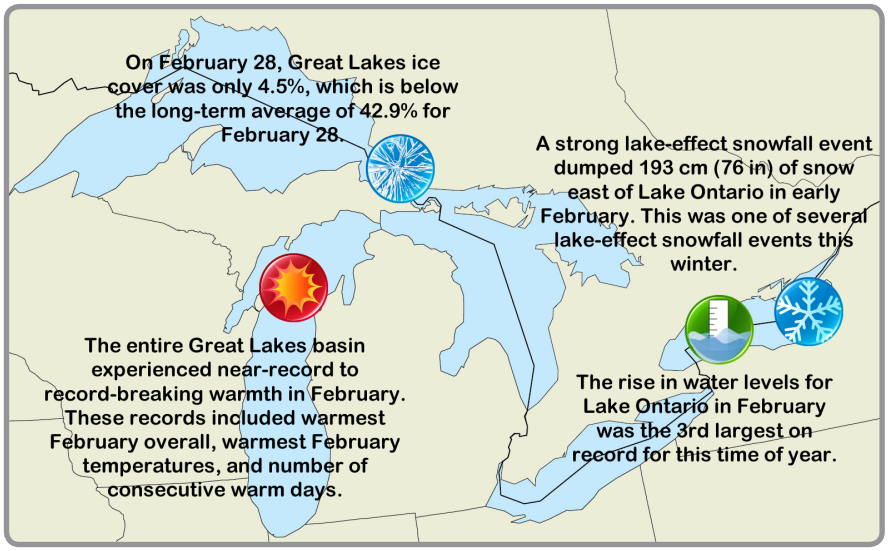
# Quarterly Climate Impacts and Outlook

# Great Lakes Region

March 2017

## Great Lakes Significant Events - *for December 2016 - February 2017*

Despite near-normal temperatures in December and a cold first half of January, winter 2016-17 will be remembered for the unseasonably warm weather in late January through February. Toronto, ON recorded its highest ever February temperature of 19°C (66°F) on February 23. As did three other stations on February 24: Syracuse, NY with a temperature of 22°C (71°F), Binghamton, NY with a temperature of 21°C (70°F), and Erie, PA with a temperature of 25°C (77°F). Erie's record was also its warmest winter day on record. Chicago, IL experienced the longest stretch of consecutive days that were 18°C (65°F) or higher from February 17-22. During the February 18-25 time period, several stations in the southern Canadian basin were marked as extremely above normal.



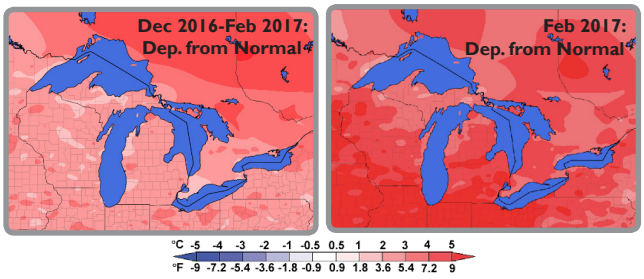

The above-normal temperatures resulted in minimal ice cover on the Great Lakes. As of February 28, the maximum ice cover extent this winter only reached 15.3%, which is significantly lower than the long-term (since 1973) average of 55%. However, March could bring additional ice growth if temperatures are cold enough.

The above-normal temperatures resulted in less snowfall than normal in many locations across the basin. Racine, WI recorded no snow in February, which has only happened one other time (in 1998) since records began in 1914. However, the open waters of the Great Lakes contributed to several episodes of heavy lake-effect snowfall. One of those events was from February 1-4, when up to 193 cm (76 in) of snow fell east of Lake Ontario and a state of emergency was declared for Oswego County (NY).

## Regional Climate Overview - *for December 2016 - February 2017*

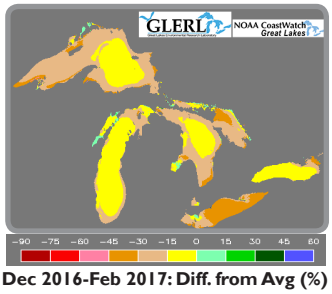
### Temperature

December temperatures ranged from near normal to 2°C (4°F) above normal; however, the southern Lake Michigan basin was colder. In January and February, temperatures ranged from 1°C (2°F) to more than 6°C (11°F) above normal. The northeastern Superior basin was warmest in January, while the western Erie and southern Michigan basins were warmest in February.




