



Minnesota  
Pollution  
Control  
Agency

# Fish Lake Total Maximum Daily Load and Schwanz Lake Nutrient Management Plan

## Excess Nutrients Project Overview

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In 2006, the Minnesota Pollution Control Agency (MPCA) listed Fish and Schwanz Lakes as impaired for aquatic recreation under Section 303(d) of the Clean Water Act. Excess nutrients in both lakes are the main cause for the impairments. Excess nutrients such as phosphorus from stormwater runoff create poor water quality conditions causing summer algal blooms, which limits recreational activities. Efforts by the City of Eagan have improved water quality to Schwanz Lake in recent years and MPCA will likely remove the lake from the impaired waters list, although the City intends to implement additional water quality improvement projects.

### Fish and Schwanz Lakes

Fish and Schwanz Lakes, 29 and 12 acres respectively, and their surrounding drainage areas are in the Gun Club Watershed. Located in separate parts of Eagan, Minnesota, both shallow lakes are in prominent City parks, which provide good public access for fishing, non-motorized boating, aesthetic enjoyment, and some swimming and wading.

Both lakes' drainage basins are predominantly urbanized and have been part of Eagan's storm sewer system since the 1970s. Historical data indicate the lakes have been nutrient enriched, with periodic nuisance algae blooms, marginal water clarity, and low oxygen in the deeper portions of the lakes. The City of Eagan's 2007 Water Quality and Wetland

Management Plan identifies Fish and Schwanz Lakes as top priorities for long-term enhancement and protection efforts.



### TMDL background

The U.S. Environmental Protection Agency (EPA) requires states to develop Total Maximum Daily Load (TMDL) studies for waters that do not meet water quality standards and are listed as "impaired." The main objectives of this project are to determine the sources of the excess nutrients and to estimate the reductions in nutrient loadings needed for Fish Lake to meet the appropriate water quality standard and to improve water quality in Schwanz Lake. The end product of this project will be a Fish Lake TMDL and Schwanz Lake Nutrient Management Report and Implementation Plan.

### Fish and Schwanz Lakes impairments

The MPCA's North Central Hardwood Forest Ecoregion shallow lake standards are  $\leq 60$   $\mu\text{g/L}$  (micrograms per liter) total phosphorus,  $\leq 20$   $\mu\text{g/L}$  chlorophyll-*a*, and

≥1.0 meter Secchi transparency for Class 2B recreational waters.

Fish Lake average summer in-lake water quality data from 1991-2007:

- total phosphorus: 39 to 116 µg/L
- chlorophyll-*a*: 13 to 49 µg/L
- secchi transparency: 1.2 to 2.1 meters

Schwanz Lake average summer (June-September) in-lake water quality data from 1991-2007:

- total phosphorus: 44 to 95 µg/L
- chlorophyll-*a*: 12 to 60 µg/L
- secchi transparency: 0.9 to 2.0 meters

### **Pollution sources**

Fish and Schwanz Lakes each receive excess nutrient loading from watershed and internal (in-lake) sources. Approximately 80-83 percent of the watershed areas draining to the lakes enter through the storm trunk lines. Phosphorus in stormwater is a result of transporting fertilizers, sediments, and organic material such as leaves and grass clippings to lakes.

Internal loading from a combination of curlyleaf pondweed dieback and sediment release of phosphorus is also a source of nutrients in the lakes. Phosphorus has built up in the sediments of these lakes after years of high phosphorus loads from urban runoff. This excess phosphorus is released into the water column when lake sediment is re-suspended by wind mixing or rough fish activity, dissolved oxygen levels are low, or pH levels are high. Phosphorus is also released when the heavy growths of the non-native invasive aquatic plant, curlyleaf pondweed, dies back in early to mid-summer.

### **Pollution reductions needed**

A reduction of 19 percent in phosphorus loading to Fish Lake would be required to consistently meet water quality standards under average precipitation conditions. Strategies to improve water quality in Fish and Schwanz Lakes include implementing Best Management Practices (BMPs) to reduce phosphorus from stormwater runoff in the watershed and in-lake sources.

Examples of BMPs would be:

- managing total phosphorus loading during future development and redevelopment
- continuing good housekeeping practices, including street sweeping, stormwater system maintenance, and public education
- pursuing stormwater retrofit activities as opportunities arise
- implementing in-lake management activities, chemical and biological, as appropriate
- re-starting the operation of the alum dosing facility to treat inflows to Fish Lake from the storm trunk system
- controlling internal loading through continued curlyleaf pondweed control efforts, fish management to control rough fish and stunted panfish, and chemical inactivation of total phosphorus in lake sediments

### **For more information**

The City of Eagan is developing the Fish Lake TMDL and Schwanz Lake Nutrient Management Plan and associated Implementation Plan with Bonestroo for the MPCA.

For more information about this project, view the Web page at <http://www.pca.state.mn.us/water/tmdl/project-fish-schwanzlake.html> or contact:

Minnesota Pollution Control Agency  
520 Lafayette Road  
St. Paul, MN 55155  
651-296-6300 or 1-800-657-3864

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