MEMORANDUM

To: Board of Managers, LMRWMO
CC: Joe Barten, LMRWMO Administrator
From: Lindsey Albright, Dakota County SWCD Water Resource Specialist
Date: April 3, 2018
Subject: Sunfish Lake – 2017 Citizen Assisted Monitoring Program (CAMP) Results

Background

Sunfish Lake is a 47 acre lake located in the City of Sunfish Lake. The lake has a median depth of 18 feet and a maximum depth of 32 feet and the watershed drains 235 acres into the lake. Land use in the lake’s watershed is comprised primarily of low density residential or is undeveloped. Sunfish Lake was placed on Minnesota’s 303(d) List of Impaired Waters in 2010 for aquatic recreation due to excess nutrients.

The lake was previously monitored through the Metropolitan Council’s Citizen Assisted Monitoring Program (CAMP) for years 2006 – 2011 and as part of the Minnesota Pollution Control Agency (MPCA) intensive water monitoring effort (Watershed Restoration and Protection Strategy (WRAPS)) 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.

The WRAPS process identified that a 44% reduction of phosphorus in Sunfish Lake from internal sources would be needed to restore the poor water quality in the lake. In order to reduce internal sources that significantly, an in-lake alum treatment of the lake sediments, recommended to the Lower Mississippi River Watershed Management Organization as a proper course of action, was performed in the summer of 2017.

2017 Water Quality Monitoring Activities

In the summer of 2017, monitoring for eutrophication parameters (chlorophyll-a, total phosphorus, and Secchi depth) took place on a biweekly schedule starting in early May and continuing through late October by CAMP volunteers. Supplemental data on the state of the waterbody prior to the 2017 alum treatment will be useful when comparing the water quality in Sunfish Lake in subsequent years post project implementation.

Additional water quality parameters recorded: water color and odor; atmospheric conditions (wind, cloud cover, air temperature); water surface and lake level; aquatic plants; algae); and suitability for recreation.

2017 Monitoring Results

Water quality was monitored on Lake Augusta thirteen times between May and October. Water clarity was determined using a Secchi disc, while water samples were collected and subsequently analyzed for total phosphorus and chlorophyll-a (field filtered). In 2017, Sunfish Lake met all of the deep lake water quality criteria set forth by the MPCA.
The 2017 water monitoring results for Sunfish Lake were evaluated against the deep lake criteria set for lakes in the North Central Hardwood Forest (NCHF) Ecoregion.

Upper limits of the threshold are indicated by the green dashed line:
- $> 1.4$ m Secchi depth
- $< 40 \mu g/L$ TP
- $< 14 \mu g/L$ Chl $\alpha$

The purple diagonal column on the right side of each graph shows the summer average for each parameter.

The CAMP program is coordinated by the Metropolitan Council
Historical Water Quality Monitoring

The federal Clean Water Act requires states to adopt water quality standards to protect waters from pollution. These standards define how much of a pollutant can be in the water and still meet beneficial uses, such as drinking water, fishing, and swimming. Water quality standards are the fundamental tools used to assess the quality of all surface waters.

Total phosphorus is a key nutrient measure; chlorophyll-a is a measure of algal abundance; and Secchi depth is a measure of water clarity. If Total Phosphorus, and one or both, of the other parameters is not meeting the state standard, the lake may be 'impaired'.

Growing season averages are calculated using samples collected from June through September of each year.

**Secchi Depth**

**Total Phosphorus**

**Chlorophyll-a**