

Eutrophication or Undesirable Algae

Significance in Michigan's Areas of Concern

Originally eight of Michigan's AOCs were listed as impaired due to eutrophication, including: River Raisin, Rouge River, Clinton River, Saginaw River/Bay, St. Marys River, Deer Lake, Muskegon Lake, and White Lake. The AOC program tracking table with current information about which BUIs have been restored in each AOC can be found at www.michigan.gov/deqaocprogram.

Michigan Restoration Criteria and Assessment

This BUI will be considered restored when:

1. No waterbodies within the AOC are included on the list of non-attaining waters due to excessive algal growths from high nutrient loadings in the most recent Clean Water Act *Water Quality and Pollution Control in Michigan: Section 303(d) and 305(b) Integrated Report* (Integrated Report), which is submitted by DEQ to U.S. EPA every two years.
2. Or, in cases where water bodies within the AOC are either on the non-attainment list or exhibit excessive algal growth from high nutrient loadings, this BUI will be considered restored when no persistent or high levels of nuisance algal growths or nuisance algal blooms occur for 2 consecutive monitoring cycles.

For the purposes of these criteria, the properties that cause AOC BUI impairment are unnatural or natural algal growths which are exacerbated by human activities. They must be persistent and high enough levels to be a nuisance. The assessments are not for the purpose of determining whether water quality standards are being met under state or federal law.

Rationale

Practical Application in Michigan

The MDEQ regulates water pollution under the authority of Part 31 of the NREPA, P.A. 451 of 1994. The AOC restoration criteria are consistent with the state's WQS, and how the State identifies waters for inclusion on the Clean Water Act section 303(d) list, which is submitted to U.S. EPA every two years. If a waterbody exhibits growths of undesirable algae in quantities which interfere with a water body's "designated uses" as identified in rules R323.1060 and R323.1100 of the Michigan WQS (e.g., inhibits swimming due to the physical presence of algal mats and/or associated odor; inhibits the growth and

production of warm water fisheries, and/or other indigenous aquatic life and wildlife), the waterbody is included on Michigan's Section 303(d) list.

In cases where waterbodies are on the non-attainment list or exhibit excessive nuisance algal growth, consideration may be given to assessment of the BUI using monitoring data. These assessments will be accomplished using protocol developed as described below.

In many locations in Michigan, eutrophication of a waterbody is a natural occurrence in certain seasons and circumstances. In some locations, natural eutrophication is augmented by watershed-wide agricultural practices that contribute non-point source nutrients to waterbodies. Neither situation is considered an issue to be addressed by the AOC program in Michigan.

In considering when eutrophication is an AOC issue, guidelines from non-regulatory actions may be used as supporting documentation, including nutrient targets under the GLWQA.

1991 IJC General Delisting Guideline

When there are no persistent water quality problems (e.g., dissolved oxygen depletion of bottom waters, nuisance algal blooms or accumulation, decreased water clarity, etc.) attributed to cultural eutrophication.

The IJC general delisting guideline is presented here for reference. The Practical Application in Michigan subsection above describes application of specific criteria for restoration based on existing Michigan programs and authorities.

State of Michigan Programs/Authorities for Evaluating Restoration

Michigan assesses water bodies throughout the state on a 5-year basin rotation cycle according to the MDEQ's "Strategic Environmental Quality Monitoring Program for Michigan's Surface Waters" (MDEQ, 1997) and "Michigan Water Quality Strategy Update" (MDEQ, 2005). Each year, a set of targeted watersheds are sampled at selected sites for conventional and toxic pollutants, and biological and physical habitat/morphology indicators. The set of watersheds sampled rotates each year, with each major watershed in the state revisited every 5 years (see Appendix 1 for maps of the basin rotations). Two particularly relevant elements of the strategy are expanded and improved water chemistry monitoring and the lake monitoring program. One of the specific objectives of these programs is to determine whether nutrients are present in surface waters at levels capable of stimulating the growth of nuisance aquatic plants/algae/slimes.

Under the water chemistry monitoring program, water samples generally are analyzed for nutrients, conventional parameters (i.e., temperature, conductivity,

suspended solids, pH, dissolved oxygen), total mercury, and trace metals (i.e., cadmium, chromium, copper, lead, nickel, zinc). A much smaller number of samples are analyzed for organic contaminants such as PCBs and base neutrals. Other parameters may be included as appropriate at specific locations, including observations of nuisance algae in AOCs with this impairment. Nutrients and conventional parameters may also be monitored at sites where biological data are collected during routine watershed assessments. Data are reviewed each year to determine whether additional parameters should be added, removed, or analyzed at a greater or lesser frequency.

MDEQ developed a 2011 Statewide Aesthetics BUI Assessment Workplan and Monitoring Protocol. (MDEQ, 2011). That protocol will be amended to conduct assessments for eutrophication, primarily by focusing on nuisance algal growth.

Some local AOC communities also have programs for monitoring water quality and related parameters which may be applicable to this BUI. If an AOC chooses to use local monitoring data for the assessment of BUI restoration, the data can be submitted to the MDEQ for review. If the MDEQ determines that the data appropriately address the restoration criteria and meet quality assurance and control requirements, they may be used to demonstrate restoration success.