record and Lake Erie's outflow was also the second highest for the month of November.

We are now at the time of year when both Lakes Erie and Ontario usually reach their seasonal minimums. From this point on, they would be expected to hold steady and then start to rise over the next few months. Typically Lakes Superior and Michigan/Huron should continue their seasonal decline for a few months before starting to rise again.

Great Lakes Water Level Information

Lake	November 2020 Monthly Mean Level		Beginning-of-December 2020 Level	
	Compared to Monthly Average (1918–2018)	Compared to One Year Ago	Compared to Beginning-of-Month Average (1918–2018)	Compared to One Year Ago
Superior	24 cm above	10 cm below	25 cm above	8 cm below
Michigan–Huron	81 cm above	6 cm below	80 cm above	10 cm below
St. Clair	72 cm above	6 cm below	80 cm above	6 cm below
Erie	64 cm above	3 cm below	65 cm above	4 cm below
Ontario	6 cm above	44 cm below	7 cm above	40 cm below

Canada

With average meteorological conditions, Lake Superior should remain above average for the next six months. Lakes Michigan-Huron and Erie will remain well above average and could approach record levels early next year if wet conditions prevail. In the event of wet conditions, Lake Ontario could approach record high levels in late winter or early spring, largely because high inflows from Lake Erie continue.

With high levels on most of the lakes, any storms and strong winds increase the risk for accelerated shoreline erosion and flooding to occur in low-lying areas, such as the November 15th high wind event that impacted southern Ontario (see more on this storm below). For current information and forecasts, please refer to local sources of information listed below.

November monthly levels

Lake Superior had a monthly average of 183.71 m (IGLD85[1]) for November. This was 24 cm above its November monthly-mean water level and 10 cm lower than its level last year. This year was the ninth highest November level on record, 18 cm lower than the highest in the period of record in 1985.

Lake Michigan–Huron's monthly-mean level in November was 177.2 m (IGLD85), 81 cm above average and 6 cm below last November's level. This was the third highest November level on record at 18 cm below the previous monthly record value in 1986.

Lake Erie's monthly-mean level was 174.65 m (IGLD85), 64 cm above average and 3 cm below its November 2019 level. This was the fourth highest November lake level on record, 20 cm below the record high in 1986.

Lake Ontario's November monthly-mean level was 74.6 m (IGLD85), 6 cm above average, 44 cm lower than the level from a year ago, and 58 cm below the record high in 1945.

Lake level changes

The level of Lake Superior went down by 3 cm during the month of November, less than its typical decline of 5 cm.

Lake Michigan–Huron went down by 6 cm during the month, just a little more than its average decline of 5 cm.

November Precipitation over the Great Lakes[1,2]

Great Lakes Basin	**78%**	**Lake Erie**	**88%**
Lake Superior	**77%**	**(including Lake St. Clair)**	
Lake Michigan–Huron	**76%**	**Lake Ontario**	**81%**

November Outflows from the Great Lakes[1]

Lake Superior	**108%**	**Lake Erie**	**126%**
Lake Michigan–Huron	**126%**	**Lake Ontario**	**119%**

[1] As a percentage of the long-term average.
[2] US Army Corps of Engineers
NOTE: These figures are preliminary.

The level of Lake Erie went down by 3 cm in November, a little less then its typical decline of 4 cm.

Lake Ontario's decreased by its average of 4 cm in November.

(Note that lake level changes are based on the levels at the beginning of the month and not the monthly average levels)

Beginning-of-November lake levels

Lake Superior's beginning-of-December level was 25 cm above average, which is 8 cm lower than last year, and the ninth highest on record.

Lake Michigan–Huron's beginning-of-December level was 80 cm above average and 10 cm lower than it was last year. This is the fourth highest in the period of record, with a level that is 15 cm lower than the previous beginning-of-month record for December set in 1986.

Lake Erie was 80 cm above average at the beginning of December and 6 cm lower than the

[1] Water levels are referenced to International Great Lakes (Vertical) Datum 1985 (IGLD85).

same time last year. This level is the fourth highest on record, 20 cm behind the record high in 1986.

