



# LEVELnews

## Great Lakes – St. Lawrence River Water Levels

### August saw all the Great Lakes at near or above record-high levels

With near or above record high water levels on all the Great Lakes combined with a greater probability of large storms and winds in the coming months, the risk continues for accelerated coastline erosion and flooding to low lying areas. For local sources of information on this, see the following sections of this edition of LEVELnews.

During the month of August, all of the lakes were either at their highest recorded levels (lakes Superior and Erie) or their second highest (lakes Michigan-Huron and Ontario), based on the period of record from 1918 to 2018. Interestingly, at the same time, most of the lakes also experienced very large declines in their water levels including Lake Erie which tied its largest August decline on record and Lake Ontario which had its second largest August decline on record. This is the time of the year when all the lakes typically decline going into the fall and winter.

Not surprisingly, the beginning-of-September levels are also very high in all the lakes, with Lake Erie the only one setting a record by starting the month 8 cm higher than the previous record level back in 1986.

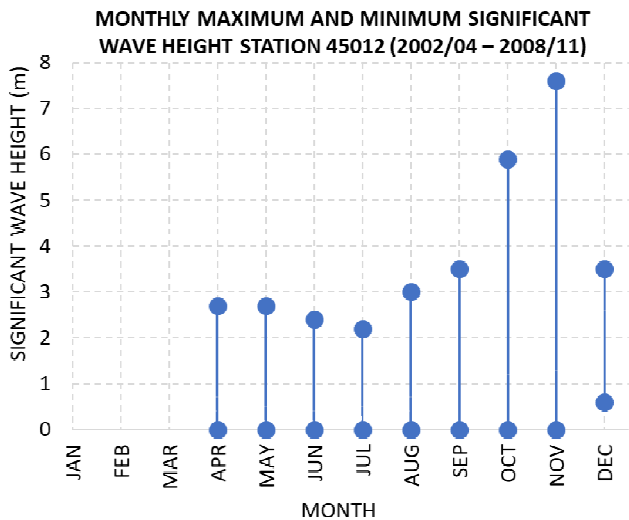
With average meteorological conditions, water levels in the Great Lakes basin are expected to demonstrate their typical seasonal decline over the next few months. How quickly they decline is dependent on the weather and how wet or dry it will be over the coming weeks and months.

| Great Lakes Water Level Information |                                         |                          |                                                    |                          |
|-------------------------------------|-----------------------------------------|--------------------------|----------------------------------------------------|--------------------------|
| Lake                                | August 2019 Monthly Mean Level          |                          | Beginning-of-September 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                            | 32 cm above                             | 21 cm above              | 30 cm above                                        | 18 cm above              |
| Michigan–Huron                      | 76 cm above                             | 37 cm above              | 73 cm above                                        | 30 cm above              |
| St. Clair                           | 80 cm above                             | 32 cm above              | 79 cm above                                        | 27 cm above              |
| Erie                                | 75 cm above                             | 30 cm above              | 72 cm above                                        | 27 cm above              |
| Ontario                             | 64 cm above                             | 62 cm above              | 54 cm above                                        | 52 cm above              |

If conditions are average, the levels in Lake Superior and Lake Erie have the potential to remain near-record seasonal highs while Lake Michigan-Huron and Lake Ontario levels would continue to be well above average, but not in record territory. With the high current lake levels, wetter-than-average conditions could result in more record-breaking levels and on the other end of the scale, even with very dry conditions all the lakes would remain above average into the fall.

### Fall water warnings

The fall and winter are seasons that 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. As shown in this graph of significant wave heights from a buoy in eastern Lake Ontario, typically waves increase during the fall and peak in November:



Data source - National Data Buoy Center: [https://www.ndbc.noaa.gov/view\\_climplot.php?station=45012&meas=wh](https://www.ndbc.noaa.gov/view_climplot.php?station=45012&meas=wh)

The largest waves occur on Lake Superior, where the maximum wave heights may approach 9 m, and the largest storm surges occur on Lake Erie, with the largest being about 2.5 m. Although waves and storm surge are usually well below

these maximums, they can create rapid changes in water levels. Anyone undertaking activities on or along the shores of the Great Lakes should be aware of potentially dangerous conditions during high winds. As well, in the coming months, the above-average levels of the lakes could increase the potential of erosion of some shorelines,

