



Minnesota
Pollution
Control
Agency

Golden Lake Watershed, Anoka County

TMDL: Excess nutrients

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TMDL

The total amount of a pollutant that a water body can carry without violating water quality standards.

Littoral

Portion of the lake that is less than 15 feet deep. This zone is home to most of the aquatic plantlife.

Golden Lake Watershed is located in the west-central portion of the Rice Creek Watershed District (RCWD) in southern Anoka County and is a sub-watershed of the Upper Mississippi Watershed.

Golden Lake itself is located in the City of Circle Pines, and the watershed includes the cities of Blaine, Circle Pines, Lexington, and Lino Lakes.

Golden Lake is 57.2 acres in size with a maximum depth of 24 feet and a mean depth of 8 feet, which classifies it as a shallow lake. The littoral area of Golden Lake makes up about 90 percent of the lake's total surface area. The lakeshore area is well developed. The lake is used recreationally for fishing and non-motorized boating, with a public access site on the west side of the lake.

About 70 percent of the watershed is vacant or agricultural and about 30 percent is developed. However, 85 percent of the watershed is predicted to be developed by 2020, with only 15 percent of the land remaining undeveloped as either open/park space or rural residential.

TMDL Background

The State of Minnesota placed Golden Lake on the 2002 impaired waters list for aquatic recreation because the lake exceeds the water quality standard for nutrients. Excess nutrients, such as phosphorus from stormwater runoff, can cause frequent summer algal blooms that limit recreation.

Under the federal Clean Water Act, states must conduct a Total Maximum Daily

Load (TMDL) study for each pollutant affecting an impaired water. The study identifies all pollutant sources and determines the amount of reduction needed by each source to effectively restore water quality. State agencies, local groups and other stakeholders work together, using water sampling data, computer modeling and public input, to develop TMDLs.

Golden Lake Impairment

The goal of this TMDL is to quantify the pollutant reductions needed for Golden Lake to meet state water quality standards. As the table below shows, Golden Lake exceeds the standards for nutrients, though it meets the standard for water clarity.

Golden Lake Water Quality		
Parameter	Golden Lake	Standard for Similar Lakes
Total Phosphorus	89 µg/L	60 µg/L or less
Chlorophyll-a	47 µg/L	20 µg/L or less
Water Clarity	1.1 meters (3.69 feet)	1 meter (3.28 feet) or greater

Pollution Sources

Where does the excess phosphorus come from? The draft TMDL study has identified three sources:

- 40 percent from the surrounding watershed,
- 57 percent from internal sources – bottom sediment of the lake, and
- 3 percent from atmospheric deposits, namely rain water, which naturally includes phosphorus.

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The surrounding watershed contributes phosphorus to Golden Lake through stormwater, which is all the water draining off the land, hard surfaces such as streets, and other areas after it rains. As areas develop into homes and businesses, the increase in hard surfaces and need for drainage result in more water running into the lake. This runoff brings pollutants with it, such as leaves and grass clippings that contain phosphorus.

Pollution Reductions Needed

To meet water quality standards, phosphorus contributions to Golden Lake need to decrease by 86 percent, under average precipitation conditions.

The draft TMDL has identified two strategies that would have the most impact on reducing phosphorus and improving water quality in Golden Lake:

- Managing the in-lake phosphorus load through weed harvesting, alum treatment, lake level drawdown and/or dredging, and
- Reducing phosphorus from urban runoff in the watershed by retrofitting Best Management Practices (BMPs).

Implementation Strategies

Several practices are underway in the watershed to improve lake water quality, including:

- A water quality pond in Circle Pines just north of the Golden Lake inlet,
- Street sweeping activities,
- An aerator in the lake, installed to prevent winter fish kills
- A watershed district standard for new developments that requires the use of water resource BMPs to improve water quality and control runoff volume, and
- Educational efforts.

For More Information

Golden Lake Nutrient TMDL Report:

www.pca.state.mn.us/water/tmdl/project-goldenlake.html.

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For information about water resources in the Rice Creek Watershed:

<http://ricecreek.org/>.

