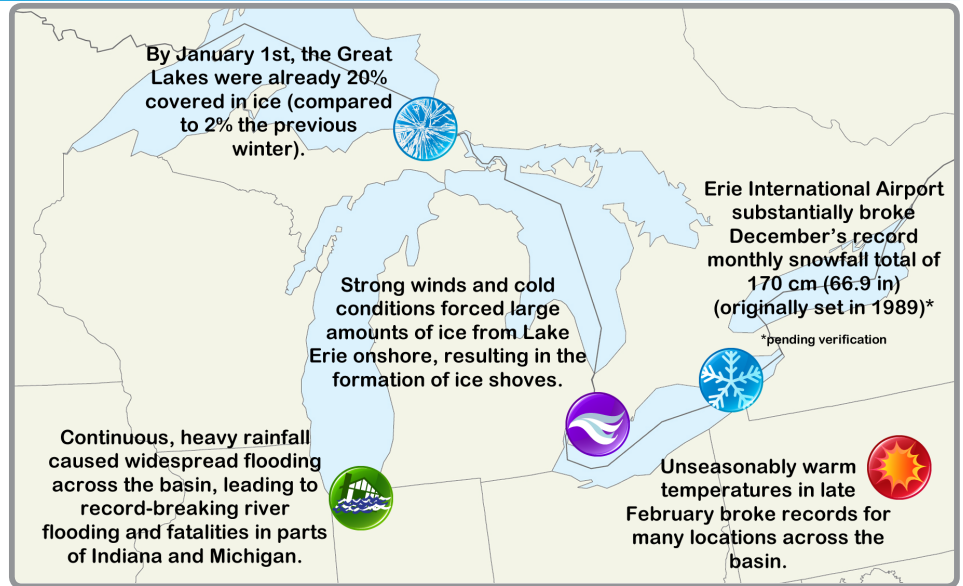




## Great Lakes Significant Events - for December 2017 - February 2018

Extreme swings in weather conditions highlighted the winter of 2017-2018. Many locations experienced near-to-record-breaking low temperatures in late December and early January. For the southern and eastern basin, the unusually cold conditions were accompanied by above-normal snow accumulation. For southern Ontario, snowfall was mixed with some areas having below-normal accumulation while others were 2-3 times the normal amount. By mid-to-late February, conditions for most of the basin had reversed. Snow accumulation was far below-normal for nearly the entire basin. Daily temperatures were above-normal by as much as 22°C (40°F) for some locations in the eastern basin. Syracuse and Watertown, NY had their warmest February day on record.

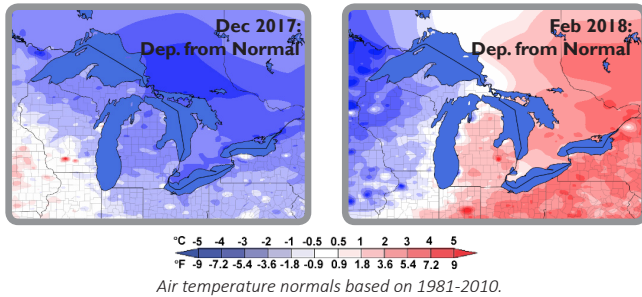


The end of February was also notable due to the excessive amounts of precipitation that impacted the majority of the area. Many sites reported more than five times the normal amount of accumulated precipitation for late February. This inundation led to widespread flooding. Several communities declared a state of emergency while others were forced to evacuate. Both the St. Joseph and Kalamazoo rivers reached record levels as a result of the prolific rainfall.

## Regional Climate Overview - for December 2017 - February 2018

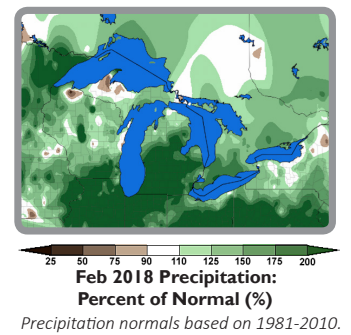
### Temperature

December average temperatures ranged from near normal to 5°C (9°F) below normal. Late December cold conditions persisted into early January where temperatures fluctuated from below to above normal for most of the basin. In February, Superior and western Michigan basins were colder than normal while eastern Michigan and Ontario basins were warmer than normal.

