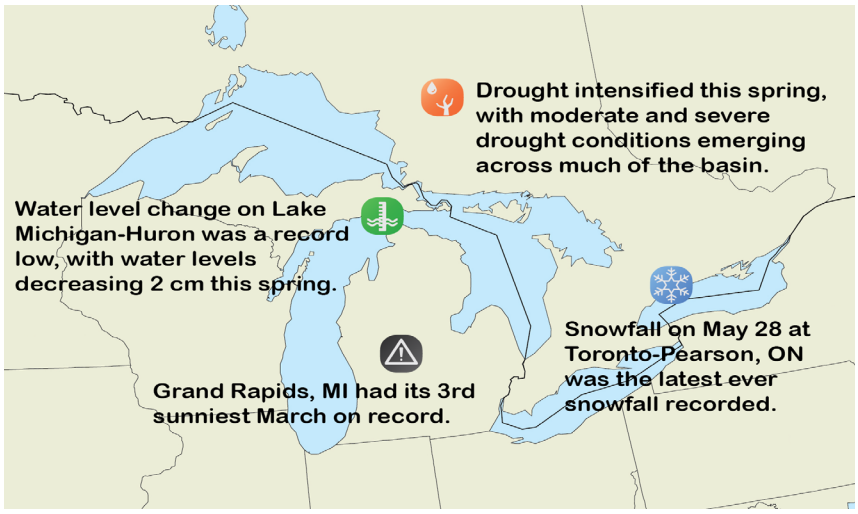
Quarterly Climate Impacts and Outlook

Great Lakes Region

June 2021

Great Lakes Significant Events – *for March - May 2021*



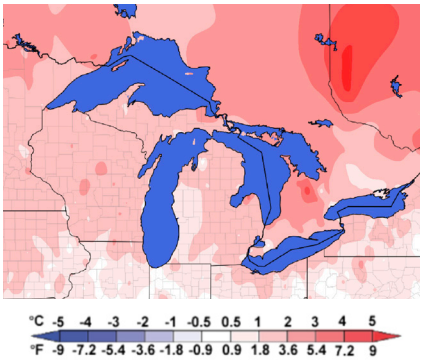
While spring was overall quite warm, a few notable cold events also occurred. Record high temperatures were set or tied from March 10-11, stretching from Michigan to Toronto and as far east as Watertown, NY, with temperatures often surpassing 21°C (70°F).

A late-season storm on April 20 dropped 12.7 cm (5 in) of snow in Toledo, OH, one of the latest snowfalls on record for the city. Then on April 21, 5 cm (2 in) of snow fell at Erie, PA, which was the third latest inch or more of snow at that site, coming nearly three weeks later than average.

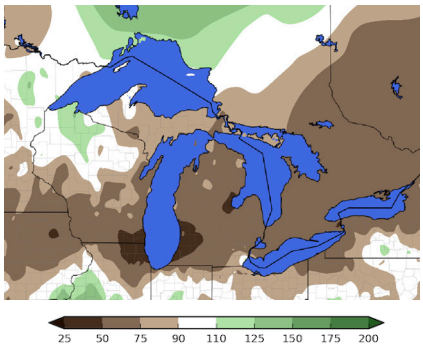
The basin also experienced record-setting warmth in mid-May. Buffalo tied its 5th warmest day in May with a high of 32°C (90°F) on May 20, which was also the third earliest 32°C (90°F) day ever recorded at Buffalo. Following record warmth at Toronto-Island, ON from May 19-23 and record warm temperatures at Toronto-Pearson on May 25, a sharp turn in the weather led to record snowfall and cold on May 28 for the city. This snowfall event also broke Toronto-Pearson's record-long stretch without precipitation that had occurred from May 6-27.

Regional Climate Overview – *for March - May 2021*

Spring 2021 Temperature Departure from Normal



Spring 2021 Precipitation Percent of Normal



U.S. normals based on 1991-2020.
Canadian normals based on 1981-2010.

Temperature and Precipitation

March was up to 5°C (9°F) warmer than normal, with the Superior basin having the largest warm anomaly. Minnesota, Wisconsin and Michigan all had their 8th warmest March on record. April was up to 2°C (4°F) warmer than normal across the entire basin. May was as much as 2°C (4°F) colder than normal, with the Michigan and Erie basins having the largest cold anomalies. Spring was up to 3°C (5°F) warmer than normal. Lake temperatures were also slightly above average this spring.

All basins except Superior were drier than average every month of spring, with the overall basin seeing 68% of average precipitation in March, 81% of average in April, and 62% of average in May. Spring precipitation was 70% of average.

Snowfall in March was also historically low in several cities, including Toronto-Pearson, ON and Rochester and Buffalo, NY, each of which had a top 5 least snowy March on record.

