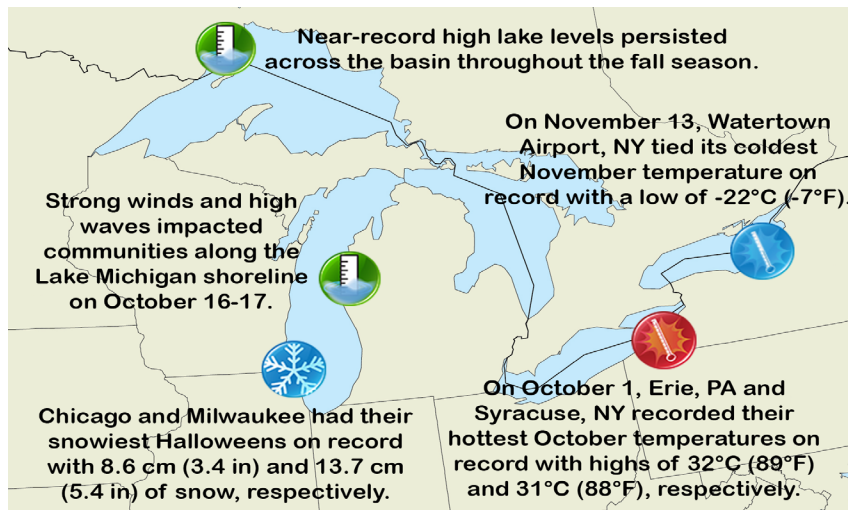


Great Lakes Significant Events – for September - November 2019

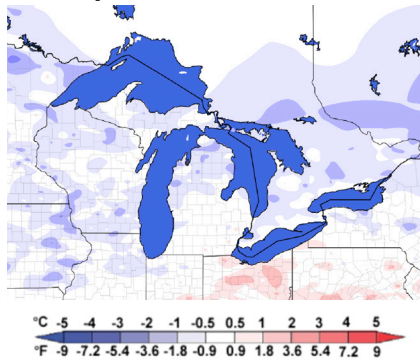


This autumn the Great Lakes once again had near-record high lake levels, leading to issues of flooding and coastal erosion. Several precipitation and snowfall records were set across the basin. October 2019 was the 2nd snowiest October on record for Chicago and Milwaukee, with Milwaukee also recording its 3rd wettest October on record. Syracuse, NY had its 4th wettest October on record. On November 11, Detroit had its snowiest November day on record. This was also the biggest November snowstorm for the city with 23.4 cm (9.2 in) of snow from November 11-12. Rochester, NY also had its 3rd snowiest 2-day period in November from November 11-12 with 35.6 cm (14 in) of snow.

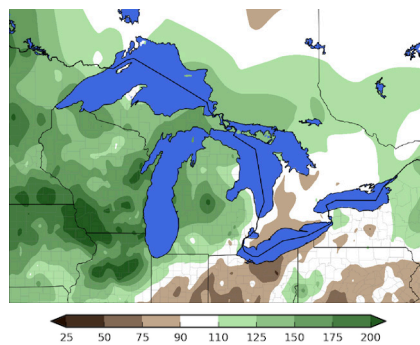
In addition, an extremely cold air mass moved across the region from November 11-13, setting many daily minimum temperature and low maximum temperatures records at locations such as Michigan City, IN; Manitowoc, WI; Sault Ste. Marie, MI; and Toronto, ON. Toronto-Pearson Airport, with an average temperature of 1.07°C (34°F), and Toronto Island, ON, with an average temperature of 2.09°C (35.8°F), had their coldest Novembers on record since 1996.

Regional Climate Overview – for September - November 2019

Fall 2019 Temperature Departure from Normal



Fall 2019 Precipitation Percent of Normal



U.S. normals based on 1981-2010.
Canadian normals based on 2002-2018.

Temperature and Precipitation

September temperatures were up to 4°C (7°F) above normal, with Ohio having its hottest September on record. October temperatures ranged from 2°C (4°F) below normal to 3°C (5°F) above normal. November temperatures were as much as 4°C (7°F) below normal. Autumn temperatures ranged from 2°C (4°F) below normal to 2°C (4°F) above normal.

September precipitation in the lake basins varied, with the overall basin seeing 127% of average. October was wet at 146% of average, while November was dry at 66% of average. Autumn precipitation ranged from 88% to 125% of average, with the overall basin seeing 115% of average. Both Wisconsin and Minnesota had their wettest autumns on record, receiving 35.1 cm (13.80 in) and 28.6 cm (11.25 in) of precipitation, respectively, more than 12.7 cm (5 in) above normal. Michigan had its 2nd wettest autumn with 33.5 cm (13.17 in) of precipitation, which was 11.5 cm (4.53 in) above normal.

