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LEVELnews

Great Lakes — St. Lawrence River Water Levels

Continued rain in May brings record-high water levels

Record high levels are forecasted to continue into the summer for all the Great Lakes, especially if wet conditions continue. All of the lakes are forecasted to stay well above average water levels into the fall, even if the summer is very dry.

With a wet winter and spring continuing through the month of May, the result is a period-of-record high levels for the beginning of June on lakes Superior, Erie and Ontario when we look at levels from 1918 to 2018. The May monthly mean water level for lakes Superior and Erie were also period-of-record high levels.

The beginning-of-June water levels for Lake Erie and Lake Ontario are the highest that have ever been recorded at any time of the year on these lakes. Lake Superior's beginning-of-June water level is a record high for this time of year, but higher beginning-of-month water levels have been recorded at other times of the year.

All the Great Lakes received above-average water supplies in May, due mainly to above-average precipitation. This continues a trend that has been seen in the Great Lake basin since 2013. Above average precipitation across the Great Lakes basin since 2013 has taken lake levels from average to well-below average levels, with Lake Michigan–Huron hitting a record low value in January 2013, to the near-record-high to record-high values seen in all the lakes at the beginning of June 2019.

Great Lakes Water Level Information

Lake	May 2019 Monthly Mean Level		Beginning-of-June 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	41 cm above	27 cm above	41 cm above	28 cm above
Michigan–Huron	69 cm above	25 cm above	75 cm above	29 cm above
St. Clair	76 cm above	21 cm above	78 cm above	23 cm above
Erie	74 cm above	17 cm above	75 cm above	18 cm above
Ontario	68 cm above	44 cm above	83 cm above	63 cm above

Canada

This year, outflows from all the lakes were above average for May. Lake Ontario outflow was increased as record high outflow from the Ottawa River began to fall. Lake Ontario outflow continues to be adjusted to balance high water levels on Lake Ontario and the lower St. Lawrence River. Further increases in Lake Ontario outflow were possible over the first part of June as flow from the Ottawa River declined. By June 13 outflow had been increased to 10,400 m^3/s, equivalent to the record-high outflow released for several weeks (June 14th to August 7th) during the high water period in the summer of 2017.

Be prepared for high water

With beginning-of-June levels of all the lakes at record-high or near-record-high values, all should be prepared for its impacts during summer. Stakeholders with interests along the lakeshore that are susceptible to shoreline erosion or are in low-lying areas should pay close attention to any weather systems that generate strong sustained winds. Such weather systems can result in a storm surge possibly causing localized flooding and accelerated erosion due to waves reaching higher up on the shoreline. In current conditions, waves could reach elevations that have not been affected since 1918.

Property owners around the Great Lakes should be following information from their local responsible agencies on high water impacts. For those planning activities around the Great Lakes this summer, some of the impacts to consider are reduced beach area along with flooding of boat ramps, docks, and flooding of low-lying parks, property and structures.

To help you plan your summer and keep you safe, consult the sources of information on flood conditions in your area. You will find references in the "Information on flooding" section. As well it's a good idea to check current water levels and wave forecasts when planning for activities around the lakes. Sources of current water levels and marine wave forecasts are provided in the "Current water levels, marine forecasts" section below. Property owners around the Great Lakes are also strongly encouraged to consult the information provided by their local responsible agencies on high water impacts on a regular basis.

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.

May Precipitation over the Great Lakes[1,2]

Great Lakes Basin	**122%**	**Lake Erie (including Lake St. Clair)**	**112%**
Lake Superior	**98%**		
Lake Michigan–Huron	**132%**	**Lake Ontario**	**144%**

May Outflows from the Great Lakes[1]

Lake Superior	**105%**	**Lake Erie**	**128%**
Lake Michigan–Huron	**127%**	**Lake Ontario**	**103%**

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

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/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 levels and related data 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.

May monthly levels

All the Great Lakes had well-above-average monthly-mean water levels in May and lakes Superior and Erie had record-high values (1918–2018).

Lake Superior was 41 cm above its period-of-record (1918–2018) May monthly-mean water level which was its record high value for the month, surpassing the previous May record set in 1986 by 3 cm, but is still 14 cm below the record-high level set in November 1985.

