



LEVELnews

Great Lakes — St. Lawrence River Water Levels

Lake Michigan-Huron continues to set record levels while Superior and Erie stay well above average

As it has for all months of 2020, in August, Lake Michigan-Huron exceeded its record high monthly level during the period of record (1918-2019), with a level 3 cm higher than the previous record in 1986. Lake Superior's level was the fifth highest August level ever recorded, 5 cm below last year's record level and Lake Erie was at its second highest level and 9 cm below last year's record level. Lake Ontario was 17 cm above average and 62 cm below the record level of last year.

Lake Michigan-Huron also started September at its highest level on record and Lake Erie was at its second highest. Lake Superior started the month at its ninth highest level on record while Lake Ontario began the month 15 cm above average, but well below its record. Precipitation in August was below average for Lake Superior and above average for Lakes Michigan-Huron, Ontario, and Lake Erie.

The outflow from Lake Michigan-Huron was the highest August outflow on record and Lake Erie's outflow was the second highest for the month of August. Note that although the level of Lake Superior was very high, the outflow was only close to average, this reflects the regulation plan adjusting the flow based on the record high levels of Lake Michigan-Huron.

Great Lakes Water Level Information				
Lake	August 2020 Monthly Mean Level		Beginning-of-September 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	27 cm above	5 cm below	26 cm above	4 cm below
Michigan–Huron	85 cm above	10 cm above	86 cm above	14 cm above
St. Clair	80 cm above	1 cm above	83 cm above	5 cm below
Erie	66 cm above	9 cm below	66 cm above	5 cm below
Ontario	15 cm above	48 cm below	15 cm above	38 cm below

At this time of year, all the lakes have typically reached their annual peaks and started their seasonal declines. With average conditions, Lake Superior is expected to remain above average for the next six months and Lake Michigan-Huron would drop below record values during the fall, but remain well above average. Lake Erie would also remain well above average and approach record levels only if there are wet conditions, while Lake Ontario is expected to stay above average for the fall and below record levels.

With high levels on all of the lakes, any storms and strong winds increase the risk for accelerated shoreline erosion and flooding to occur in low-lying areas. For current information and forecasts, please refer to local sources of information listed below.

August monthly levels

Lake Superior was 27 cm above its August monthly-mean water level and 5 cm lower than its level last year (which was the highest in the period of record). This year was the fifth highest August level on record.

Lake Michigan-Huron's monthly-mean level in August was 85 cm above average at 10 cm above last August's level. This was the highest August level on record at 3 cm above the previous monthly record value in 1986.

Lake Erie's monthly-mean level was 66 cm above average at 9 cm below its August 2019 level. This was the second highest August lake level on record behind only last year's level.

Lake Ontario's August monthly-mean level was 15 cm above average and 48 cm lower than the record high from a year ago.

Lake level changes

The level of Lake Superior held steady during the month of August, which is the average for this month. This is typically the time of year when the lake has peaked, but this won't be evident until the lake begins to decline.

Lake Michigan-Huron went down by its average of 4 cm during the month of August.

The level of Lake Erie went down by 12 cm in August, more than its typical decline of 8 cm.

Lake Ontario is another lake that experienced its average decline, with the level going down by 14 cm.

August Precipitation over the Great Lakes^{1,2}

Great Lakes Basin	110%	Lake Erie	83%
Lake Superior	91%	(including Lake St. Clair)	
Lake Michigan-Huron	118%	Lake Ontario	115%

August Outflows from the Great Lakes¹

Lake Superior	105%	Lake Erie	125%
Lake Michigan-Huron	133%	Lake Ontario	118%

¹ As a percentage of the long-term average.

² US Army Corps of Engineers

NOTE: These figures are preliminary.

Beginning-of-September lake levels

Lake Superior's beginning-of-September level was 26 cm above average, which is 4 cm lower than last year, and the ninth highest on record.

Lake Michigan-Huron's beginning-of-September level was 86 cm above average and 14 cm higher than its level at the same time last year. This is the highest in the period of record, with a level that is 6 cm higher than the previous beginning-of-month record for September set in 1986.

