

Sunfish Lake



Results of a Water Quality Study on Sunfish Lake in the City of Sunfish Lake

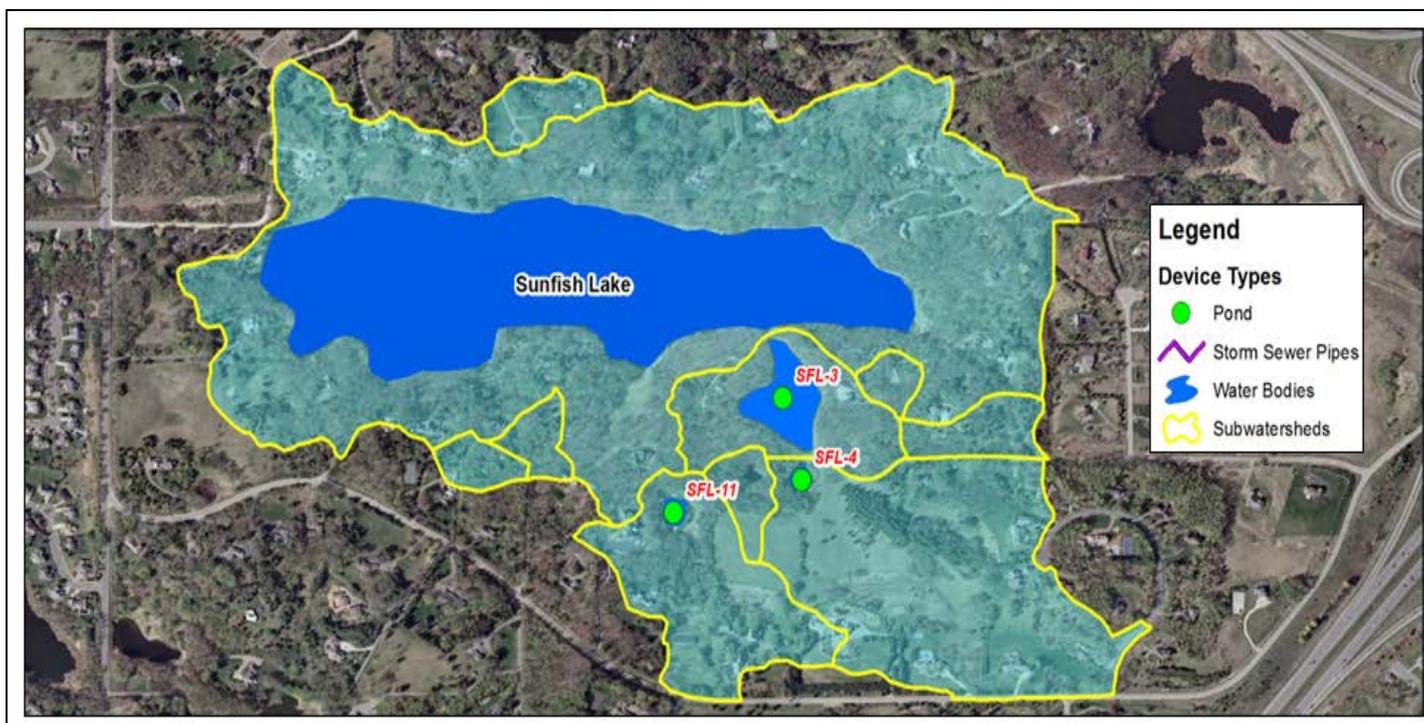
Sub-watershed Area: 235 acres Lake surface area: 47 acres Maximum lake depth: 32 feet

Lake condition: Poor water quality due to excessive nutrients (phosphorus) that spur algae growth

Sources of nutrients: Releases of phosphorus from the lake bottom and runoff from streets and yards in the watershed

