Nutrient Monitoring

STATE OF MICHIGAN, DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Nutrient Framework to Reduce Phosphorus and Nitrogen Pollution

EGLE monitors water quality in Michigan lakes and streams, with an emphasis on four goals: (1) determine status and attainment of water quality standards; (2) measure spatial and temporal trends; (3) evaluate program effectiveness; and (4) identify emerging issues. Nutrient (phosphorus, nitrogen) assessment is an important part of the state's monitoring activities and includes several components.

Since 2001, nutrient levels have been measured in over 10,000 lakes, across a variety of programs (Figure 1). Lakes that are known to be impaired are targeted for sampling to support the development of Total Maximum Daily Loads (TMDLs). Additionally, EGLE participates in the Environmental Protection Agency's (EPA) National Lake Assessment, which started in 2007 and results in 50 randomly selected lakes being sampled every 5 years. EGLE also provides funding to support data collection by: (a) the Cooperative Lakes Monitoring Program; (b) the Department of Natural Resources Fisheries Division; and (c) local governments, organizations, and universities.

As part of the Water Chemistry Monitoring Program, EGLE currently monitors nutrient concentrations at 250 randomly selected streams and rivers across the state every 5 years (50 sites per year; Figure 2). EGLE also monitors nutrients at fixed sites on Saginaw Bay, Grand Traverse Bay, St. Marys River, Detroit River, and St. Clair River. These activities allow for an assessment of temporal and spatial trends across the state. Water samples are also collected by EGLE biologists from targeted sites as part of annual watershed surveys. In addition, EGLE participates in the EPA National Rivers and Streams Assessment, which started in 2008 and results in 50 randomly selected waterbodies being sampled every 5 years.

Special monitoring studies for nutrients are conducted as needed. These studies may support other EGLE programs (TMDLs, National Pollution Discharge Elimination System, Nonpoint Source), as well as respond to suspected water quality problems and concerns. Each year, EGLE solicits monitoring recommendations from internal and external partners, and study plans are prepared for the selected projects.

This combination of targeted and randomly selected monitoring sites ensures that EGLE effectively characterizes nutrient levels in Michigan's surface waters.
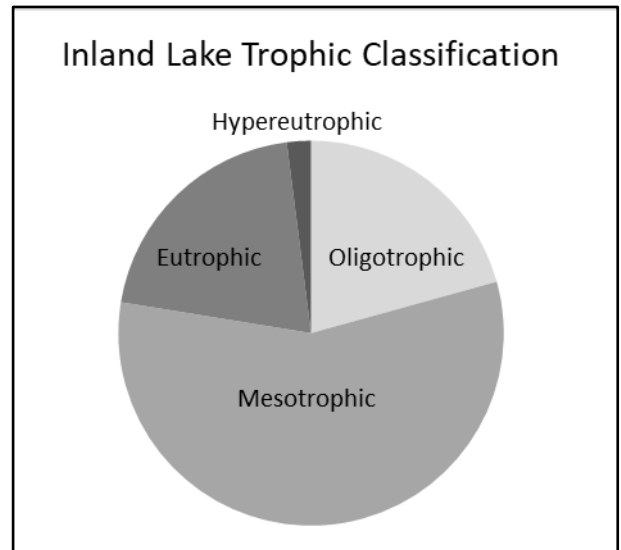

Figure 1. Trophic classification of over 10,000 Michigan inland lakes using data collected since 2001.
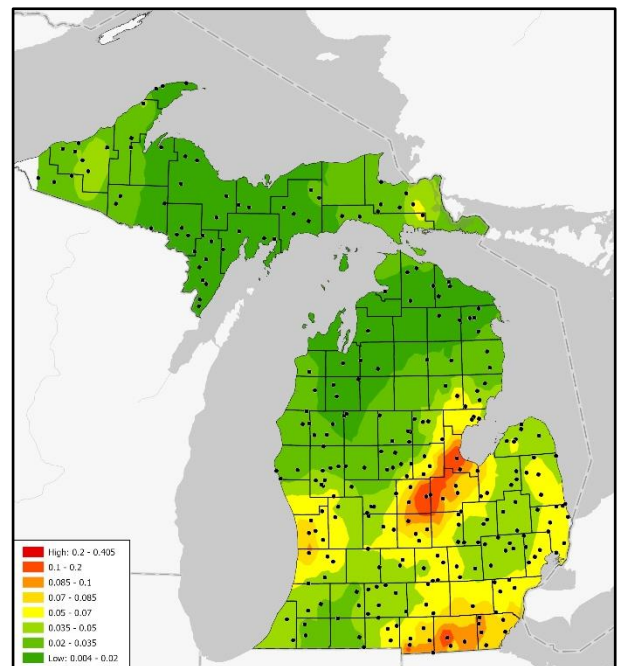

Figure 2. Interpolation of total phosphorus (TP) medians using probabilistic data at 250 sites (black dots) from 2005-2019. The figure shows TP concentrations are typically lower in the northern portion of the state and higher in the southern portion. Red = higher TP concentration. Green = lower TP concentrations.