Lake Erie was 66 cm above average at the beginning of September and 5 cm lower than the same time last year. This level is the second highest on record behind only last year.

Lake Ontario's level at the start of September was 15 cm above average and 38 cm lower than the record high water levels of last year.

At the beginning of September, all of the Great Lakes were at least 60 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

At this time of year, all the lakes have typically peaked and have started their seasonal decline.

The level of Lake Superior is expected to stay well above average if it receives average water supplies. Very wet fall conditions would result in a late peak and the lake again getting close to record values.

If Lake Michigan-Huron continues its typical seasonal decline, it will likely drop and stay below record levels in the coming months. However, above average water supplies during the fall could bring the level back above record levels.

With average conditions, Lake Erie would see levels decline even more below the record levels, but stay well above average throughout the fall.

Lake Ontario would continue its seasonal decline with average conditions and remain above average throughout the fall.

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 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:

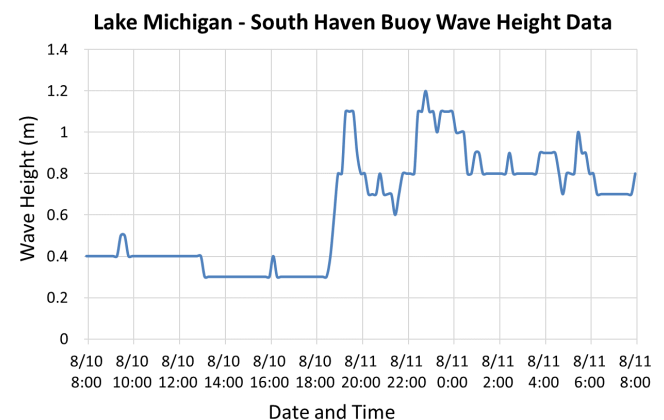
<https://waterlevels.gc.ca/C&A/bulletin-eng.html>

Meteotsunamis – what are they and are they dangerous?

On August 10th, a straight line wind event called a derecho came over the southern portion of the Great Lakes, this caused a Meteotsunami to form over Lake Michigan that caused a rise of 1.35 m in the local lake level over a period of 1 hour (see figure below showing wave height at a buoy in the southeastern portion of Lake Michigan). So what are meteotsunamis and why can they be dangerous?

As the name suggests, meteotsunamis are waves that are related to meteorological activity. In this case, they form when a change of air pressure and jump in wind speed are pushed along by a warm or cold front over the water at the same speed and direction as the water's own motion. Unlike the more commonly known ocean tsunamis, which are generally caused by earthquakes.

In the Great Lakes, they tend to form due to large convective storms in the southwestern end of the basin. They are most common on Lakes Michigan and Erie due to their location and water depth.



Unlike what we may see in movies, these tsunami waves are not as big as buildings that can destroy entire cities, with most of them less than 2 cm in height and are not even noticed, even by people along the shore. However, there can be ones that reach more significant heights as a 2016 paper

(<https://www.nature.com/articles/srep37832>) in Nature suggests meteotsunamis over 30 cm in height occur around 100 times a year within the Great Lakes basin.

The biggest danger of them is partly related to their unexpectedness, if it is stormy and windy, the instinct is to not go too close to the shore, but the problem is sometimes these meteotsunamis hit during perfectly sunny days in calm waters. For example, in May 2012, three swimmers were dragged a kilometer into Lake Erie by a sudden wave and needed to be rescued. While tragically, seven people were killed in 1954 when a 3-metre wave in Lake Michigan swept people fishing off a pier in Chicago.

There are currently various research efforts underway with the goal of being able to make better forecasts of these waves. It is hoped that higher resolution weather models will allow for more accurate warnings of these waves, better communication of their dangers, and a reduction in the number of injuries and deaths they cause.

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>.

Additional information can also be found at the International Lake Superior Board of Control web site, <https://www.ijc.org/en/lisbc>, 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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