

MEMORANDUM

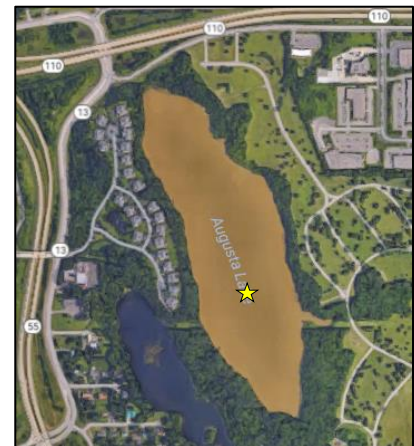
To: Board of Managers, LMRWMO
CC: Joe Barten, LMRWMO Administrator
From: Lindsey Albright, Dakota County SWCD Water Resource Specialist
Date: April 3, 2018
Subject: Lake Augusta – 2017 Citizen Assisted Monitoring Program (CAMP) Results

Background

Lake Augusta is a 46 acre lake located in the City of Mendota Heights. The lake has a median depth of 18 feet and a max. depth of 33 feet and therefore must meet the water quality standards for deep lakes. Land use within the watershed is primarily institutional (cemetery), commercial, and residential (low and high density). Lake Augusta was placed on Minnesota's 303(d) List of Impaired Waters in 2010 for aquatic recreation due to excess nutrients.

Historical monitoring of Lake Augusta was conducted by the Gun Club WMO from 2007-2009 for total phosphorus and chlorophyll-a. Secchi depth measurements were taken from 1998-2009. In 2012 and 2013, the Minnesota Pollution Control Agency (MPCA) led an intensive water monitoring effort as part of the Watershed Restoration and Protection Strategy (WRAPS) of Lake Augusta to gain a better understanding of water quality, sources of pollution, and the necessary pollution reductions to improve the water quality and meet State standards.

The [WRAPS](#) identified that a 78% reduction of phosphorus in Lake Augusta from internal sources was necessary 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 was recommended to the Lower Mississippi River Watershed Management Organization as a proper course of action. That alum treatment was implemented in the spring of 2017.



★ Monitoring Location

Recent Water Quality Monitoring Activities

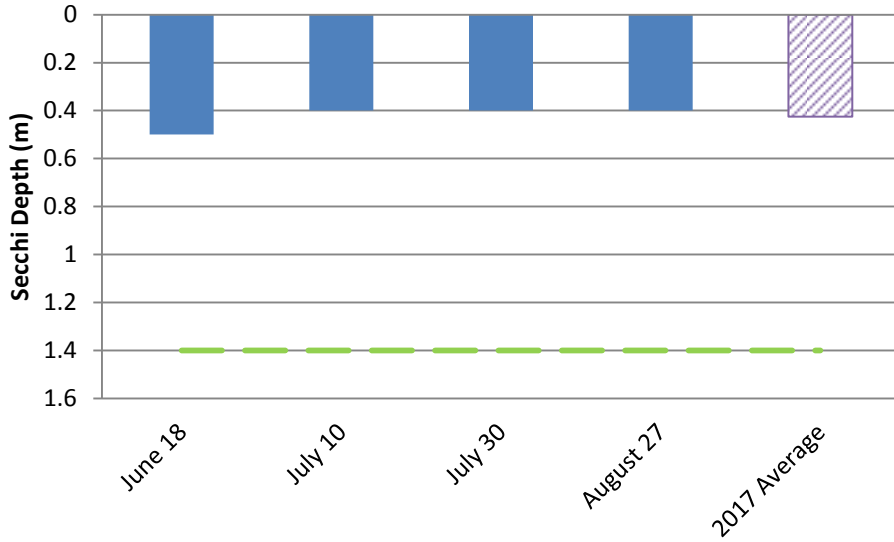
In the summers of 2016 and 2017, monitoring for eutrophication parameters (chlorophyll-*a*, total phosphorus, and Secchi disk transparency) took place through the Citizen Assisted Monitoring Program (CAMP). This was done to gain data on the state of the waterbody prior to an alum treatment. The same monitoring location used by both the Gun Club WMO and the MPCA during the WRAPS project was used for monitoring in 2017.

