

## **Assessment and treatment of internal phosphorus loading in Northwood Lake, City of New Hope**

### **Two-part Study**

1. Investigate internal phosphorus release from sediment in Northwood Lake
2. Implement iron-filings pilot study in the lake and assess post-treatment phosphorus water quality

### **Rationale**

USEPA has listed approximately 3,000 lakes for impairments due to excess phosphorus. Phosphorus levels in lakes are affected by two primary sources:

1. Inputs from watershed runoff
2. Internal loading resulting from release of phosphorus from the sediment

High phosphorus loading can cause and accelerate eutrophication and harmful algal blooms and weed growth in the lake. Reducing internal loading can improve lake water quality, reduce weed growth and algal blooms, and help meet TMDL allocation goals.

The project will investigate the effectiveness of iron filing addition to Northwood Lake to bind up the phosphorus in the sediment, preventing its release into the lake's water column. Iron filing addition to sand filters has been studied extensively by the University of Minnesota's St. Anthony Falls Lab, showing effective removal of soluble phosphorus from stormwater runoff.

Building on that success, a 2017 study by the U of M looked at iron filing addition to lake sediments under controlled laboratory conditions. The study showed a significant reduction in phosphorus release from the sediment.

The proposed pilot study in Northwood Lake will now look at iron filing addition directly to the lake sediment. It will be one of the first field applications of iron filings as a sediment phosphorus inactivation method in lakes. If successful, iron filing addition can be a viable tool for treating lake phosphorus in the numerous lakes across the Metro area and the state that are experiencing high internal loading of phosphorus.

## **Project Approach**

The project will be a two-year effort:

- **Year 1:** Measure current conditions in the lake through a combination of sediment core collection and assessment and in-situ water quality sampling. This will form the baseline for evaluating effectiveness of iron filing treatment. It will also provide information on the amount of iron filings needed for the treatment. Prepare a project report on the procedures and results.
- **Year 2:** Apply iron filings across the lake sediment surface. Perform both water quality sampling and sediment analysis. Determine change from Year 1 (untreated) conditions. Prepare a project report on the procedures and results.

## **Project Costs**

The project costs will include labor costs for the U of M to perform the work, lab testing costs, and material costs for the iron filings. Stantec staff will assist as needed at no cost to the project.

Estimated costs are as follows:

- Year 1 study: \$16,409
- Year 2 study: \$26,876
- Iron filings (Year 2): \$15,000-\$30,000

## **BCWMC Funding Request**

We are requesting \$15,000-\$30,000 from the BCWMC to help cover the project costs. We are currently pursuing other grant funding options as well (University of Minnesota, Stantec), though there are no guarantees about being awarded this money.