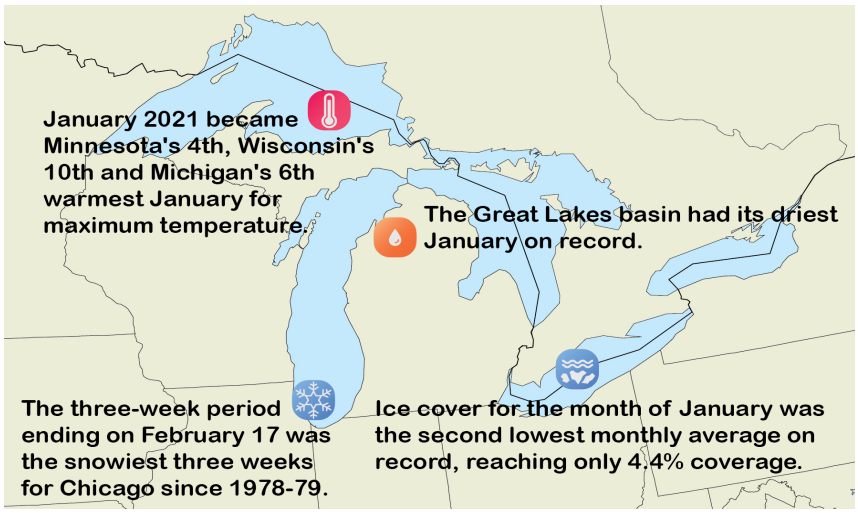
Quarterly Climate Impacts and Outlook

Great Lakes Region

March 2021

Great Lakes Significant Events – *for December 2020 - February 2021*



From December 24-26, a blizzard in the eastern area of the basin produced up to 81 cm (32 in) of snow in OH and PA.

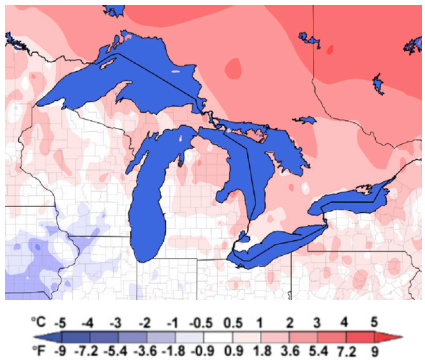
There were extreme temperature swings in February. Temperatures in early February were up to 16°C (29°F) above normal in Ontario before rapidly changing to -16°C (-29°F) below normal by mid-month and by late February, temperatures were once again above normal.

Many record low and record cold maximum temperatures were set across the basin from February 14-16, with temperatures dropping to -25°C (-13°F) or colder in several locations. Then within seven hours on February 16, Duluth, MN warmed up by 22°C (39°F).

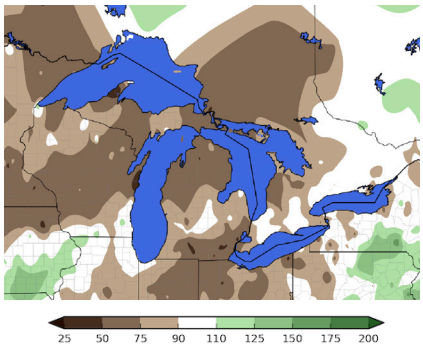
Although February was near normal or snowier than average for many locations, including Grand Rapids, MI which received twice as much snow as normal for the month, snowfall this winter was overall below average for the region. Similarly, ice cover was below average this winter, even though there was rapid freezing with the arrival of the polar vortex in early February followed by rapid melting as temperatures warmed once again at the end of the month.

Regional Climate Overview – *for December 2020 - February 2021*

Winter 2020-2021 Temperature Departure from Normal



Winter 2020-2021 Precipitation Percent of Normal



U.S. normals based on 1981-2010.
Canadian normals based on 2002-2019.

Temperature and Precipitation

While December and January were up to 4°C (7°F) and 7°C (13°F) warmer than normal, respectively, February was as much as 7°C (13°F) colder than normal. Winter temperatures ranged from 1°C (2°F) below to 3°C (5°F) above normal.

All basins were drier than normal every month this winter, with the overall basin seeing 73% of average in December, 37% in January, and 54% in February. The Superior and Michigan-Huron basins had their record driest January. Winter precipitation was below average, with the basin seeing 55% of average.

Ice cover in December was below average and January ice cover was near record low. The colder conditions in February led to rapid freezing. Maximum ice cover occurred on February 19 at 45.8% (long-term average max of 53.3%).