2017 Water Quality Monitoring Results

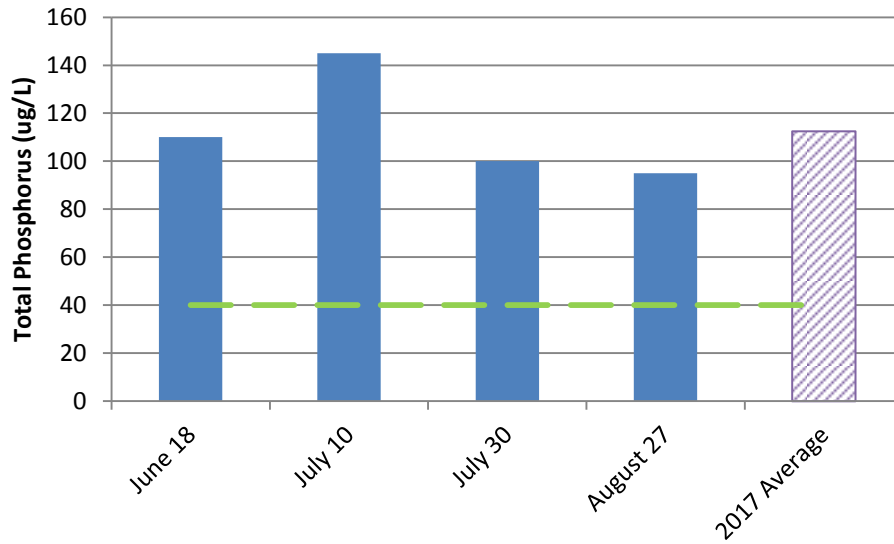
Water quality was monitored on Lake Augusta four times in 2017 between June and September. Water clarity was determined using a Secchi disc, while water samples were collected and subsequently analyzed for total phosphorus and chlorophyll-*a* (field filtered). In 2017, Lake Augusta did not meet any of the deep lake water quality criteria set forth by the MPCA. There were improvements from 2016 (pre-alum treatment) to 2017 (post-alum treatment) in all three eutrophication parameters. The lake will continue to be monitored in future years to track the effectiveness of the alum treatment.

2017 Monitoring Results

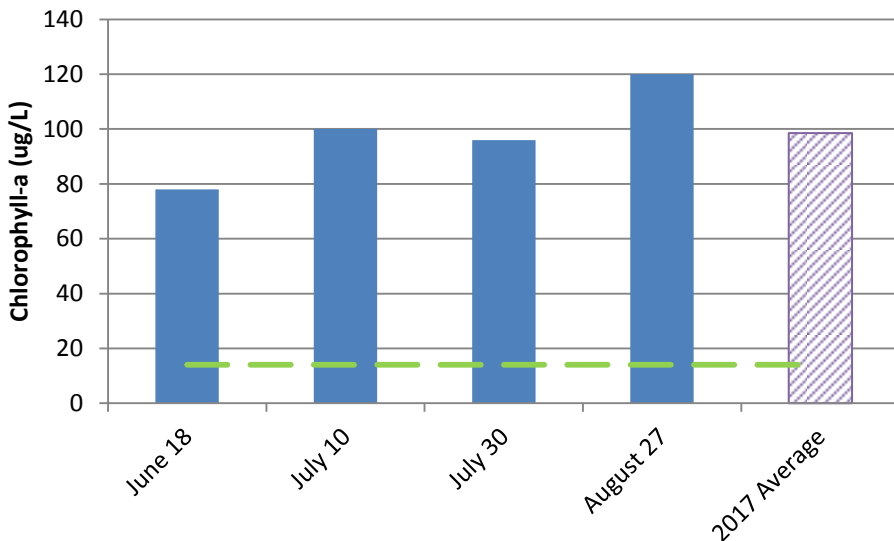
Secchi Depth



Total Phosphorus (TP)