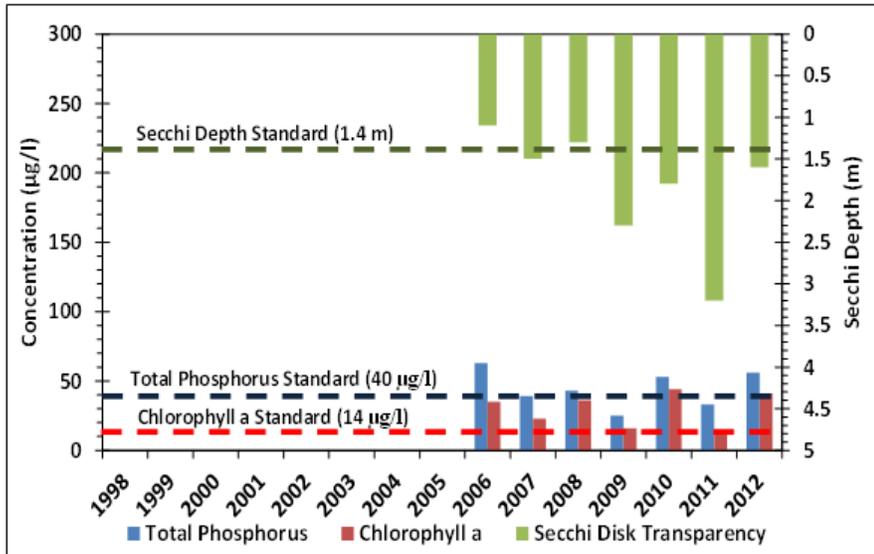
In 2012 and 2013, the Lower Mississippi River Watershed Management Organization (LMRWMO) studied five lakes, including Sunfish Lake, to gain a better understanding of their water quality, sources of pollution, and the pollution reductions needed to improve the water quality and meet State standards. The Minnesota Pollution Control Agency funded the project through the Clean Water Land and Legacy Act. The project, called a “Watershed Restoration and Protection Strategy (WRAPS)” resulted in restoration plans for lakes with poor water quality, like Sunfish, and protection plans for lakes with good water quality.

Sunfish Lake is located in the City of Sunfish Lake between highway 110 to the north and interstate 494 to the south. Land use in the lake’s watershed is comprised primarily of low density residential or is undeveloped. The properties surrounding the lake are serviced by Subsurface Sewage Treatment Systems (SSTS). Sunfish Lake has a high overflow outlet, constructed in the late 1990s, that can convey water to Friendly Marsh in Mendota Heights through Interstate Valley Creek and ultimately into the Mississippi River. The outlet is located above the lake’s Ordinary High Water elevation (OHW), so discharge from the lake is typically limited to seepage.



Water Monitoring Results

Sunfish Lake has a maximum depth of 32 feet and therefore must meet Minnesota water quality standards for deep lakes: the average total phosphorus (TP) concentrations during the summer must be less than 40 micrograms per liter ($\mu\text{g/l}$); chlorophyll-a concentrations must be less than 14 $\mu\text{g/l}$; and Secchi depth transparency must be greater than 1.4 meters (4.6 feet) (see sidebar for explanations of these parameters). The lake was previously monitored through the Metropolitan Council’s Citizen Assisted Monitoring Program (CAMP) from 2006 to 2011 and as part of this study in 2012. The long-term average total phosphorus and chlorophyll-a levels do not meet State standards, while the average Secchi depth does meet the water quality standard.



Sunfish Lake Summer Average (June–September) Water Quality Data

Phosphorus is the plant nutrient that most often stimulates the growth of algae. A lake that is rich in phosphorus has the potential for abundant algal growth, which can reduce water clarity.

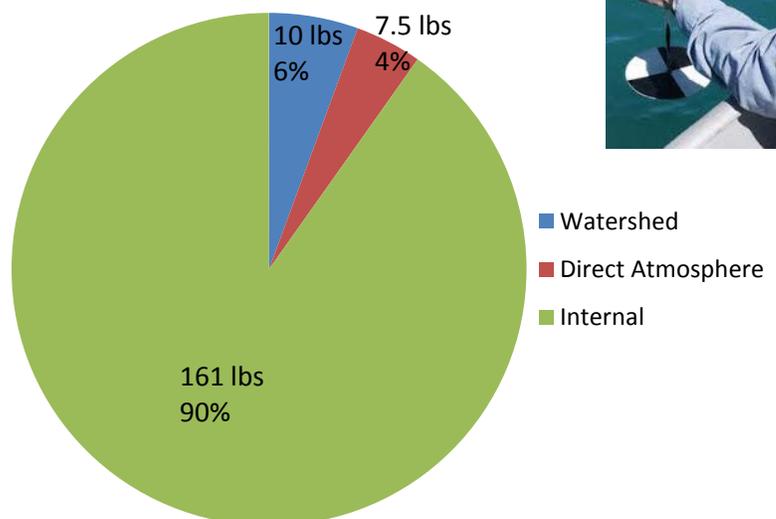
Chlorophyll-a is the main photosynthetic pigment in algae. Too much chlorophyll-a indicates an abundance of algae in the lake.