Lake	End of Nov 2019 Compared to:		Change since Sept 1st	
	Average	2018	2019	Average
Sup.	+33 cm	+6 cm	-6 cm	-9 cm
Mich.-Huron	+90 cm	+42 cm	0 cm	-17 cm
Erie	+70 cm	+8 cm	-25 cm	-23 cm
Ont.	+47 cm	+33 cm	-36 cm	-29 cm

Current Water Levels

In September, monthly mean water levels met or exceeded monthly record high water levels on Lakes Superior, St. Clair, and Erie, based on the period of record. In October and November, no monthly mean records were set, but water levels remain well above average and near record highs. During the fall, water levels on the Great Lakes typically begin or continue to decline. Lakes Erie and Ontario have been declining since June and since September 1st have declined more than average. Lakes Superior and Michigan-Huron have declined less than average since September 1st.

Regional Impacts – for September - November 2019

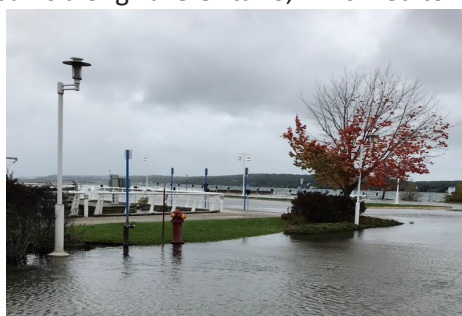
Agriculture continues to be impacted by ongoing [wet conditions](#). From late planting in the spring due to exceptionally wet conditions to slow development and maturation throughout the summer, constant wet conditions into the fall slowed the harvest of corn and soybeans and made it difficult to carry out fall field work. Corn and soybean harvesting is behind average in all Great Lakes states. In Wisconsin and Michigan, the percentage of corn harvested is more than three weeks behind average while soybeans remain covered in snow and are unlikely to be harvested until spring.

Erosion and flooding from high winds and high lake levels continues. Strong winds led to flooding in [Traverse City](#) and [St. Joseph](#), MI on October 16, where homeowners along the [Grand Haven](#) lakeshore had to rip up their decks. The [Erie Basin Marina](#) in Buffalo, NY was damaged from three storms on Oct. 31, Nov. 21 and Nov. 27. Also on Oct 31., a gauge near Port Colborne, ON recorded its second highest lake surge event, with records available for the past 107 years. In addition, an emergency shoreline protection project was initiated in [Chicago](#) at Juneway Beach on November 18.

Economic impacts from high lake levels and historic flooding led to an estimated 30 percent loss of business along the [Lake Ontario](#) and St. Lawrence River shorelines. Record [outflows](#) on Lake Ontario led to the loss of CAD 2.6 million (USD 2 million) a day for shipping and business that depend on the shipping and navigating industries. [New York](#) offered discounted rates at flood-affected state parks along Lake Ontario, which led to increased campground attendance.



Soybeans in snow (credit: M. Knapp)



Flooding in Traverse City (credit: M. Gillen)



Buffalo, NY breakwall damage (USACE).

Regional Outlook – for January - March 2020

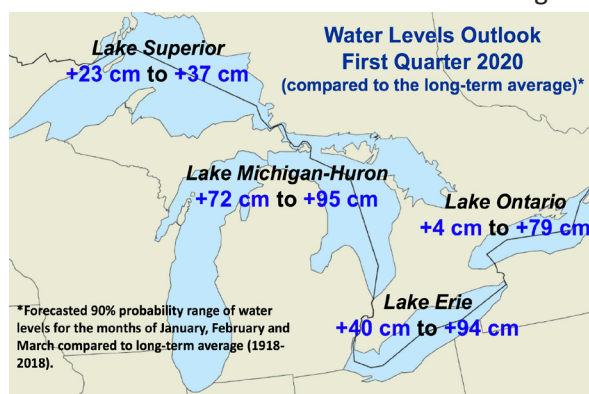
Temperature and Precipitation

The temperature outlook from [American](#) forecasters shows an enhanced chance for below-normal temperatures this winter while the precipitation outlook has an enhanced chance for above-normal precipitation. The temperature outlook from [Canadian](#) forecasters shows an enhanced chance for above-normal temperatures while the precipitation outlook shows equal chances for above-, below- and near-normal precipitation during this winter season.

Great Lakes Water Levels and Ice Cover Forecast

The December monthly forecast indicates that Lakes Erie and Ontario are forecasted to continue their seasonal declines into the early winter and Lakes Superior and Michigan-Huron are forecasted to continue declining until late winter or early spring under average water supplies. In the first quarter of 2020, water levels are forecasted to remain well-above average and near record high. Water levels will continue to be above average even under low water supply scenarios in the next quarter, while high water supply scenarios could lead to near- or above-record high levels. There continues to be a risk for coastal flooding and shoreline erosion as storms can bring strong winds and waves to the coast. Ice jams will be a concern this winter while water levels remain high.

NOAA's Great Lakes Environmental Research Laboratory [experimental ice cover projection](#) over the Great Lakes projects ice cover to be 47% this winter, while the historical average for the basin is 55%. The preliminary projection for each lake is: 54% for Lake Superior, 41% for Lake Michigan, 66% for Lake Huron, 80% for Lake Erie, and 32% for Lake Ontario.



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