Lake	End of May 2021 Level Compared to:		Change in Level from beg. of Mar. to end of May:	
	Average for May	May 2020	2021 Change in Level	Average Change in Level
Sup.	+10 cm	-15 cm	+8 cm	+17 cm
Mich.-Huron	+41 cm	-50 cm	-2 cm	+24 cm
Erie	+33 cm	-45 cm	+14 cm	+32 cm
Ont.	-37 cm	-64 cm	+20 cm	+43 cm

Current Water Levels

At the end of May, water levels continue to be below last year's levels, but remain above average on Lakes Superior, Michigan-Huron, and Erie. During the spring months, water levels typically rise due to increased precipitation and runoff. However, the recent drier conditions led to well below average seasonal rises during the spring. Lake Michigan-Huron has experienced a decline in lake level between the beginning March and end of May because of the dry conditions, which is also a record low change in level during this time.

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Regional Impacts – *for March - May 2021*

Drought around the Great Lakes has worsened this spring due to the lack of precipitation, above-normal temperatures and high evapotranspiration. While the eastern half of the basin is experiencing persistent abnormal dryness, the central and western areas have moved into moderate drought conditions and in some places, even severe drought. In Michigan, conditions were dry enough for a dust devil to form over uncovered farm field in Vicksburg, MI on May 12. In addition, while the number of fires that have occurred so far this year across Ontario is slightly below average, fire potential remains a concern due to the ongoing dry conditions and likelihood for warmer-than-average summer weather.

While lake levels continue to be lower than the record and near-record highs set over the last few years, high wind and wave events continue to have an impact across the basin. On May 28, strong northeasterly winds led to a seiche event on Lake Erie. Lakeshore flooding occurred along the Lake Erie Islands and the water levels at Marblehead, OH crested at the second highest in recorded history. Due to high wind and waves, the opening of Chicago beaches was delayed on May 28 and a stretch of the city's Lakefront Trail had to be closed.

Agriculture was impacted this spring from early warmth in March that spurred early development. This was followed by several late-season freezes and snow events in April and May. Cooler weather later in the season also led to pollination issues as bees were less active during these stretches of colder weather. This spring, however, corn and soybean planting are ahead of average for this time of year but drought continues to remains a concern for the summer.

Dust Devil in Vicksburg, MI. (credit: M. Torregrossa, MLive)

Flooding in Put-In-Bay, OH. (credit: Perry's Victory & IPM)

Soybeans in Michigan. (credit: R. Costa, MSU Extension)

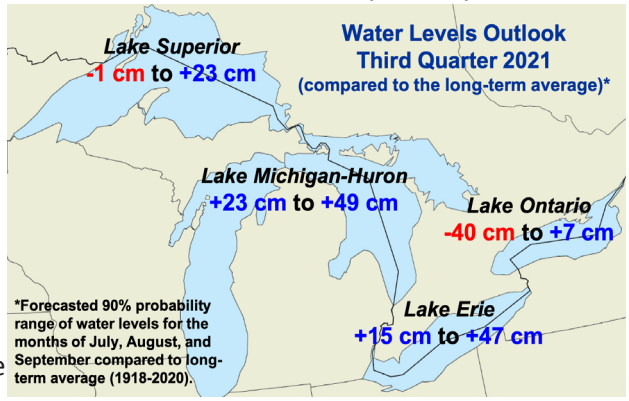
Regional Outlook – *for July - September 2021*

Temperature and Precipitation

The outlook from American and Canadian forecasters shows an enhanced chance for above-normal temperatures, especially to the west. The precipitation outlook shows equal chances for above-, below- and near normal precipitation throughout the basin, except for enhanced chances for above-normal precipitation in the far western area of the basin from American forecasters.

Great Lakes Water Levels

The June water level forecast indicates that water levels are forecast to reach their peaks and/or begin their seasonal declines, depending on the lake. Lake Superior is forecast to reach its monthly mean water level peak in August, Lakes Michigan-Huron and Ontario are forecast to reach their peak in July, and Lake Erie is forecast to reach its peak in June, while Lake St. Clair likely already reached its peak in May. Forecasted peak water levels have been influenced by the drier basin conditions that have occurred so far this year in 2021. The 90% range for the third quarter indicates that even under dry conditions, water levels on Lakes Michigan-Huron and Erie are forecast to remain above average.



Harmful Algal Blooms (HAB)

The HAB season typically peaks in the late summer. The Seasonal Lake Erie HAB Forecast will be issued on June 30. Since conditions can change quickly through the summer, the HAB Forecast is updated twice weekly from July to October.

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*
  - *NCEI*
  - *GLERL*
  - *CoastWatch Great Lakes Node*
  - *Great Lakes Sea Grant Network*
  - *North Central River Forecast Center*
  - *Ohio River Forecast Center*
  - *Climate Prediction Center*
  - *Office for Coastal Management*
- *GLISA*
- *US Army Corps of Engineers, Detroit District*
- *NIDIS*
- *USDA Midwest Climate Hub*

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