Water clarity, or transparency, is often measured with a **Secchi disk** - a black and white disk that is lowered into the water until it disappears from view. The depth at which it is no longer visible is measured numerous times to get an average for the summer.



Sources of Phosphorus

Sunfish Lake receives nutrients like phosphorus, from a variety of sources. Monitoring and modeling results indicate the majority (90%) of the phosphorus in Sunfish comes from the sediments at the bottom of the lake or “internal loading.” Internal phosphorus loading is a problem in many lakes because historic inputs of phosphorus get concentrated in the sediments. This phosphorus is recycled from the lake sediments into the overlying waters, primarily during summer periods, when it contributes to the growth of nuisance algal blooms.



Another 6% of the phosphorus comes from the surrounding watershed. Storm water and snow melt running off residential areas carry grass clippings, fertilizers, and leaves into the lake through swales or steep yards. Fertilizer in runoff feeds algae blooms directly while leaves and grass breakdown in the water, also releasing nutrients to the water column.

Strategies for Reducing Phosphorus in Sunfish Lake

The WRAPS report and restoration plan for Sunfish Lake indicates that a 44% reduction of phosphorus from internal sources is needed to improve water quality, reduce algae growth and meet State standards. This will, in turn, allow sunlight to reach more of the lake bottom, improving rooted aquatic plant growth, habitat, and lake oxygen levels.

In order to reduce internal sources by 44%, an in-lake alum treatment of the lake sediments is recommended. Alum (aluminum sulfate) is a nontoxic material commonly used in water treatment plants to clarify drinking water. In lakes alum is used to reduce the amount of the phosphorus in the water. Alum is applied near the lake surface, and on contact with water it forms a fluffy aluminum hydroxide precipitate called floc. Aluminum hydroxide (the principle ingredient in common antacids such as Maalox) binds with phosphorus to form an aluminum phosphate compound. This compound is insoluble in water so the phosphorus in it can no longer be used as food by algae. As the floc slowly settles, it collects suspended particles in the water and carries them to the lake bottom, leaving the water noticeably clearer. On the bottom of the lake the floc forms a layer that acts as a phosphorus barrier by combining with phosphorus as it is released from the sediments.



What Can You Do? Every Property Is Like a Shoreline

If you live along the shore of Sunfish Lake, it's probably obvious that water running off your property ends up in the lake. However, even if you live several blocks from the lake, runoff from your property likely gets to the lake through drainage swales on your land. These pathways to the lake essentially turn every property into a shoreline. These swales collect rainwater and snowmelt leaving your property and convey them to Sunfish Lake without treatment.



Pollutants carried in that runoff include lawn fertilizers, nutrients from decaying grass clippings and leaves, pesticides, toxins from coal-tar driveway sealants, oil from leaking cars, pet waste, and salt, sand and other deicers. In the lake, these pollutants can contribute to poor water quality – affecting aesthetics and recreational enjoyment of the lake, as well as fish, bugs, birds, and their habitats. Other sources of pollution in Sunfish Lake may include leaking or non-compliant septic systems, re-suspension of nutrients that entered the lake long ago, and the die-off of aquatic plants through natural processes or herbicide treatments.

You can be part of the solution by using some easy practices at home.

- ✓ *Plant a native garden along your shoreline to provide a buffer from the lawn*
- ✓ *Stabilize any eroding areas along the lake with vegetation*
- ✓ *Sweep or rake excess grass clippings, fertilizer, leaves, and deicers before they get into the drainage swale (compost grass and leaves)*
- ✓ *Maintain your septic system*
- ✓ *Clean up after your pet (put waste in trash)*
- ✓ *Install a rain barrel to collect rainwater for use in gardens*
- ✓ *Keep your car in good repair to avoid leaks*
- ✓ *Use asphalt-based driveway sealants (or if using a service, ask the company to use them)*
- ✓ *Wash your car on the lawn (where city rules allow) so water soaks into the ground*