Harmful Algal Blooms (HABs) & Hypoxia

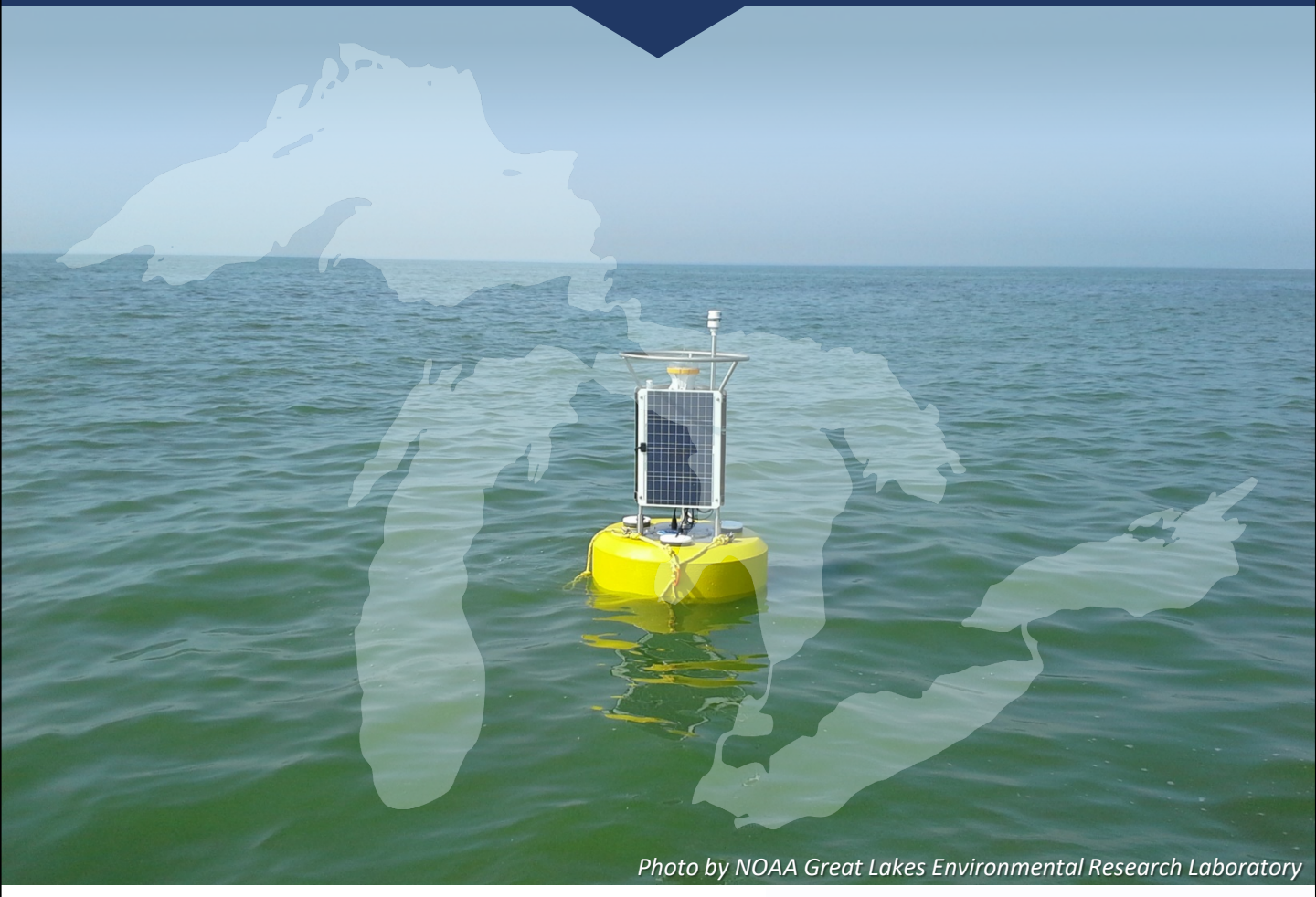
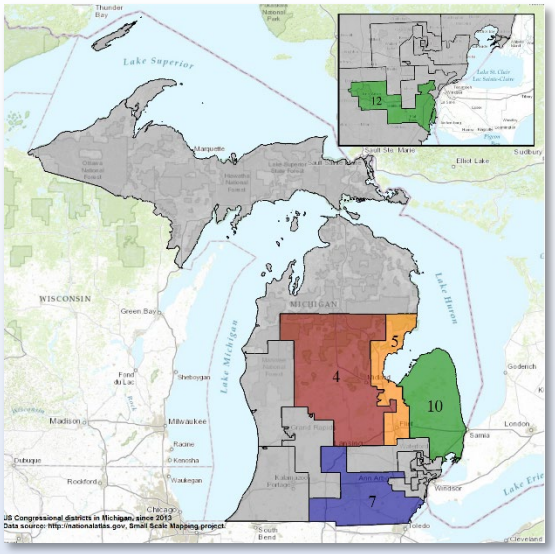


