

Identifying Aquatic Invasive Species (AIS) Risk in the Great Lakes

What did we do?

TNC scientists are working with scientists with the U.S. Fish & Wildlife Service along with Great Lakes basin state agencies and universities to map aquatic invasive species (AIS) introduction risk for the U.S. side of the Great Lakes.

Aquatic invasive species can arrive through one or more potential pathways of introduction. These pathways include shipping (ballast water exchange), canals, recreational boating, pet escape, bait release, and others. We developed risk indices that incorporate and account for these different pathways.

To assess risk the U.S. waters of the Great Lakes and tributaries were divided into a grid of standardized management units (each unit is 9 km by 9 km). An index of invasion pressure was developed using data representing different aquatic invasive risk pathways for each management unit. Information on human population density and number of constructed ponds (proxies for the trades in living organisms), number of ship visits and number of in-lake discharge events (proxy for ballast water discharge), marina and/or boat launch parking lot size (proxy for trailer boat pathway), and the presence of canals or headwater connections were attributed to each grid cell. Two kinds of weighting multipliers were then applied to the attributed spatial surrogate data so that both historic patterns and future predicted patterns of introduction were incorporated into the calculation of an index of invasion pressure, or risk (See Figure 1 below).

Why is this important?

Aquatic invasive species are difficult to eradicate once established, compete with native species, and can be expensive to deal with.

- “In 2009 and 2010, the eight states in the Great Lakes basin spent nearly \$31 million on aquatic invasive species, with Wisconsin, Minnesota, Michigan and Illinois ranking among the top spenders” ([TNC](#)).
- “The cost of aquatic invasive species directly and indirectly impacts everyone” ([TNC](#)).
- “It is extremely difficult to control the spread of an invasive species once it is established, which makes prevention the most cost-effective approach to dealing with organisms that have not yet entered or become established in the Great Lakes” ([NOAA](#)).
- “. . . the damage caused by invasive species often goes beyond the ecological. They can threaten human health and hurt the Great Lakes economy by damaging critical industries such as fisheries, agriculture, and tourism” ([NOAA](#)).

How will we use this information?

The Great Lakes are huge (94,000+ mi²) – with many potential entry points and pathways where aquatic invasive species (AIS) could be introduced resulting in hundreds of potential locations where AIS surveillance could/should be undertaken. Identifying the most important places to monitor for new aquatic invaders gives agencies the best chance of detecting and then eradicating the invader before it has a chance to spread. This work identifies the highest risk sites thereby helping prioritize the

surveillance efforts of state and federal partners and enabling limited resources to be deployed where they can have the greatest effect increasing surveillance capacity and capability.

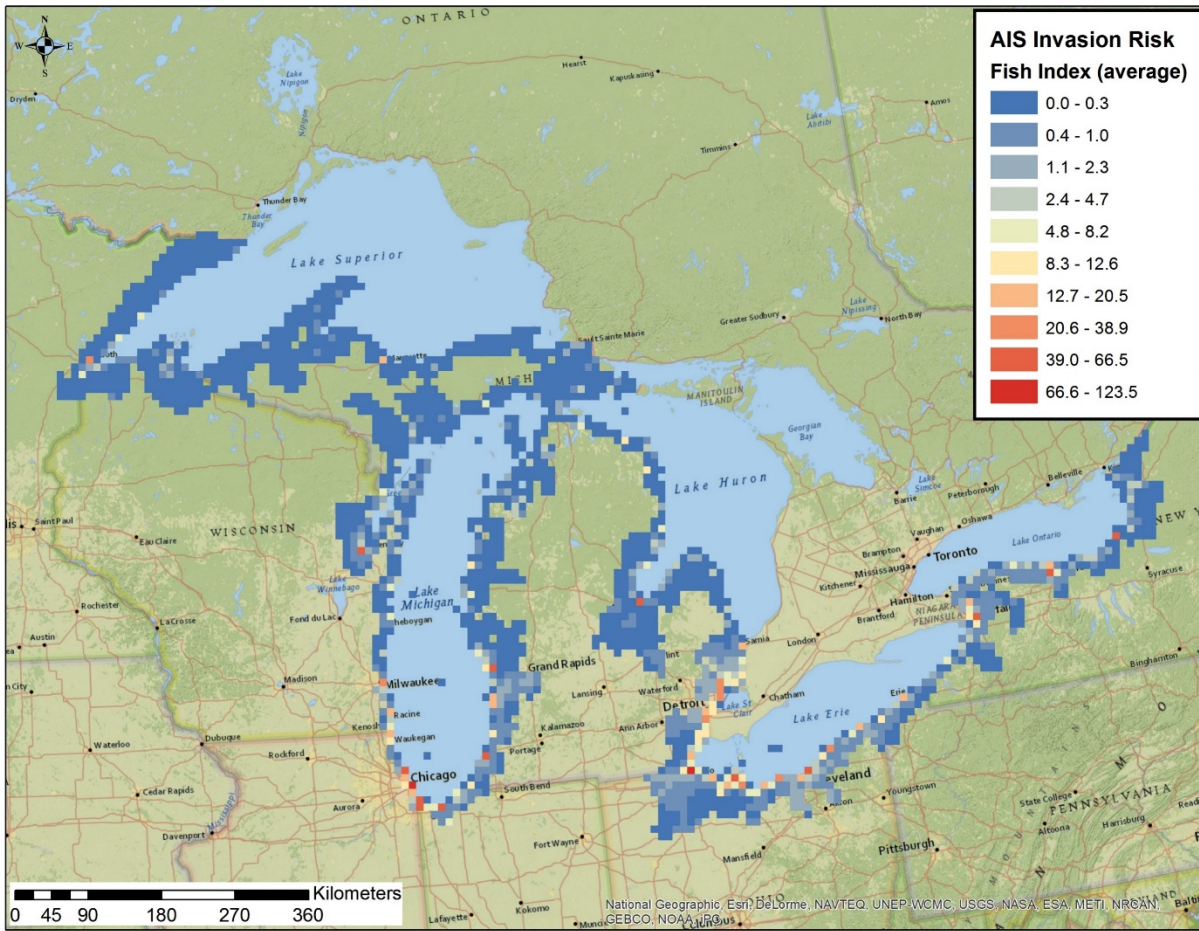


Figure 1. This map represents aquatic invasive species (AIS) fish introduction risk for the U.S. side of the Great Lakes. The risk index incorporates or considers multiple potential pathways of introduction including shipping, canals, boating, pet escape, bait release, and others. Red colors represent higher risk and are therefore higher priority for surveillance.

For more information about other things TNC is doing to combat aquatic invasive species see <https://www.nature.org/ourinitiatives/regions/northamerica/areas/greatlakes/explore/great-lakes-aquatic-invasive-species.xml>

Partners:

