



Minnesota
Pollution
Control
Agency

Medicine Lake

Total Maximum Daily Load

Excess Nutrients Project Overview

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Medicine Lake has been placed on the state's list of impaired waters. The lake contains excess levels of nutrients such as phosphorus from stormwater runoff. These excess nutrients can lead to frequent algae overgrowth in the lake, interfering with swimming, fishing, and other aquatic recreation.

Medicine Lake

Medicine Lake is located in the city of Plymouth in Hennepin County, Minnesota. Areas of land that drain into the lake include portions of the cities of Plymouth, Medicine Lake, Minnetonka, Golden Valley, New Hope, and Medina. The land in this watershed is mostly developed, and a high percentage of the land is covered by impervious surfaces such as concrete.

The lake occupies approximately 900 surface acres in size, with a maximum depth of 11 meters. The outlet of Medicine Lake is the headwater of Bassett Creek which drains into the Mississippi River.

Total Maximum Daily Load background

Based on the federal Clean Water Act, lakes and streams that do not meet water quality standards are "impaired". The Clean Water Act requires states to develop a clean-up plan for each impairment affecting a water body. The clean-up plan and the process used to create it are called a Total Maximum Daily Load (TMDL). A TMDL must identify all sources of the pollutant that cause a water body to violate standards. The TMDL also determines how much pollutant reduction is needed from each source to ensure the

water body meets water quality standards in the future.



Medicine Lake impairment

The Minnesota Pollution Control Agency (MPCA) has prepared a TMDL report on Medicine Lake. The goal of this report is to quantify the pollutant reductions needed for Medicine Lake to meet water quality standards. For lakes in the North Central Hardwoods Forest Ecoregion, summer averages of less than 40 µg/L total phosphorus concentration, less than 14 µg/L chlorophyll-a concentration, and at least 1.4 meters of Secchi depth are considered appropriate.

Historical data for Medicine Lake indicate annual variations in average phosphorus concentrations but consistent non-compliance with state standards. While Secchi depth values generally meet the criteria, chlorophyll-*a* concentrations are generally substantially greater than the allowable level. The combination of high phosphorus and high chlorophyll-*a* support listing Medicine Lake as impaired.

Pollution sources

About 50 percent of the total phosphorus load to Medicine Lake comes from the stormwater runoff from the watershed. Most of the remaining phosphorus comes from internal loading. Phosphorus in stormwater results when organic material (such as leaves, grass clippings, fertilizers, and sediments) wash into the stormwater system. Impervious surfaces in the watershed cause water to move more directly into streams and lakes, without the benefit of natural filtration.

There are two primary internal sources of phosphorus in Medicine Lake: sediment release of phosphorus and curlyleaf pondweed senescence.

Pollution reductions needed

For Medicine Lake to consistently meet water quality standards under average precipitation conditions, phosphorus loading to Medicine Lake must be reduced by 28 percent in the watershed and in-lake phosphorus must also be controlled. This will require continued management of in-lake phosphorus loading and retrofitting Best Management Practices (BMPs) to reduce phosphorus from urban runoff.

Implementation strategies

BMPs recommended for Medicine Lake include:

- Add stormwater detention ponds and other infiltration BMPs.
- Increase infiltration in the watershed through the use of rain gardens, native plantings, and reforestation.
- Protect high-value wetlands to prevent phosphorus export.
- Conduct streambank restoration on tributaries.
- Manage in-lake phosphorus levels through plant and fish population manipulations.

For more information

The Medicine Lake Excess Nutrient TMDL Report was prepared for the MPCA, and the Bassett Creek Watershed Management Commission by LimnoTech.

For more information about the Medicine Lake Excess Nutrient TMDL Report, view the Web pages at <http://www.pca.state.mn.us/water/tmdl/project-medicinelake-phosphorus.html> or contact the MPCA at 800-657-3864 or 651-296-6300.

For general TMDL information, browse MPCA's Impaired Waters Web pages at www.pca.state.mn.us/water/tmdl/.

For more information about water bodies in the Bassett Creek Watershed, go to www.bassettcreekwmo.org.