

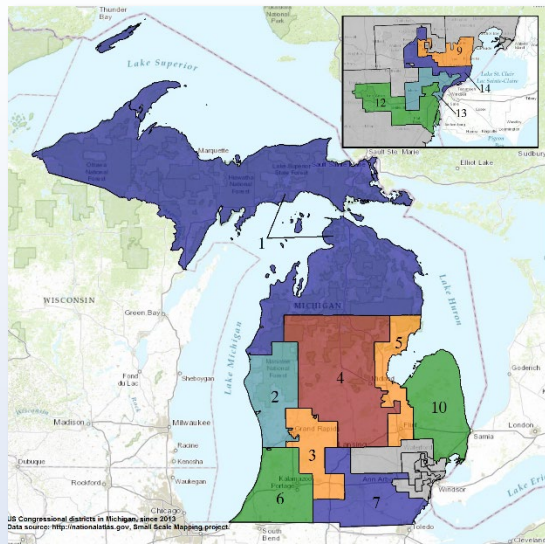
# Lake-Effect Snow & Ice Forecasting



Photo by NOAA Great Lakes Environmental Research Laboratory

**Winter weather** brings challenges for commerce, risks for human safety, and opportunities for recreation to the Great Lakes region. Accurate forecasts of lake-effect snow and lake ice conditions are important for community preparedness and industry decision-making, but have been difficult to develop.

With our partners including the NOAA Great Lakes Environmental Research Laboratory and National Weather Service, CIGLR is developing models to improve lake-effect snow forecasts, ice predictions, and visibility forecasts. We engage with Great Lakes mariners to help us co-design the products that they need for safe commerce, transportation, and search-and-rescue efforts.



Map of Michigan Congressional districts most affected by lake-effect snow and Great Lakes ice cover



Cooperative Institute for  
Great Lakes Research

**CIGLR**  
Great Lakes Science for Society

Hosted by the University of Michigan,  
CIGLR is a partnership between the National  
Oceanic and Atmospheric Administration  
(NOAA), universities, NGOs, and businesses.

With support from:



# Quick Facts

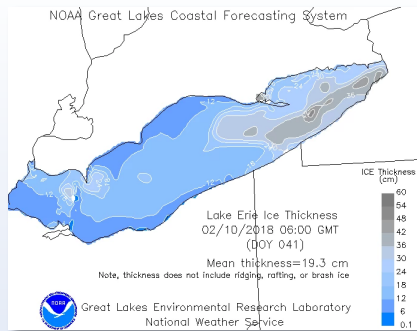
- The Great Lakes store and move huge amounts of heat and water, making the weather and regional climate unique and hard to predict.
- Lake-effect snow is one of the most hazardous weather events in the region, putting safety at risk and impacting commerce.
- Certainty is often low in the location, duration, and severity of lake-effect snow forecasts.
- Ice cover in the Great Lakes is highly variable from year-to-year and is influenced by annual and longer-term climate trends.
- Understanding and predicting ice cover is important for navigation, weather forecasting, fisheries management, recreational safety, and search-and-rescue efforts.



Photo by Major Mark Frank, New York Army National Guard

*A devastating lake-effect snow storm was responsible for at least 13 fatalities in Buffalo, NY, in 2014. Although the National Weather Service predicted this storm, the forecast models failed to simulate the extreme intensity and location of the storm. This record event dumped 7 feet of snow in 72 hours, costing state and local governments \$46 million.*

## Current Research & Outcomes



Scan to read more

*The Great Lakes Coastal Forecasting System includes a 5-day forecast of ice concentration. With partners at NOAA Great Lakes Environmental Research Laboratory, ice forecast products under development include ice thickness, ice movement, and vessel deicing.*

- New models are enabling the first-ever ice forecast prediction tool for the NOAA Great Lakes Operational Forecast System.
- Forecast model advancements are providing the National Weather Service with improved lake-effect snow, precipitation, visibility, and ice forecast guidance that will improve accuracy.
- A monitoring network on Great Lakes lighthouses gathers heat and water vapor data used to improve lake-effect snow forecasts.
- NOAA CoastWatch is publishing daily ice cover maps based on satellite-derived lake surface temperatures.
- Analysis of historical ice cover is informing models of lake thermal structure, ecosystem forecasting, and climate trends.

## Research & Management Needs

- Development of accurate ice predictions at smaller geographic scales to support navigation in bays and connecting waterways.
- Research to improve predictions of snow depth on the ice and the interactions between ice and waves.
- Development of easy-to-interpret communication about ice and snow forecast uncertainties in collaboration with forecast users.
- Evaluation of economic impacts of shipping delays and restrictions due to ice.
- Federal investment to increase icebreaking capacity in the Great Lakes in support of winter season commercial shipping.



Photo by NOAA Great Lakes Environmental Research Laboratory

*Research teams are engaging the shipping industry, US Coast Guard, and Canadian Coast Guard to identify their ice information needs and develop decision-support products to address them. These new tools will support greater efficiency in winter commerce and promote public safety.*

## Contact Us

Mary Ogdahl, Program Manager  
Cooperative Institute for Great Lakes Research  
University of Michigan  
ogdahlm@umich.edu | 734-763-3010  
<https://cigl.r.seas.umich.edu/>

*Need more information?  
Scan QR code to submit  
a request*

