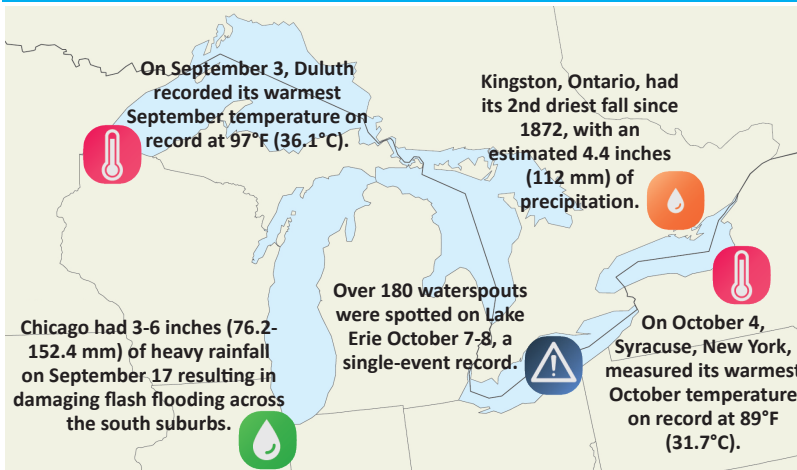


### Great Lakes Significant Events – September-November 2023



Record warmth settled across the western Great Lakes in early September with high temperatures exceeding 90°F (32.2°C) for several days. Warm conditions lingered in the west, with Duluth recording its 3rd warmest September in 150 years.

While most of the region saw little precipitation in September, Duluth was hard-hit with multiple extreme rain events that left the area with over 10 inches (25.4 cm) of precipitation for the month.

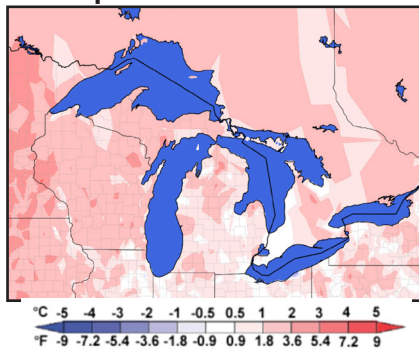
Warmth again blanketed the Great Lakes in early October, this time setting record highs from west to east. Temperatures were 10-20°F (5.6-11.1°C) above normal from October 1-5. Syracuse had its 6th warmest October on record.

A strong cold front traversed the region in late October, ushering in cold air and lake-effect snow in the western and central parts of the basin.

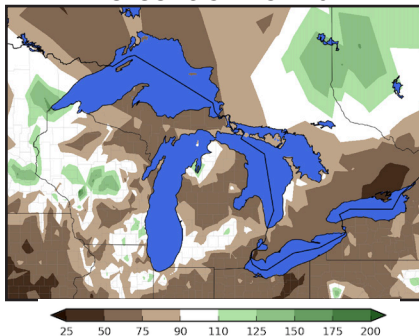
The season's first major lake-effect snow event in the eastern reach of the basin occurred from November 27-29, producing up to 46 inches (116.8 cm) of snow east of Lake Ontario and up to 23 inches (58.4 cm) of snow east of Lake Erie.

### Regional Climate Overview – September-November 2023

#### Fall Temperature Departure from Normal



#### Fall Precipitation Percent of Normal



Precipitation and temperature normals based on 1991-2020.

#### Air Temperature and Precipitation

September and October were up to 3°C (5°F) above normal, especially in the Superior basin in September and the Ontario basin in October. Counties along the western shore of Lake Superior had their warmest September on record. November ranged from 1°C (2°F) below normal in the Ontario basin to 1°C (2°F) above normal in the Superior basin. Fall was up to 2°C (4°F) above normal.

September and November were dry for all basins, with the Great Lakes basin seeing 47% and 55% of average, respectively. Counties along the southern shore of Lake Erie had their driest September on record. October was drier for all basins except Michigan-Huron, with the overall basin seeing 106% of average. For fall, the overall basin saw 69% of average with all lake basins being dry.

#### Current Water Levels

Lake	End of Nov 2023 Level Compared to:		Change in Level from beg. of Sep. to end of Nov:	
	Average for Nov	Nov 2022	2023 Change in Level	Average Change in Level
Sup.	-5 cm	-22 cm	-25 cm	-10 cm
Mich.-Huron	+8 cm	-4 cm	-22 cm	-17 cm
Erie	+23 cm	+4 cm	-38 cm	-23 cm
Ont.	-11 cm	-1 cm	-56 cm	-29 cm

At the end of November, water levels were below average on Lakes Superior and Ontario and above average on Lakes Michigan-Huron and Erie. Dry conditions across much of the Great Lakes region this fall led to greater-than-average water level declines on all lakes from the beginning of September to the end of November. Lake Superior experienced its 6th largest seasonal decline for fall since records began in 1918, and Lake Ontario had its 3rd largest drop.

