Nutrient Monitoring

STATE OF MICHIGAN, DEPARTMENT OF ENVIRONMENTAL QUALITY

Nutrient Framework to Reduce Phosphorus and Nitrogen Pollution

The Department of Environmental Quality (DEQ) 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.

From 2001 through 2010, nutrient levels were measured in 735 large public access lakes (Figure 1). Impaired lakes have been sampled over the last 18 years on a targeted basis to support the development of Total Maximum Daily Loads (TMDLs). In 2007 and 2012, the DEQ participated in national lake surveys, which resulted in the nutrient data from 50 randomly-selected Michigan lakes in both years. The DEQ also provides funding to support the collection and analysis of lake phosphorus samples by: (a) volunteers through the Cooperative Lakes Monitoring Program; (b) the Department of Natural Resources Fisheries Division; and (c) local governments, organizations, and universities.

The DEQ monitors nutrient concentrations each year at fixed stations in Michigan, including the mouths of 26 rivers; 3 connecting channels; and multiple locations in Saginaw and Grand Traverse Bays. A total of 250 randomly-selected streams and rivers are sampled over a 5-year period (50 sites per year) (Figure 2). These activities allow for an assessment of temporal and spatial trends across the state. In addition, water samples are collected by DEQ biologists from selected sites as part of the watershed surveys conducted each year. In 2013 and 2014, the DEQ is participating in the National Rivers and Streams Assessment, which will result in nutrient data from another 50 randomly-selected water bodies.

Special monitoring studies for nutrients are conducted as needed. These studies may support other DEQ programs (TMDLs, National Pollution Discharge Elimination System, Nonpoint Source), as well as respond to suspected water quality problems and concerns. Each year, the DEQ 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 the DEQ effectively characterizes nutrient levels in Michigan's surface waters.

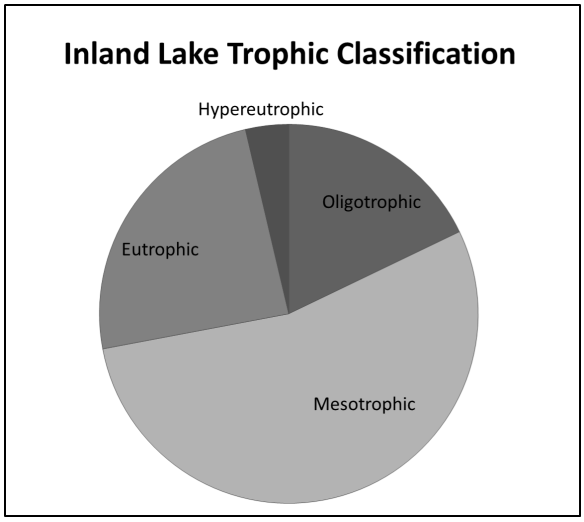

Figure 1. Trophic classification of 735 public access lakes in Michigan using data collected from 2001-2010.

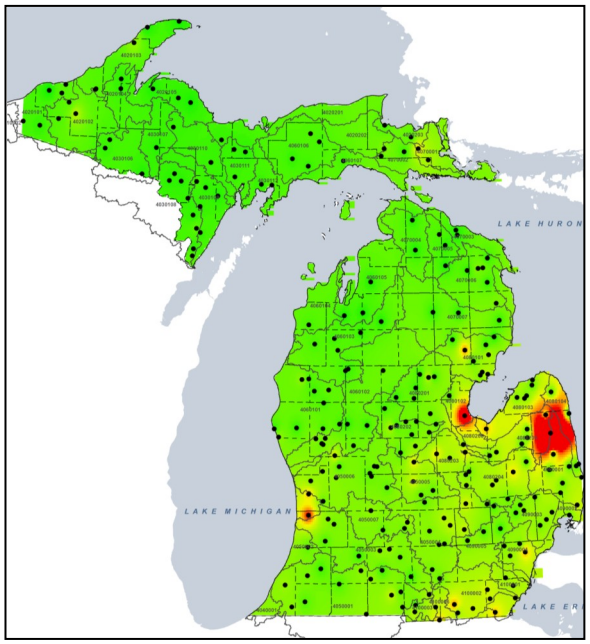

Figure 2. Interpolation image of total phosphorus medians using probabilistic data at 250 sites from 2005-2009. This figure shows total phosphorus concentrations were typically lowest in the Upper Peninsula and gradually increased south-southeastward, although site-to-site variability was present across the state. Red = Higher TP concentrations. Green = Lower TP concentrations.

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