Chlorophyll-a (Chl a)



The 2017 water monitoring results for Lake Augusta 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 $\mu\text{g/L}$ TP
 < 14 $\mu\text{g/L}$ Chl a

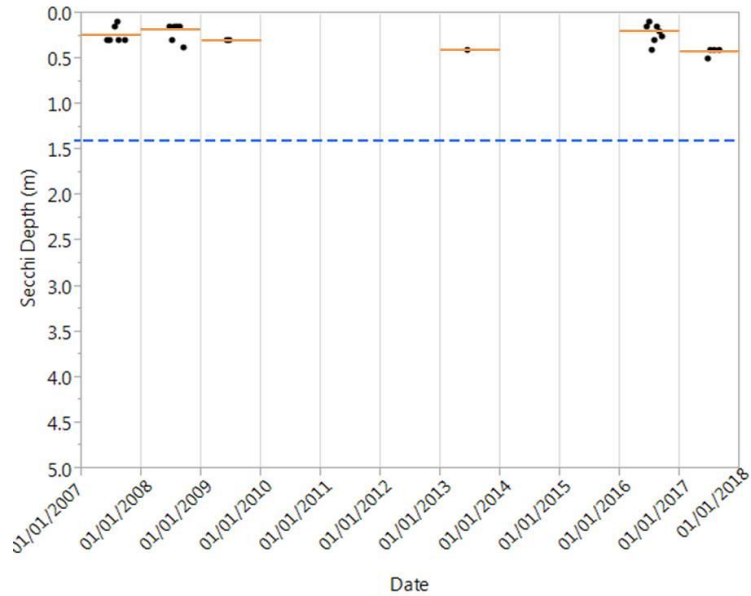
The **purple diagonal column** on the right side of each graph shows the summer average for each parameter.



The CAMP program is coordinated by the Metropolitan Council

Historical Water Quality Monitoring

Secchi Depth

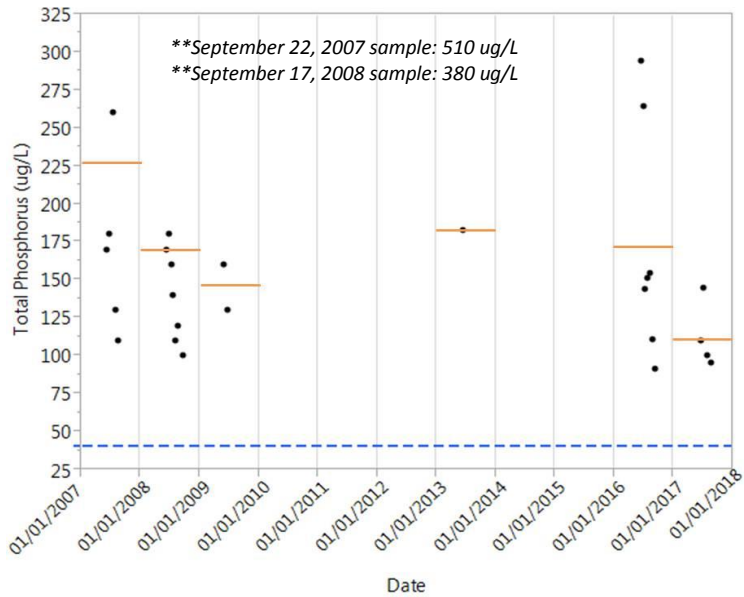


The federal Clean Water Act requires states to adopt water quality standards to protect waters from pollution. These standards define how much of a pollutant can be in the water and still meet beneficial uses, such as drinking water, fishing, and swimming. **Water quality standards** (---) are the fundamental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

Total Phosphorus



Chlorophyll-a