## Regional Impacts – September-November 2023

**Agriculture:** U.S. and [Canadian](#) farmers throughout the Great Lakes region were behind schedule in harvesting corn and soybean crops due to crop development delays, which subsequently delayed winter wheat planting during fall. Canadian corn [yields](#) ended high while soybeans were low. The [Michigan apple crop](#) had an excellent harvest this season, while the [eastern Ontario](#) and [New York apple harvests](#) was reduced by a mid-May freeze event.

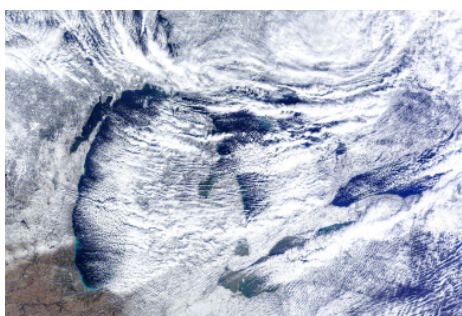
**Drought and Water Supply:** Streamflows and groundwater wells in western New York reported record-low levels during fall. Wells ran dry for at least [100 homes](#) in part of Genesee County, New York, with some residents required to [haul water](#) to their homes. Businesses and farms were also affected, with one New York dairy farmer hauling in 60,000 gallons a day for their cows. Low water levels in ponds and creeks also affected rural fire fighting operations.

**Fall Foliage:** Warm October temperatures [delayed the start](#) of the fall color season in Canada, and the colors were less vibrant due to a lack of cold nights. Many Canadian trees also dropped their leaves later than usual. Fall colors were also [delayed in Michigan](#), but the color vibrance was unaffected.

**Harmful Algal Blooms (HABs):** The 2023 Western Lake Erie HAB started in early July, which is the [second earliest start](#) since records began in 2002. The bloom reached moderately severe intensity and persisted into mid-September.



Below-normal streamflow at Tonawanda Creek in Batavia, NY, on October 23. (Credit: USGS, NY Water Science Center)



Satellite image of lake effect snow across the Great Lakes region (credit: NOAA Great Lakes CoastWatch)



Fall colors in the United States (credit: Dennis Today)

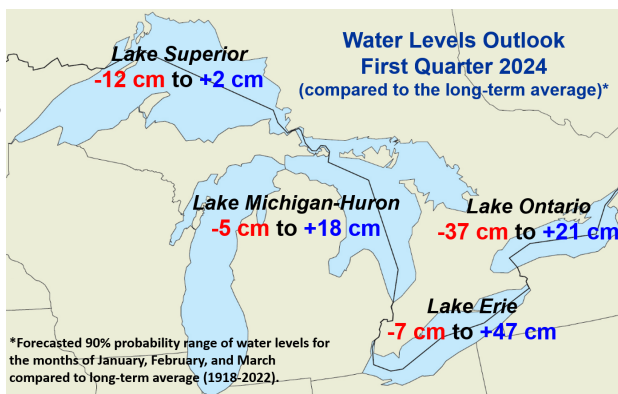
## Regional Outlook – for January-March 2024

### Temperature and Precipitation

[American](#) and [Canadian](#) forecasts indicate above-normal temperatures for the entire Great Lakes basin. The American forecast shows a chance of below-normal precipitation in the central and western basins. The Canadian forecast shows equal chances of below-, above, and near-normal precipitation basin-wide.

### Great Lakes Water Level Outlook

The December forecast indicates that first quarter (Jan, Feb, Mar) water levels on Lakes Superior and Michigan-Huron will likely be reaching the end of their seasonal decline period, while Lakes Erie and Ontario will likely complete their seasonal declines and begin their seasonal rises. Under average water supply conditions, water levels on Lakes Superior and Ontario are projected to remain below average, while Lakes Michigan-Huron and Erie are projected to remain above average. If very dry conditions occur in the Lakes Michigan-Huron or Erie basins, those water levels could drop below average.



### Ice Cover Outlook

The [U.S. National Ice Center](#) predicts below-normal ice conditions on Lakes Superior, Michigan, Erie, Ontario, and St. Clair. Slightly below-normal ice conditions are predicted for Lake Huron.

## Partners

[Midwestern Regional Climate Center](#)  
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