Lake Ontario's level at the start of December was 7 cm above average and 40 cm lower than the water level from last year.

At the beginning of December, all of the Great Lakes were at least 40 cm above their chart datum level (chart datum is a reference elevation for each lake in order to provide more information on the depth of water for safe boat navigation on the lakes).

Water levels forecast

Relative to their beginning-of-December levels and with average water supplies for this time of year, some of the lakes would be expected to continue their seasonal decline while others may hold steady or begin their seasonal rise in the coming months.

The level of Lake Superior is expected to stay above average if it receives average water supplies throughout the fall and the winter.

Lake Michigan-Huron will likely remain below record levels with average water supplies, but still much higher than average in the coming months. However, above average conditions could bring the level above record levels by mid-winter.

With average conditions, Lake Erie would stay well above average throughout the fall, while very wet conditions could result in the levels approaching record levels during the winter.

Lake Ontario would continue the last part of its seasonal decline with average conditions and remain above average throughout the fall and winter. However, with above average water supplies, Lake Ontario would begin its seasonal rise.

For more information on the probable range of water levels consult the July 2018 edition of LEVELnews at https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/great-lakes-levels-related-data/levelnews-great-lakes-st-lawrence/july-2018.html

For a graphical representation of recent and forecasted water levels on the Great Lakes, refer to the Canadian Hydrographic Service's Monthly Water Levels Bulletin at: https://waterlevels.gc.ca/C&A/bulletin-eng.html

November Wind Storm Brings High Winds and Flooding

A squall line tracked across southern Ontario on November 15th and 16th, resulting in extremely high winds and public wind warnings. These high winds were experienced by several municipalities, including Windsor, London, Kitchener, Port Colborne, and St. Catharines. Wind speeds in excess of 141 km/h were experienced in certain areas, causing widespread power outages. This period of maximum wind speed was followed by a weaker but longer period of less extreme wind speed conditions.

Pronounced effects from the high winds, including storm surge and large waves, were experienced on the northeast shores of the Great Lakes, with Lake Erie being hit the hardest. Similar extreme climatic conditions were observed over Lake Ontario but the impacts were less severe, primarily due the lower lake levels, which were close to average for November. Nonetheless, the east end of Lake Ontario experienced a storm surge of approximately 30 cm near Kingston. A pulse of water into the upper St. Lawrence River additionally resulted in river levels increasing by nearly a half meter.

Photo Credit: Jason Homewood, Lower Thames Conservation Authority

High water levels in the past several years have contributed to extensive damage and erosion along the Lake Erie coast. The lake often experiences comparatively larger storm surge events as a result of the lake depth and/or storm direction. The current high water levels, in addition to the high-impact fall storm resulted in flooding, erosion, and coastal damage. Lake Erie's north shore experienced a 2 m storm surge and wave heights approaching 5 m. The image below, taken at Erieau, Ontario (between Point Pelee and Port Stanley), shows the size of the waves, and subsequent damage experienced along the Lake Erie coast.

Information on flooding

With water levels so high, the risk of flooding is also high. Great Lakes water levels are hard to predict weeks in advance due to natural variations in weather. To stay informed on Great Lakes water levels and flooding, visit the Ontario flood forecasting and warning program web site at https://www.ontario.ca/flooding.

Additional information can also be found at the International Lake Superior Board of Control web site, https://www.ijc.org/en/lsbc, and the International Lake Ontario–St. Lawrence River Board web site, https://ijc.org/en/loslrb.

Information on current water levels and marine forecasts

Daily levels: Current daily lake wide average levels of all the Great Lakes are available on the Great Lakes water levels and related data by clicking on "Daily water levels for the current month". 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 change when it is changing relatively rapidly due to the high precipitation recently experienced.

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: http://tides.gc.ca/eng/find/region/6. 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 on the Great Lakes water level and related data web page 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.

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