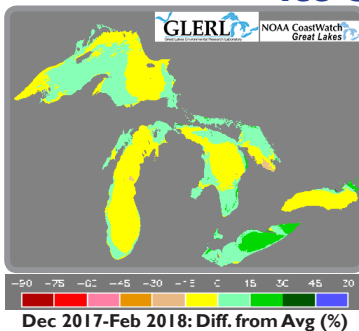


### Precipitation & Snowfall

In December, all lake basins except Superior received at least 75% below normal precipitation. January precipitation was below normal for all basins. In February precipitation ranged from near normal to well above normal. Winter snowfall ranged from 50% to 175% of normal. December snowfall ranged from less than 25% to 175% of normal. January snowfall ranged from less than 50% to 150%, though a majority of the region saw snowfall deficits. February snowfall ranged from 50% to 175% of normal.



### Ice Cover



The Great Lakes were, on average, above their long-term average ice cover for the period. Somewhat unique, the Great Lakes had two peaks of maximum ice coverage during this winter. The first maximum of 35.5% was reached on January 16 after which ice cover declined to about 15.1%, and then increased again to reach 69.0% on February 11.

### Great Lakes Water Levels

| Lake           | End of Feb. 2018 Compared to: |                      | Change since December 1st |                     |
|----------------|-------------------------------|----------------------|---------------------------|---------------------|
|                | Average                       | Last Year            | 2017/18                   | Average             |
| Superior       | +34 cm<br>(+13.4 in)          | +16 cm<br>(+6.3 in)  | -14 cm<br>(-5.5 in)       | -20 cm<br>(-7.9 in) |
| Michigan-Huron | +51 cm<br>(+20.1 in)          | +26 cm<br>(+10.2 in) | -4 cm<br>(-1.6 in)        | -8 cm<br>(-3.1 in)  |
| Erie           | +56 cm<br>(+22.0 in)          | +15 cm<br>(+5.9 in)  | +11 cm<br>(+4.3 in)       | +2 cm<br>(+1.2 in)  |
| Ontario        | +34 cm<br>(+13.4 in)          | +4 cm<br>(+1.6 in)   | +12 cm<br>(+4.7 in)       | +10 cm<br>(+3.5 in) |

Water level statistics based on 1918-2017.



## Regional Impacts - for December 2017 - February 2018

### Flooding

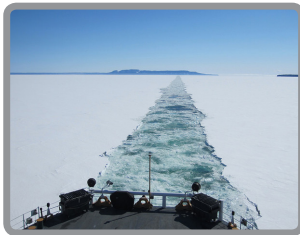
Large parts of the southern and central basin experiencing flooding in late February due to excessive precipitation. As many as 22 counties in Indiana declared a state of emergency. Some communities in Indiana, Michigan, and Ontario were forced to evacuate. In South Bend, IN, the St. Joseph River reached 500-year flood levels and crested at 3.9 m (12.7 ft). The Kalamazoo river also broke a 72-year record. Events such as these were widespread in late February and contributed to several deaths across the basin.



Flooded Street in Late February  
Goshen, Indiana  
(Photo: Sam Lashley)

### Transportation & Shipping

The cold conditions in late December and early January had widespread implications across the Great Lakes basin. Rapid ice formation on the lakes led to a sudden slow-down in shipping capabilities throughout the basin. While icebreakers were utilized to help in opening up shipping lanes, the extent of the ice this year made it difficult to mitigate the impacts on the region's economy. For the holiday season, the extent of snow and ice made travel difficult. For many locations, the accompanying snow and ice caused flight delays and dangerous driving conditions. Later, the drastic change to above-normal temperatures and precipitation damaged roadways across the basin.



Ice Breaker  
(Photo: GLERL)

### Coastal Impacts

Rapid ice formation in late December due to below-normal temperatures impacted the coastline of both rivers and lakes across the Great Lakes basin. The extensive ice coverage created an ice jam on the St. Clair River. On the coast of Lake Erie, massive ice shoves were reported to have formed due to the ice coverage and high winds forcing it onshore. High water levels are also playing a role in coastal damage. Lake Ontario's high water levels have delayed the renovations to Kingston, Ontario's Breakwater Park. With Great Lakes water levels remaining well above average, and with a good chance of high levels persisting well into the summer months, the risk of shoreline erosion will likely continue.



