



Silver Lake Total Maximum Daily Load for Excess Nutrients

The list of impaired waters developed by the Minnesota Pollution Control Agency (MPCA) includes Silver Lake because it exceeds the water quality standard for nutrients for aquatic recreation. Excess nutrients such as phosphorus from stormwater runoff create poor water quality conditions causing frequent summer algal blooms which limit recreational activities.

Based on the Federal Clean Water Act, waters 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 is a Total Maximum Daily Load (TMDL) study. A TMDL must identify all sources of the pollutant causing a water body to violate standards. The TMDL also determines the amount by which each source must reduce its contribution to ensure a water body meets applicable water quality standards.

Silver Lake

Silver Lake is a 72.5-acre basin located partially in the city of Columbia Heights and partially in the city of St. Anthony Village, and the watershed is located within four municipalities and three counties (Anoka, Hennepin and Ramsey). Silver Lake has a 678.6-acre watershed. Hart Lake drains to Silver Lake from the southwest and a series of natural wetlands are found northeast of the lake within Silverwood Park, previously a Salvation Army camp, but now owned by the

Three Rivers Park District. Silver Lake outlets to Ramsey County Ditch (RCD) 3 which outlets into RCD 2 and eventually to Rice Creek and the Mississippi River. The main land uses in the Silver Lake watershed are single family residential (40 percent), institutional (13 percent), multi-family (12 percent), and commercial (11 percent).



Silver Lake impairment

The goal of this TMDL is to quantify the pollutant reductions needed for Silver Lake to meet state water quality standards. The numeric targets for shallow lakes in the North Central Hardwood Forest Ecoregion are summer averages of $\leq 60 \mu\text{g/L}$ total phosphorus concentration, $\leq 20 \mu\text{g/L}$ chlorophyll-a concentration, and ≥ 1.0 meter of Secchi depth.

The summer average total phosphorus concentration in Silver Lake ranges from approximately 40 µg/L to 110 µg/L for the years in which measurements were taken. Chlorophyll-a ranged from approximately 18 µg/L to 52 µg/L. Water clarity, as measured by Secchi depth measurements ranged from approximately 0.55 meters to over 1.2 meters.

Pollution reductions needed

A reduction of 15 percent in phosphorus loading to Silver Lake would be required to consistently meet water quality standards under average precipitation conditions. In-lake phosphorus load management and the reduction of phosphorus from urban runoff in the watershed by retrofitting Best Management Practices (BMP) would have the most impact on reducing phosphorus loads and improving water quality in Silver Lake.

Implementation strategies

The Silver Lake watershed is fully developed with minimal existing water quality treatment, and limited opportunities are available to reduce external loading. Small, incremental reductions are possible through retrofit as redevelopment occurs and through the implementation of BMP throughout the subwatershed. Examples of BMP would be to increase ponding and filtration in the Silver Lake watershed through the use of regional ponding, rain gardens, native plantings, and reforestation; retrofit detention ponds; encourage shoreline restoration; and educate property owners about proper fertilizer use and low-impact lawn care practices. Additional implementation strategies would also include in-lake reductions of phosphorus loading through strategies such as fisheries management and in-lake treatments.

More information

The Silver Lake Nutrient TMDL Report was prepared for the Rice Creek Watershed District, Three Rivers Park District, and MPCA by Emmons and Olivier Resources, Inc.

For more information about the Silver Lake Nutrient TMDL Report, view the Web pages at <http://www.pca.state.mn.us/water/tmdl/project-silverlake-nutrients.html>.

Contact information

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

For more information about waterbodies in the Rice Creek Watershed, go to <http://ricecreek.org/>.