# Invasive Species

Photo by D. O'Keefe, Michigan Sea Grant

Invasive species are perhaps the greatest stressor currently facing the Great Lakes. The economic and ecological impacts of established invaders, plus the imminent threat of new introductions, present an urgent need for science-based decision making to proactively protect the Great Lakes now and into the future.

With our partners at the NOAA Great Lakes Environmental Research Laboratory, CIGLR is committed to developing information products, predictive models, and strategies to combat and manage invasive species in the Great Lakes region.
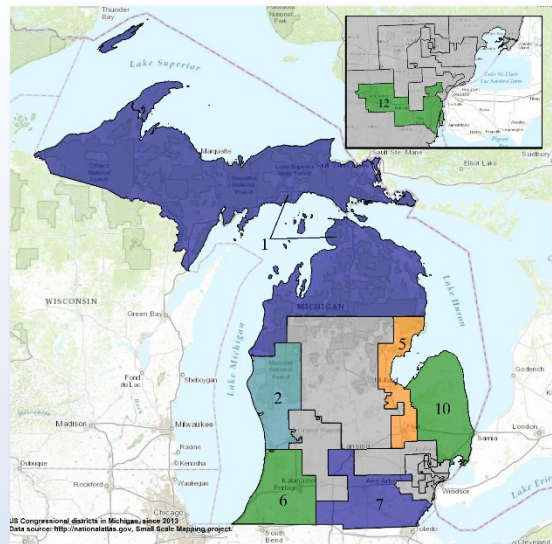
Map of Michigan Congressional districts most affected by Great Lakes invaders

Quick Facts

- 188 aquatic non-native species are in the Great Lakes; over 55 are invasive and cause ecological and economic harm.
- Invasive species cost the U.S. over $200 million each year in lost revenue, control, and treatment.
- Industries most affected include sport and commercial fishing, tourism, water treatment, and power generation.
- Dramatic changes to the ecosystem include degraded habitat, declines in native species, and disrupted food webs.
- Ballast water, deliberate release, and accidental release have been the main pathways for introduction.
- New introductions have slowed over the past decade due to ballast water regulation, but established species continue to spread.

Quagga and zebra mussels have changed the available food sources in the Great Lakes, causing declines in native fish populations. Invasive mussels are also partly responsible for the proliferation of harmful algal blooms (HABs). Their selective feeding on other types of algae allows HAB-forming species to thrive.

Photo by NOAA Great Lakes Environmental Research Laboratory.

Current Research & Outcomes
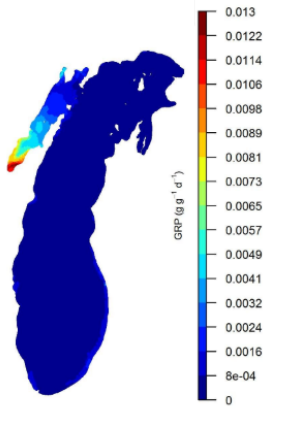
A recent modeling study showed that the entire extent of Lake Michigan contains suitable habitat for bighead carp, one of the four species of Asian carp currently thriving in the Illinois River. Colored areas on the map indicate suitable habitat quality, from low (blue) to high (red).

Image by Peter Alsip, CIGLR

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- Long-term monitoring is documenting the impacts of invasive mussels and driving models to guide nutrient management.
- Lab experiments are revealing the connection between invasive mussel feeding and the formation of toxic harmful algal blooms.
- Food web monitoring is relating invasive mussels to declines in critical food sources like springtime and deep-water algae, which put valuable sport and commercial fisheries at risk.
- Model simulations of Asian carp invasion are predicting what may happen if they invade the Great Lakes. In Lake Erie, Asian carp could cause declines in some resident fish populations by up to 35%. The same model predicted that within 20 years of invasion, Asian carp could compose 30% of Lake Erie's fish population.

Research & Management Needs

- Investment in improved surveillance technology for early detection, such as the use of environmental DNA (eDNA).
- Expansion of rapid response programs for eradication of new invaders.
- Development of a full accounting of the economic impacts of invasive species in the Great Lakes.
- Maintain efforts to reduce Asian carp in the Illinois River and block their access to the Great Lakes.
- Track and eradicate grass carp in western Lake Erie.
- Continued support for ballast water regulations that prevent the entry of new invasive species.
- Support for federal regulation in the trade of live organisms.

Although highly successful control efforts have reduced numbers of spawning sea lamprey by 90%, they continue to impede critical fish communities and hinder ecosystem objectives in the Great Lakes.

Photo by T. Lawrence, Great Lakes Fishery Commission.

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