*Air temperature normals based on 1981-2010. Water temperature LTA from 1992-2016.*

### Ice Cover

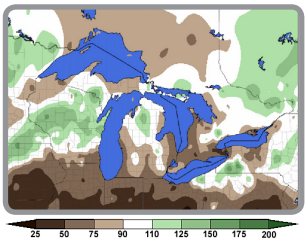



**Dec 2016-Feb 2017: Diff. from Avg (%)**

Although ice cover peaked above the long-term average (LTA: 1973-2016) in a few areas on the Great Lakes in December, ice cover on most of the Lakes was well below the LTA during December-February. Ice cover peaked at 15.3% during this period (on February 8) and lakes Erie and St. Clair became essentially ice free on February 23.

### Precipitation & Snowfall

In December, all lake basins except Erie received near- to above-normal precipitation. The entire Great Lakes basin received near- to above-normal precipitation in January and February, with much falling as rain. Despite precipitation being near to above normal, snowfall varied. December snowfall was near to above normal for much of the basin, while January snowfall was generally near to below normal. February snowfall ranged from less than 25% in the Erie, Michigan, and southern Huron basins to 200% of normal in parts of the Superior basin. Winter snowfall ranged from 25% to 175% of normal.




**Dec 2016-Feb 2017 Snowfall: Percent of Normal (%)**

*Snowfall normals based on 1981-2010.*

### Great Lakes Water Levels

| Lake | End of Feb. 2017 Compared to: | | Change since December 1st | |
|---|---|---|---|---|
| | Average | Last Year | 2016/17 | Average |
| Superior | +20 cm (+7.9 in) | -4 cm (-1.6 in) | -14 cm (-5.5 in) | -20 cm (-7.9 in) |
| Michigan-Huron | +23 cm (+9.1 in) | -6 cm (-2.4 in) | -6 cm (-2.4 in) | -7 cm (-2.8 in) |
| Erie | +41 cm (+16.1 in) | +10 cm (+3.9 in) | +24 cm (+9.4 in) | +3 cm (+1.2 in) |
| Ontario | +31 cm (+12.2 in) | +1 cm (+0.4 in) | +47 cm (+18.5 in) | +9 cm (+3.5 in) |

*Water level statistics based on 1918-2016.*

# Regional Impacts - *for December 2016 - February 2017*

## Agriculture

The significantly warmer-than-normal temperatures in February caused an early dormancy break to some overwintering annual and perennial crops in the southern Great Lakes basin. If the warmth persists and growth continues in early spring, there is an increased risk for freeze damage during March, April, and May. For instance, in 2012, an early spring followed by a series of hard frosts wiped out 80% of the apple crop and 90% of the cherry crop in Ontario. Similarly, many fruit crops were severely damaged in Michigan. The unseasonably mild conditions allowed maple syrup farms to tap trees in February, but many producers worry it could be a short season.

*Ripe tart cherries in Michigan (Photo: AgBio Research Program, MSU)*

## Wildlife

The unseasonably warm temperatures impact wildlife and migration. Reports show the American Woodcock is already back in Michigan after the winter, which is extremely early. Woodcock tend to follow the receding snowline north, which makes them vulnerable to late season snowstorms this year.

*The American Woodcock (Photo: Audubon.org)*

## Coastal Erosion

Lake ice typically helps protect beaches and beach habitats. This winter's ice is only shoreline surface ice so instead of protecting the beaches, the ice is scouring away the shoreline when it is pushed by wind and waves. Park officials in Presque Isle State Park (Erie, PA) are having to increase shoreline management to ensure the beaches are usable for residents.

## Transportation

January lake-effect snowfall events caused significant transportation issues in both Buffalo, NY and Toronto, ON. In the Buffalo area, 61 cm (2 ft) of snow fell in just 6 to 8 hours on January 5, causing a traffic standstill during the evening commute and hundreds of children were stranded at school or on buses for several hours. Lake-effect snow also caused a 100+ vehicle pile-up just east of Toronto on the 7th. An ice road from Bayfield, WI to Madeline Island was not able to open and the ferry ran all winter for the 2nd year in a row due to warmer-than-normal conditions.