Lake Michigan–Huron's monthly-mean level in May was 69 cm above average, 25 cm above last May's level, the 5th highest May mean level on record and the highest it has been since 1986.

Lake Erie's monthly-mean level was 74 cm above average and 8 cm higher than the previous record set in 1986. This is now the highest mean-monthly level on record.

Lake Ontario's May monthly-mean level was 68 cm above average and 44 cm higher than a year ago, but 10 cm lower than in May 2017, which is the record high for Lake Ontario.

Lake level changes

Very high water supplies in May, due mainly to well above-average precipitation, resulted in well-above-average water level rises during May for all of the Great Lakes.

Lake Superior's levels rose by 13 cm in May, more than its average (1918–2018) rise of 10 cm through the month of May.

Lake Michigan–Huron rose by 18 cm, the 5th highest May rise on record and more than double the 8 cm average rise.

Lake Erie's level rose by 10 cm, double its average May rise of 5 cm.

Lake Ontario rose 48 cm, the largest May rise on record, and six times its average 8 cm rise in May.

Beginning-of-June lake levels

All the Great Lakes began June at least 41 cm above average and all the lakes had levels above those seen at the beginning of June 2018. Lakes Superior, Erie and Ontario had record high levels for the beginning of June.

Lake Superior's beginning-of-June level was 41 cm above average (1918–2018) and 28 cm higher than June 2018. This set a new beginning-of-June record high level, 8 cm higher than the

previous beginning-of-June record-high value set in 1986, but was 9 cm below the record high monthly-mean level of October 1985.

Lake Michigan–Huron's beginning-of-June level was 75 cm above average and 29 cm higher than its level at the same time last year. Lake Michigan–Huron was the highest it had been since 1986 but was 5 cm below this record high.

Lake Erie was 75 cm above average at the beginning of June and 18 cm higher than the same time last year. This was 10 cm higher than the record high beginning-of-June level set in 1986.

Lake Ontario's level at the start of June was 83 cm above average and 63 cm higher than the water levels last year. This also set a new record by 2 cm over the beginning-of-June record set in 2017. Lake Ontario levels continued to rise during the first days of June, reaching a daily-average level of 75.92 m by June 6, which was 4 cm higher than the record-high daily-average level set on May 29, 2017.

At the beginning of June, all of the lakes were at least 62 cm above their chart datum level.

Water levels forecast

Relative to their beginning-of-June levels and with average water supplies for this time of year, lake Superior and Michigan–Huron rise over the month of June, while lake Erie and Ontario enter their seasonal decline.

Looking ahead through the summer, and based on their beginning-of-June levels and past conditions on the lakes (1918–2018), continued record-high water levels are forecasted for all the lakes, if the lakes continue to receive above-average water supplies. If the wet trend changes and very dry conditions occur, all of the lake levels will still remain well above average.

Lake Superior's probable range of future lake levels looking forward to September are between 22 cm and 44 cm above average. This forecast, based on beginning-of-June conditions, indicates that if the lake receives average water supplies it will be above record levels (1918–2018) and will remain above record levels until September. The probable range of lake levels between July and September for Lake Superior could exceed its record values by as much as 13 cm if very wet conditions occur but is more likely to exceed it by about 7 cm. If very dry conditions occur it could drop below record values by 10 cm.

The probable range of values until September for Lake Michigan–Huron are between 63 cm and 92 cm above average. Within this probable range of values, Lake Michigan–Huron is most likely to remain at or below its record-high values, but if very wet conditions are seen it could exceed record values by as much as 7 cm. If very dry conditions occur levels could fall below record-high values by 24 cm.

The probable range of values for Lake Erie up to September are between 44 cm and 78 cm above average. If very wet conditions occur, Lake Erie could exceed record high levels by 11 cm within the probable range of future lake levels, however it is more likely to drop just below record values. If very dry conditions occur levels could drop below record high value by 21 cm.

Lake Ontario's probable range of levels is between 24 cm above average with very dry conditions and 83 cm above average with very wet conditions. Lake Ontario's levels are likely to drop below record values in July and continue to decline through to September, but could exceed record high values by 15 cm if exceptionally wet conditions occur.

For more information on the probable range of water levels consult the July 2018 edition of LEVELnews.

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.

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