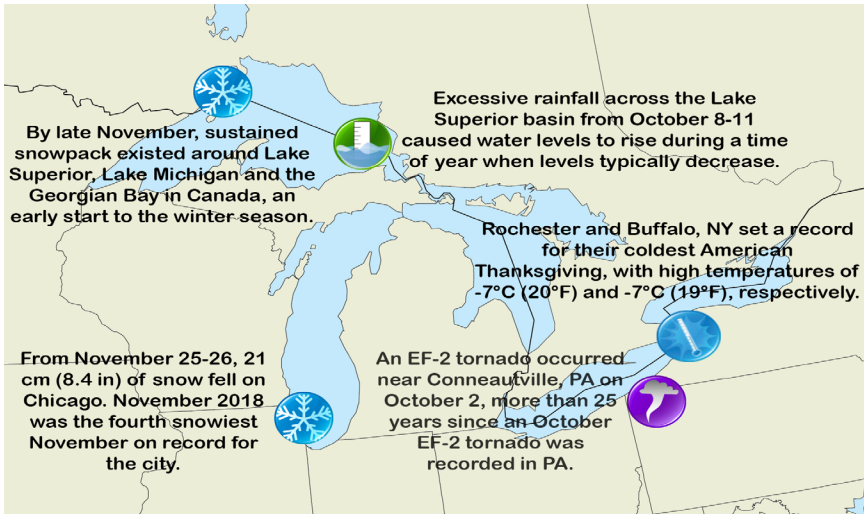
Quarterly Climate Impacts and Outlook

Great Lakes Region

December 2018

Great Lakes Significant Events – *for September - November 2018*



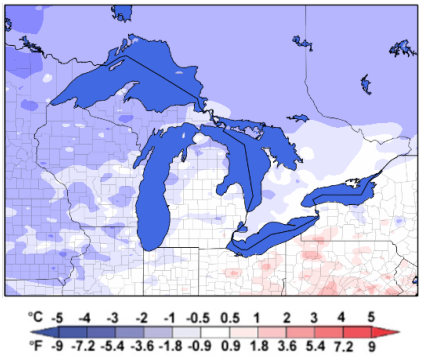
Extreme shifts from unseasonably warm to record cold temperatures occurred this fall season. For Cleveland, OH and Erie, PA, it was the second warmest September on record at 22°C and 21°C (70.7°F and 69.7°F), respectively. Many record warm temperatures occurred in the eastern lakes on October 8 and 9, when Erie tied its warmest October temperature on record at 32°C (89°F).

Following extreme warmth early in the season, cold weather abruptly set in for November throughout the basin. The warmest temperature reached in Chicago during all of November was 11°C (52°F), the coldest mark since records began in 1871.

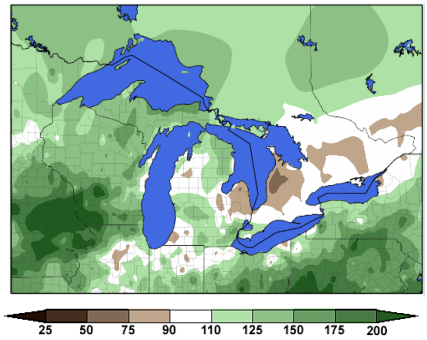
Six counties in the central area of the upper peninsula of Michigan recorded their wettest October on record while Sault Ste. Marie, MI had its second wettest October with 19 cm (7 in) of precipitation. Toronto recorded its cloudiest November on record with an average cloud cover of 88% during daylight hours while 10 days during the month were cloudy 100% of the time. In addition, as of December 4, Chicago was having its second wettest year-to-date on record.

Regional Climate Overview – *for September - November 2018*

Fall 2018 Temperature Departure from Normal



Fall 2018 Precipitation Percent of Normal



U.S. normals based on 1981-2010. Canadian normals based on 2002-2017.

Precipitation and Temperature

September temperatures were up to 4°C (7°F) above normal, with the southern Erie basin being the warmest. October temperatures ranged from 3°C (5°F) below normal in the Superior basin to 3°C (5°F) above normal in the southern Erie basin. November temperatures were as much as 4°C (7°F) below normal. Autumn temperatures ranged from 2°C (4°F) below normal in the Superior basin to 1°C (2°F) above normal in the southern Erie basin.

September was drier than normal, with precipitation ranging from 76% of normal to near normal. October was wetter than normal, with precipitation ranging from 109% to 154% of normal. In November, precipitation ranged from 67% of normal in the Michigan basin to 131% of normal in the Ontario basin. Autumn precipitation averaged out to be near normal.

At the end of November, surface waters of the Great Lakes are among the coldest for this time of year since 1995, despite very warm water temperatures on all but Lake Superior earlier this fall.