## Recreation & Tourism

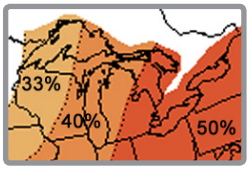
Low ice cover caused by warmer temperatures has impacted recreation. The Michigan Pond Hockey Classic, a tournament that brings up to 7,000 people to Whitmore Lake every year, had to cancel the event due to thin ice for a 2nd year in a row. Ice fishing in western Lake Erie is typically a big attraction but the business has struggled this winter due to inadequate ice cover.

*Lake Erie in 2015 when ice was more plentiful (Photo: Epic Ice Fishing Adventures)*

# Regional Outlook - *for April - June 2017*

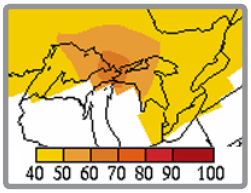
## Temperature & Precipitation

The Climate Prediction Center (CPC) and Environment and Climate Change Canada (ECCC) predict greater than normal chances for above-normal temperatures across the entire Great Lakes basin for the April through June time period. The CPC outlook says there are better chances for above-normal precipitation in the extreme western U.S. basin, while ECCC does not have a clear signal whether precipitation in the Canadian basin will be above, near, or below normal for April through June. The current monthly and seasonal outlooks can be found through CPC and ECCC.



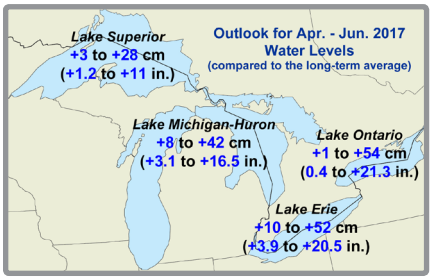

*CPC April-June 2017 Temperature Outlook*

*33-50%: Probability of Above Normal*




*ECCC April-June 2017 Temperature Outlook*

*40-70%: Probability of Above Normal*




## Water Levels

Great Lakes water levels typically climb in the spring months as temperature and runoff increases and evaporation decreases. All of the Great Lakes are expected to remain above average in the April-June 2017 time period unless exceedingly dry conditions are experienced.

*Graphic (left): Potential range for water levels for Apr-June 2017 compared to the long-term average (1918-2016).*

## Fire Potential

The early spring and warmer temperatures, combined with the lack of snowfall and snow cover, could mean dry conditions across the basin. As a result, the Great Lakes basin could enter the spring fire season earlier than usual due to these factors and the forecasted above-normal temperatures in April. Any dry and windy periods of weather during April could produce an increased risk for wildfire activity.

*Minnesota wildfire in 2015 (Photo: James Silverstone, USFS)*

## Great Lakes Region Partners

**Environment and Climate Change Canada (ECCC)**
www.ec.gc.ca
**Agriculture and Agri-Food Canada**
www.agr.gc.ca
**Midwestern Regional Climate Center**
mrcc.isws.illinois.edu
**Northeast Regional Climate Center**
www.nrcc.cornell.edu
**Great Lakes Region State Climatologists**
www.stateclimate.org
**National Oceanic and Atmospheric Administration**
www.noaa.gov
- **National Centers for Environmental Information**
  www.ncei.noaa.gov
- **Great Lakes Environmental Research Laboratory**
  www.glerl.noaa.gov
- **NOAA Great Lakes Sea Grant Network**
  www.seagrant.noaa.gov
- **North Central River Forecast Center**
  www.crh.noaa.gov/ncrfc
- **Ohio River Forecast Center**
  www.weather.gov/ohrfc
- **Climate Prediction Center**
  www.cpc.noaa.gov
- **Office for Coastal Management**
  http://coast.noaa.gov/

**Great Lakes Integrated Sciences & Assessments**
www.glisa.umich.edu
**US Army Corps of Engineers, Detroit District**
www.lre.usace.army.mil
**National Integrated Drought Information System**
www.drought.gov
**USDA Midwest Climate Hub**
https://www.climatehubs.oce.usda.gov/midwest

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