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

|                     |     |                            |      |
|---------------------|-----|----------------------------|------|
| Great Lakes Basin   | 76% | Lake Erie                  | 103% |
| Lake Superior       | 69% | (including Lake St. Clair) |      |
| Lake Michigan-Huron | 68% | Lake Ontario               | 93%  |

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

|                     |      |              |      |
|---------------------|------|--------------|------|
| Lake Superior       | 134% | Lake Erie    | 128% |
| Lake Michigan-Huron | 130% | Lake Ontario | 141% |

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

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

**NOTE:** These figures are preliminary.

especially steep shorelines exposed to waves that are made up of silts, sands, gravels and cobbles. Although erosion around the Great Lakes can result in significant changes to the shoreline that can impact property and activities around the lakes, it is also a naturally occurring process that helps support the ecosystem of the Great Lakes.

### 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/lsrc>, and the International Lake Ontario–St. Lawrence River Board web site, <https://ijc.org/en/loslrb>.

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

**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 you are interested in. 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.

### **August monthly levels**

All the Great Lakes had well-above-average monthly-mean water levels in August, with lakes Superior and Erie recording a value above or tied with a record-high value (1918–2018).

Lake Superior was 32 cm above its period-of-record (1918–2018) August monthly-mean water level and 21 cm above its level in August of last year. This value is tied with 1952 and 1950 for the highest values for the month.

Lake Michigan–Huron’s monthly-mean level in August was 76 cm above average, 37 cm above last August’s level. This puts it at the second highest August level, 7 cm below the value in 1986.

Lake Erie’s monthly-mean level was 75 cm above average, 30 cm above its level during August 2018 and 19 cm higher than the previous record set in 1986. This is now the highest mean-monthly level on record.

Lake Ontario’s August monthly-mean level was 64 cm above average and 62 cm higher than a year ago. You have to go back to 1947 to find the one year that had a higher level for August, which was 5 cm higher than this year.

### **Lake level changes**

Lake Superior’s levels declined by 4 cm in August, while the lake typically goes up by 1 cm between the beginning of August and September.

Lake Michigan–Huron went down by 10 cm, which is much more than the average decline of 4 cm.

Lake Erie’s level declined by 16 cm, double its average fall of 8 cm and tied with 3 other years for the largest August to September decline on record.

Lake Ontario went down by 34 cm, more than double its average decline of 14 cm and the second largest on record, only 1 cm less than the record decline in 2017.

## **Beginning-of-September lake levels**

At the beginning of September, Lake Erie had a record high level for that time of the year, with the other lakes all well above average.

Lake Superior's beginning-of-September level was 30 cm above average (1918–2018) and 18 cm higher than September 2018. This beginning-of-September level is the third highest beginning-of-month level, just 1 cm below 1952 and 2 cm below 1950.

Lake Michigan–Huron's beginning-of-September level was 73 cm above average and 30 cm higher than its level at the same time last year. Also the third highest in the period of record, this time 8 cm lower than 1986 and 1 cm lower than 1973.

Lake Erie was 79 cm above average at the beginning of September and 27 cm higher than the same time last year. This sets a new record by 8 cm over the beginning-of-September record set in 1986.

Lake Ontario's level at the start of September was 54 cm above average and 52 cm higher than the water levels last year. This is a beginning of month level we have not seen since 1952.

At the beginning of September, all of the lakes were at least 64 cm above their chart datum level.

## **Water levels forecast**

Relative to their beginning-of-September levels and with average water supplies for this time of year, all the lakes would be expected to begin or continue their seasonal decline.

The forecast for Lake Superior indicates that if the lake receives average water supplies it will start its seasonal decline starting in September.

However, with extremely wet conditions, it could again start to approach record values for the next few months.

Lake Michigan-Huron would continue its seasonal decline in September if we experience average water supplies. Only under very extremely wet conditions would levels return to their near-record values. However, even if we experience very dry conditions, the levels will continue to be well above average going into the fall.

As it starts the month at a record high level, average conditions for Lake Erie would still possibly result in a record-high level for September. Consequently, wet conditions would keep the level above records values while even dry water supplies would still continue to keep the levels well above average.

Lake Ontario has fallen enough below its record values that only extremely wet conditions would result in those record levels being approached again. With average conditions, the seasonal decline in the lake levels will continue into the fall while only extreme dry conditions would allow the lake to approach average levels by the end of the year.

For more information on the probable range of water levels consult the September 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/september-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>

**FOR MORE INFORMATION:**

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