Photo by NOAA Great Lakes Environmental Research Laboratory

Harmful algal blooms & hypoxia

pose a risk to drinking water quality for millions of Great Lakes residents. Both of these problems are caused by excess nutrients in the water. Harmful algal blooms can produce toxins that threaten human health. Hypoxia, or extremely low oxygen, can cause water to be corrosive, discolored, and contain manganese, a heavy metal that is toxic to humans at high levels.

With our partners at the NOAA Great Lakes Environmental Research Laboratory, CIGLR is committed to developing forecasting tools, answering critical questions, and engaging directly with communities to inform decisions that keep the public safe.



Map of Michigan Congressional districts most affected by harmful algae and hypoxic water

UNIVERSITY OF MICHIGAN

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:

NOAA

Great Lakes RESTORATION

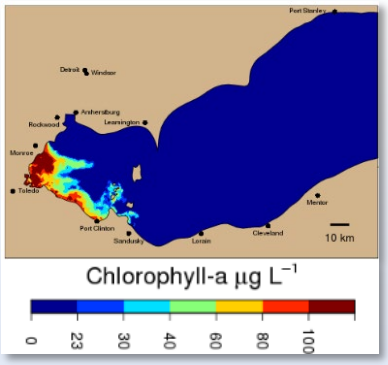
Quick Facts

- Harmful algal blooms (HABs) consist of cyanobacteria that are capable of producing toxins.
- HABs are caused by nutrient pollution from agricultural runoff, wastewater discharge, and other sources.
- Hypoxia occurs when excess algae die and sink to the lake bottom, where decomposition consumes oxygen needed by animals.
- Hypoxic water can be corrosive, discolored, and contain the heavy metal manganese, which is toxic to humans at high levels.
- The hypoxic zone in Lake Erie can grow as large as 6,000 square miles; hypoxia also occurs in some Great Lakes embayments, such as Saginaw Bay in Lake Huron.

Photo by Haraz N. Ghanbari, Associated Press

Harmful algal blooms can produce toxins that threaten human and animal health. Great Lakes HABs most commonly produce a toxin called microcystin, which is a liver toxin and skin irritant. High levels of microcystin were responsible for the Toledo water crisis in 2014 that left 500,000 people without water for 3 days. The economic impact of this event was estimated at $65 million.

Current Research & Outcomes



The Lake Erie HAB Tracker is an experimental 5-day forecast of algal bloom severity and movement. It was developed through a co-design process involving scientists, municipal water managers, and anglers.

Scan to read more

- Monitoring buoys, environmental sample processors (ESPs), and weekly sampling events provide real-time data to managers and fuel forecast models in Lake Erie and Saginaw Bay.
- Monitoring data are being used to evaluate Lake Erie's progress toward achieving bi-national phosphorus load reduction targets.
- Drinking water managers and other stakeholders in Lake Erie receive weekly algal toxin data to aid in decision making.
- The experimental Lake Erie Hypoxia Forecast provides advance warning to drinking water managers, giving them time to adjust treatment processes and ensure the delivery of safe drinking water.
- Research on the relationship between hypoxia and manganese is identifying the risk this heavy metal poses to drinking water.

Research & Management Needs

- Research to understand challenges to meeting nutrient reduction targets aimed at controlling HABs.
- Evaluation of the economic impacts of HABs and hypoxia relative to the costs of conservation practices.
- Real-time monitoring of toxins and advanced detection technologies, including the use of genomics techniques.
- Development of improved HAB forecasts to predict toxin levels.
- Research on improved hypoxia forecasts to guide water treatment.
- Research to understand what drives toxin production, human health impacts, and effects on aquatic organisms.
- Federal investment in control technologies to prevent agricultural nutrients from polluting waterways.

Photo by Devin Gill, CIGLR

Research teams are engaging water treatment managers to develop the experimental Lake Erie Hypoxia Forecast. Through this collaboration, scientists and water treatment managers identified risks to drinking water, including elevated manganese levels, and quickly devised research experiments and products to protect water quality.

Contact Us

Mary Ogdahl, Program Manager
Cooperative Institute for Great Lakes Research
University of Michigan
ogdahlm@umich.edu | 734-763-3030
https://ciglr.seas.umich.edu/

Need more information? Scan QR code to submit a request