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LEVELnews

Great Lakes — St. Lawrence River Water Levels

Continuing record high levels on some of the Great Lakes during September

All the Great Lakes are well above average, with some remaining in record territory. This, combined with a greater probability of large storms and winds during the fall months heightens the risk for accelerated coastline erosion and flooding to low lying areas. For local sources of information on this, see the following section of this edition of LEVELnews.

Lake Erie exceeded the previous record high level during the month of September, while Lake Superior tied its record level for the month, based on the period of record from 1918 to 2018. Lakes Michigan-Huron reversed its typical seasonal decline and ended up higher at the beginning of October than at the beginning of September. Lake Ontario continued its steady decline since the highs of June putting the month of September below its record level but still well above average.

The beginning of October water level on Lake Superior matched its highest recorded level, while Lakes Michigan-Huron and Erie were at the second highest level for the beginning of the month of October.

With average meteorological conditions, water levels in the Great Lakes basin are expected to begin or continue their typical seasonal decline over the next few months and all the lakes are expected to be below record levels in October.

Great Lakes Water Level Information

Lake	September 2019 Monthly Mean Level		Beginning-of-October 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	16 cm above	35 cm above	18 cm above
Michigan–Huron	77 cm above	34 cm above	83 cm above	42 cm above
St. Clair	76 cm above	24 cm above	79 cm above	24 cm above
Erie	69 cm above	21 cm above	69 cm above	20 cm above
Ontario	50 cm above	50 cm above	44 cm above	46 cm above

Canada

The weather will influence how quickly the levels will go down. It would take much wetter than average conditions to once again approach record levels on all the 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/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 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.

September Precipitation over the Great Lakes[1,2]

Great Lakes Basin	**127%**	**Lake Erie**	**78%**
Lake Superior	**153%**	**(including Lake St. Clair)**	
Lake Michigan–Huron	**135%**	**Lake Ontario**	**80%**

September Outflows from the Great Lakes[1]

Lake Superior	**122%**	**Lake Erie**	**126%**
Lake Michigan–Huron	**127%**	**Lake Ontario**	**135%**

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

September monthly levels

All the Great Lakes had well-above-average monthly-mean water levels in September, 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) September monthly-mean water level and 16 cm above its level in September of last year. This value is tied with 1985 for the highest values for the month.

Lake Michigan–Huron's monthly-mean level in September was 77 cm above average, 34 cm above last September's level. This puts it at the second highest September level, 10 cm below the monthly record value in 1986.

Lake Erie's monthly-mean level was 69 cm above average, 21 cm above it level during September 2018. This is now the highest mean-monthly level on record, 4 cm above the previous record high in 1986.

Lake Ontario's September monthly-mean level was 50 cm above average and 50 cm higher than a year ago. You have to go back to 1952 to find the last year that had a higher level for September.

Lake level changes

Lake Superior's levels rose by 4 cm in September, while the lake typically goes down by 1 cm between the beginning of September and October.

Lake Michigan–Huron also went up by 4 cm, for a month when the lake typically declines 6 cm. This is the third largest rise for this lake during September.

Lake Erie's level declined by 12 cm, close to its average fall of 9 cm during September to October.

Lake Ontario went down by 24 cm, a much larger drop than its average decline of 14 cm. This ties the 7th largest decline on record for September.

Beginning-of-October lake levels

At the beginning of October, Lake Superior had a record high level for that time of the year, while Lakes Michigan-Huron and Erie were the second highest.

Lake Superior's beginning-of-October level was 35 cm above average (1918–2018) and 18 cm higher than October 2018. This beginning-of-October level is the highest beginning-of-month level at 1 cm above 1985.

Lake Michigan–Huron's beginning-of-October level was 83 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 value coming in at 19 cm lower than the record year of 1986.

Lake Erie was 69 cm above average at the beginning of October and 20 cm higher than the same time last year. This puts the level at the second highest on record 7 cm lower than the beginning-of-October record set in 1986.

Lake Ontario's level at the start of October was 44 cm above average and 46 cm higher than the water levels last year. This is a beginning of month level we have not seen since 1986 when it was 3 cm higher.

At the beginning of October, all of the Great Lakes were at least 68 cm above their chart datum level.

Water levels forecast

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

Typically, if the lake receives average water supplies, the level of Lake Superior would decline in October. However, given its record high starting level, with extremely wet conditions, it could again be close to record values for the next few months.

Lake Michigan-Huron would continue its seasonal decline in October if we experience average water supplies. Even under extremely wet conditions the levels would not return to their near-record values until early next year. However, even if very dry conditions are experienced, the levels will continue to be well

above average throughout the fall and early winter.

This month could well be the end of the 5 month streak of record water levels for Lake Erie. Although it starts out October close to its record high level, even extremely wet conditions would have a hard time getting it to a record high this month. Nevertheless, the lake will stay well above average throughout the rest of the year even with average or dry conditions.

Lake Ontario has continued to fall 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 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 October 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/october-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 Llevels Bulletin at: https://waterlevels.gc.ca/C&A/bulletin-eng.html

Lake Evaporation

Lake evaporation, or the process of water moving from the lakes into the atmosphere as the lake water is cooled, is a complex process that contributes, along with precipitation, inflow and outflow, to water level fluctuations of the Great Lakes. Evaporation from the Great Lakes generally peaks in the fall to early winter months, when the air temperature above the lakes drops, but the water remains relatively warmer and ice free. The rate of evaporation from the lakes is dependent on a number of factors including wind speed, air temperature, water temperature and ice cover. Significant evaporation occurs when dry cold air blows over warmer lake water; conditions encountered when air temperatures drop rapidly from above- to below-freezing. When air temperatures drop quickly, and the lake is ice free, watch for the mist above the surface of the lake as evidence that evaporation is occurring.

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