Current Water Levels

At the end of February, water levels are tracking below last year's levels, but remain above average on lakes Superior, Michigan-Huron and Erie. Lake Ontario has recently dropped below average. Water levels this winter continued to decline and the decline from December to late February was above average on all the lakes. The larger than average declines this winter have been driven by drier conditions experienced throughout the basin and a cold February that increased evaporation off the lakes. Although water levels are below last year, water levels on Lake Superior through Lake Erie remain high. There remains the potential for coastal impacts as the lakes head into their seasonal rise.

Lake	End of Feb. 2021 Level Compared to:		Change in Level from beg. of Dec. to end of Feb.:	
	Average for Feb.	Feb. 2020	2020/21 Change in Level	Average Change in Level
Sup.	+19 cm	-14 cm	-26 cm	-20 cm
Mich.-Huron	+67 cm	-26 cm	-20 cm	-8 cm
Erie	+51 cm	-35 cm	-11 cm	+2 cm
Ont.	-14 cm	-60 cm	-10 cm	+10 cm

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Regional Impacts – *for December 2020 - February 2021*

Ice jams on the St. Clair River led to coastal flooding and erosion in early February as ice was pushed down river. Flood watches and a state of emergency were declared. As a result of high water levels and strong winds, yards, homes and wastewater plants were flooded. Ships and ferrys were unable to traverse the water due to the build-up of ice and ice breakers were sent to clear the way. This event occurred prior to the Arctic blast in mid-February and as temperatures plummeted, ice grew until Lake St. Clair was frozen over, stalling ice-breaking efforts until temperatures warmed.

Additional impacts from winter conditions include rescues of people who were stranded on ice floes. On February 4, 66 fisherman were rescued from three separate ice floes in Sturgeon Bay and then on February 21, ten people were rescued by the Coast Guard from ice floes on Lake Erie.

Agricultural impacts from the cold snap in February were of concern, in particular cold injury to vitaculture in Michigan as well as damage to tree fruits such as apples and stone fruit. This winter's harvest in Niagara, ON for the production of ice wines was the smallest in two decades. With above-normal temperatures expected this spring, there is concern among fruit growers for an early break in dormancy and increased frost risk later this spring.

Flood risk for Lake Ontario and the upper St. Lawrence River was lowered as a result of the relatively dry winter. There was a moderate (28%) flood risk in December 2020 that was reduced to a low risk (8%) as lake levels are below the long-term average for this time of year. Above-average springtime precipitation, however, could rapidly change conditions.

Ice jam on the South Channel (credit: C. Warren)

Ice floe rescue on Sturgeon Bay on February 4 (credit: US Coast Guard)

Ice-covered pier in Grand Haven, MI (credit: J. Bissell, MLive)

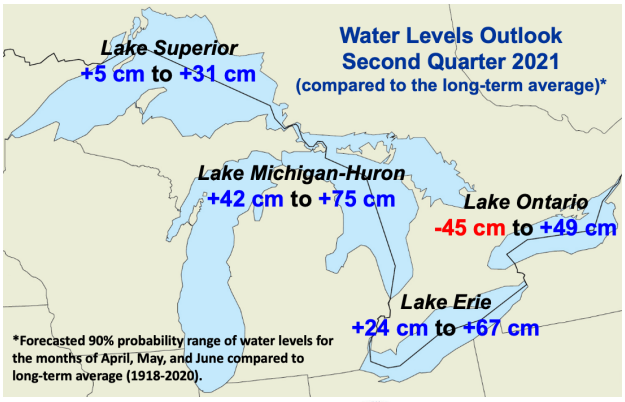
Regional Outlook – *for April - June 2021*

Temperature and Precipitation

The outlook from American and Canadian forecasters shows an enhanced chance for above-normal temperatures in the basin. The precipitation outlook shows enhanced chances for above-normal precipitation from American forecasters except for the far western area of the Lake Superior basin where there are equal chances for above-, below- and near-normal precipitation. Canadian forecasts show equal chances for above-, below- and near-normal precipitation this spring with enhanced chances for below normal precipitation in the Erie and Ontario basins.

Great Lakes Water Levels

The March water level forecast indicates that in the second quarter of 2021, all the lakes will enter or continue their period of seasonal rise. The seasonal rise is a result of spring rainfall and increased runoff from snowmelt and precipitation. The ongoing La Niña is forecast to transition to ENSO neutral this spring, however, wetter than normal conditions are still forecast for the basin this spring and early summer. In the spring, increased rainfall could enhance the seasonal rise on the lakes. Based on the current forecast, even under wet conditions water levels are forecast to remain below record high levels during the second quarter of 2021.



Partners

- Midwestern Regional Climate Center
- Environment and Climate Change Canada
- Agriculture and Agri-Food Canada
- Northeast Regional Climate Center
- Great Lakes Region State Climatologists
- NOAA
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  - Office for Coastal Management
- GLISA
- US Army Corps of Engineers, Detroit District
- NIDIS
- USDA Midwest Climate Hub

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