St. Clair River Ice Jam near Algonac, MI  
on January 4  
(Photo: US Army Corps of Engineers)

### Recreation & Tourism

The increase in ice cover this winter has affected recreational activities across the Great Lakes. In past years, ice fishing has been hindered by below-normal ice coverage. However, the early and increased ice coverage of this winter has allowed the ice fishing market to return in full force. The Michigan Pond Hockey Classic in Whitmore Lake, MI was also able to be held after having been canceled the last two years due to poor ice coverage.



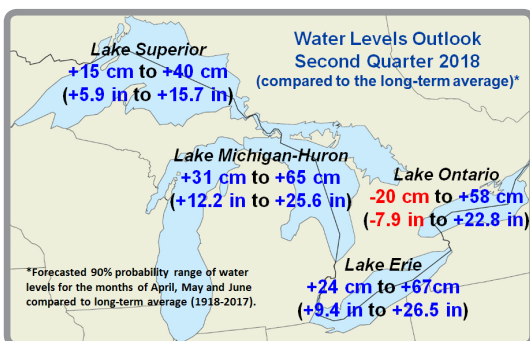
Children playing ice hockey  
(Photo: Michigan Sea Grant)

## Regional Outlook - for April - June 2018

### Temperature & Precipitation

The CPC and ECCC predict that the Great Lakes basin has a greater chance for above-normal temperatures for central and eastern portions of the basin for the April through June period. The entire basin is also forecasted to have a greater chance of above-normal precipitation for the same period. While La Niña conditions have been present in the equatorial Pacific Ocean for several months, the CPC and ECCC now predict that La Niña will transition into a more neutral phase by the end of the spring. The current monthly and seasonal outlooks can be found through CPC and ECCC.

### Water Levels



Graphic (above): Potential range for water levels for Apr-June 2018 compared to the long-term average (1918-2017).

Water levels of all the lakes are expected to see typical seasonal rises over the spring quarter when increased precipitation and snowmelt, and decreased lake evaporation are common. With wet conditions forecasted to continue into spring and all of the Great Lakes well above average at the start of March, all should be prepared for continued higher than normal water levels into the spring and summer.

### Ongoing Flooding Risk

The excessive rainfall that most of the basin received in late February in conjunction with other conditions such as frozen soil and snow/ice cover in the northern basin could increase the risk of flooding in the spring. Additionally, above-normal lake levels put coastal communities at risk for coastal flooding and erosion. Any heavy precipitation events in the spring will likely only make conditions worse.



Flooding in Goshen, Indiana  
in Late February  
(Photo: Sam Lashley)

## Great Lakes Region Partners

- Environment and Climate Change Canada (ECCC)  
[www.canada.ca/en/environment-climate-change.html](http://www.canada.ca/en/environment-climate-change.html)
- Agriculture and Agri-Food Canada  
[www.agr.gc.ca](http://www.agr.gc.ca)
- Midwestern Regional Climate Center  
[mrcc.isws.illinois.edu](http://mrcc.isws.illinois.edu)
- Northeast Regional Climate Center  
[www.nrcc.cornell.edu](http://www.nrcc.cornell.edu)
- Great Lakes Region State Climatologists  
[www.stateclimate.org](http://www.stateclimate.org)
- National Oceanic and Atmospheric Administration  
[www.noaa.gov](http://www.noaa.gov)
- National Centers for Environmental Information  
[www.ncei.noaa.gov](http://www.ncei.noaa.gov)
- Great Lakes Environmental Research Laboratory  
[www.glerl.noaa.gov](http://www.glerl.noaa.gov)
- NOAA Great Lakes Sea Grant Network  
[www.seagrant.noaa.gov](http://www.seagrant.noaa.gov)
- North Central River Forecast Center  
[www.crh.noaa.gov/ncrfc](http://www.crh.noaa.gov/ncrfc)
- Ohio River Forecast Center  
[www.weather.gov/ohrfc](http://www.weather.gov/ohrfc)
- Climate Prediction Center  
[www.cpc.noaa.gov](http://www.cpc.noaa.gov)
- Office for Coastal Management  
<http://coast.noaa.gov/>
- Great Lakes Integrated Sciences & Assessments  
[www.gliisa.umich.edu](http://www.gliisa.umich.edu)
- US Army Corps of Engineers, Detroit District  
[www.lre.usace.army.mil](http://www.lre.usace.army.mil)
- National Integrated Drought Information System  
[www.drought.gov](http://www.drought.gov)
- USDA Midwest Climate Hub  
<https://www.climatehubs.ocs.usda.gov/midwest>

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