



# LEVELnews

## Great Lakes – St. Lawrence River Water Levels

### Water levels remain high on all the Great Lakes at the start of December

Water levels of all the Great Lakes remain well above average, with all of the lakes either at their second or third highest monthly average water levels for November on record (1918 to 2018). With all the lakes still well above average and a greater probability of large storms and winds during the late fall and early winter months there is heightened risk for accelerated coastline erosion and flooding to low lying areas. For current information and forecasts, please refer to local sources of information listed below in this edition of LEVELnews.

Since their record high water levels in the summer, Lake Superior, Lake Erie, and Lake Ontario have all had average to greater than average declines, while Lake Michigan-Huron has not had a typical seasonal decline. In fact, Lake Michigan-Huron’s level at the start of December was only 5 cm below its beginning-of-month record level.

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 2019 Monthly Mean Level		Beginning-of-December 2019 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	34 cm above	5 cm above	33 cm above	6 cm above
Michigan–Huron	87 cm above	40 cm above	90 cm above	42 cm above
St. Clair	79 cm above	21 cm above	87 cm above	23 cm above
Erie	67 cm above	10 cm above	70 cm above	8 cm above
Ontario	50 cm above	42 cm above	47 cm above	33 cm above

All of the Great Lakes water levels are expected to be below record monthly mean levels in December, but still well above average. However, given the high level of Lake Michigan-Huron, even with average water supplies there is a good chance record high values will be reached in the new year. For the other lakes, It would take much wetter than average conditions to once again exceed record levels.

for web sites on up-to-date Great Lakes water levels.

### November Precipitation over the Great Lakes<sup>1,2</sup>

Great Lakes Basin	66%	Lake Erie	45%
Lake Superior	70%	(including Lake St. Clair)	
Lake Michigan–Huron	78%	Lake Ontario	41%

### November Outflows from the Great Lakes<sup>1</sup>

Lake Superior	127%	Lake Erie	127%
Lake Michigan–Huron	134%	Lake Ontario	130%

<sup>1</sup> As a percentage of the long-term average.

<sup>2</sup> US Army Corps of Engineers

NOTE: These figures are preliminary.

### Information on flooding

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>.

Local flood watches and flood warning information are issued in Ontario by Conservation Authorities at <https://conservationontario.ca/conservation-authorities/find-a-conservation-authority/> or Ministry of Natural Resources and Forestry district office at <https://www.ontario.ca/page/ministry-natural-resources-and-forestry-regional-and-district-offices>.

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/loslr>.

More information is also provided in the “Water levels forecast” section at the end of this newsletter.

### Information on current water levels and marine forecasts

With lake levels changing day-to-day the Government of Canada Great Lakes water levels and related data website at: <https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/great-lakes-levels-related-data.html> provides a source

**Daily levels:** Current daily lake wide average levels of all the Great Lakes are available on the [Government of Canada Great Lakes Water Level Gauging Stations website](#) 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> provides hourly water levels. 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 “Wave height forecasts for the Great Lakes and St. Lawrence River” link.

## **November monthly levels**

Although no records were set during the month of November, water levels were still very high with all of the lakes recording either their second or third highest level in the period-of-record (1918-2018).

Lake Superior was 34 cm above its November monthly-mean water level and 5 cm above last year's November level. This is the second highest November level on record, 8 cm below the highest level seen in 1985.

Lake Michigan–Huron's monthly-mean level in November was 87 cm above average, 40 cm above last November's level. This also puts it at the second highest November level, but 12 cm below the monthly record value of 1986.

Lake Erie's monthly-mean level was 67 cm above average, 10 cm above its November 2018 level. This was the third highest November lake level on record, 17 cm below the record high November value in 1986.

Lake Ontario's November monthly-mean level was 50 cm above average and 42 cm higher than a year ago. This was also the third highest on record, but for this lake it was 14 cm below the record high year of 1986.

## **Lake level changes**

Lake Superior's levels went down by 8 cm in November, while the lake typically goes down by 5 cm between the beginning of November and December.

Lake Michigan–Huron went down by 2 cm during the month of November. This is half of its average decline of 4 cm.

Although it has seen greater than average declines since the summer, Lake Erie's level only declined by 1 cm from November to December, which is a less than its average decline of 4 cm.

Lake Ontario went down by 4 cm, which is exactly its average decline.

## **Beginning-of-December lake levels**

All the lakes started December at either their second or third highest level seen in the period of record (1918–2018).

Lake Superior's beginning-of-December level was 33 cm above average and 6 cm higher than December 2018. This beginning-of-December level is 9 cm less than the highest beginning-of-month recorded in 1985.

Lake Michigan–Huron's beginning-of-December level was 90 cm above average and 42 cm higher than its level at the same time last year. This is the second highest in the period of record, with a level that is 5 cm lower than the record year of 1986.

Lake Erie was 70 cm above average at the beginning of December and 8 cm higher than the same time last year. This level is the third highest on record and 16 cm lower than the beginning-of-December record set in 1986.

Lake Ontario's level at the start of December was 47 cm above average; 33 cm higher than the water levels last year and the third highest on record. The last time the level was this high at the start of December was back in 1945 when the level was 21 cm higher.

At the beginning of December, all of the Great Lakes were at least 58 cm above their chart datum level (Note: 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.

Given Lake Superior's high level at the start of the month, if there were wet conditions seen in the basin, the lake level could again be at record values in the next few months. While average conditions would see water levels decline slightly but stay well above average.

If we experience average water supplies, Lake Michigan-Huron would decline slightly for the next few months but there is a high likelihood of reaching record high levels in the new year. Even with very dry conditions, the levels will continue

to be well above average throughout the fall and early winter.

Lake Erie would only get back into record high levels if the lake experiences extremely wet conditions. Nevertheless, the lake will stay well above average throughout the next month and into the early part of next year even with average or dry conditions.

As with Lake Erie, at this point in the year Lake Ontario has typically hit its annual minimum. With average conditions, it would start to rise over the next few months. Average water supplies would keep Lake Ontario well above average while very wet conditions would once again put the lake level back towards record highs.

For more information on the probable range of water levels consult the December 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/december-2018.html>

**FOR MORE INFORMATION:**

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>

**Just what is the “chart datum”?**

At times you may hear the Great Lakes levels referenced to chart datum. A chart datum is a horizontal plane used to reference current lake levels in order to provide more information on the depth of water for safe boat navigation on the lakes. The chart datum used on navigation charts for the Great Lakes is a low-water level set from recorded lake levels for each lake so that lake levels are expected to be above the chart datum 95% of the time.

At the beginning of December, all of the Great Lakes levels were at least 58 cm above chart datum level. Nautical charts reference the bottom of the lake to the chart datum, so for instance, if a location on the nautical chart indicates that the bottom of the lake is 1 m below chart datum, then using December 1 water levels, you can tell that the depth of water will be at least 1.58 m at that location.

For more information on chart datum you can refer to the Fisheries and Oceans Canada web page on vertical datums at: [www.tides.gc.ca/eng/info/verticaldatums](http://www.tides.gc.ca/eng/info/verticaldatums) and the chart datum for each of the Great Lakes is given in Canadian Hydrographic Service's monthly water levels bulletin at: <https://waterlevels.gc.ca/C&A/bulletin-eng.html>.

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