Great Lakes Water Levels

Lake	Begin of Dec 2018 Compared to:		Change since Sep. 1st	
	Average	2017	2018	Average
Sup.	+28 cm +11.0 in	0 cm 0 in	+6 cm +2.4 in	-10 cm -3.9 in
Mich.-Huron	+49 cm +19.3 in	+2 cm +0.8 in	-12 cm -4.7 in	-18 cm -7.1 in
Erie	+62 cm +24.4 in	+11 cm +4.3 in	-6 cm -2.4 in	-23 cm -9.1 in
Ont.	+14 cm +5.5 in	-17 cm -6.7 in	-16 cm -6.3 in	-29 cm -11.4 in

Every lake began December at above-average levels for this time of year, and all except Lake Ontario were at or above their levels seen at the same time in 2017, generally due to above-average water supply conditions for this quarter. The above-average water supplies resulted in Lake Superior's levels rising when on average they decline, while all of the other lakes declined less than average.

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Environment and Climate Change Canada / Environnement et Changement climatique Canada

Regional Impacts – *for September - November 2018*

Crop harvest in the Great Lakes region has been slow. Wet conditions across the region, primarily in October, delayed the ability to harvest crops as the fields became too wet to navigate. Although November was drier, early-season snow also slowed harvest. Corn harvest fell 2% behind the 2013-2017 average as of November 25 while soybeans were 4% behind the five-year average, resulting in the slowest harvest since 1995 when data first began being recorded.

Coastal erosion and localized flooding on the shores of Lake Superior near Duluth on October 10 due to a strong storm caused CAD 24.5 million (USD 18.4 million) of damage. Several popular spots for tourists were damaged, as well as the seawall by the Minnesota Slip Bridge and rail lines in the area. Wind gusts of 80 km/h (50 mph) or more were frequently measured, including a gust measured at 138 km/h (86 mph) by a freighter near Castle Danger. Waves as high as 4 to 5.5 m (14 to 18 ft) were recorded, causing flooding as well as loss of power for about 4,700 customers.

The Harmful Algal Bloom (HAB) that occurred on Lake Erie this year had a severity index (SI) of 3.6, which was much weaker than the initial forecast suggested. This bloom was relatively mild, especially when compared with the bloom from 2017 (SI=8). This year's bloom started early in the last week of June due to rapid warming of the lake, but was disrupted by a storm on September 9-10 that produced strong winds. The bloom never re-established from this disturbance and ended earlier than normal in the first week of October.

Snow on soybeans (Credit: Mary Knapp).

Lakewalk along Lake Superior in Duluth.

Lake Erie HAB (9 July 2018).

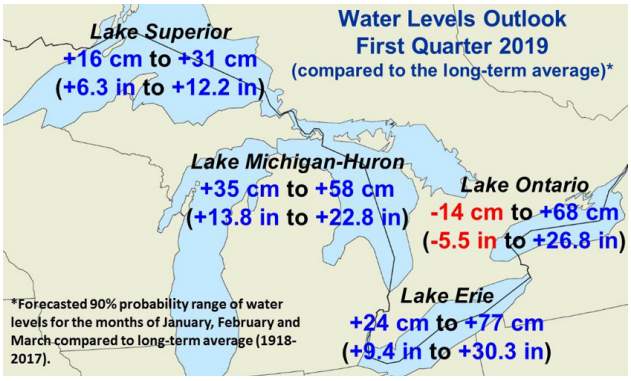
Regional Outlook – *for January - March 2019*

Temperature and Precipitation

According to American forecasters, the temperature outlook shows an enhanced chance of above-normal temperatures for the western lakes while Canadian forecasters expect equal chances for above-, near- and below-normal temperatures for the basin. There is an equal chance for above-, near- and below-normal precipitation for the basin except for the far southern region, which has an increased chance for below-normal precipitation.

Great Lakes Water Levels and Ice Cover Forecast

During the winter, Great Lakes water levels typically reach their seasonal low due to high evaporation and limited runoff. Lake Superior's water level is expected to continue its decline between January and March, Lake Michigan-Huron and Lake Erie are forecasted to reach their seasonal minimum in February and then begin to rise, while Lake Ontario's level is expected to rise. All lakes are expected to stay below their record high values, even if wet conditions occur.



NOAA's Great Lakes Environmental Research Laboratory experimental ice cover projection over the Great Lakes projectss ice cover to be 50% this winter. The preliminary projection for each lake is: 50% for Lake Superior, 40% for Lake Michigan, 64% for Lake Huron, 29% for Lake Ontario, and 74% for Lake Erie.

Partners

- *Midwestern Regional Climate Center*
- *Environment and Climate Change Canada*
- *Agriculture and Agri-Food Canada*
- *Northeast Regional Climate Center*
- *Great Lakes Region State Climatologists*
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  - *CoastWatch Great Lakes Node*
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- *GLISA*
- *US Army Corps of Engineers, Detroit District*
- *NIDIS*
- *USDA Midwest Climate Hub*

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