



Cross Lake

Phosphorus Loading and Alum Feasibility

Overview

- Background and Reasoning for Study
- Results
- Next Steps

At a Glance

Background

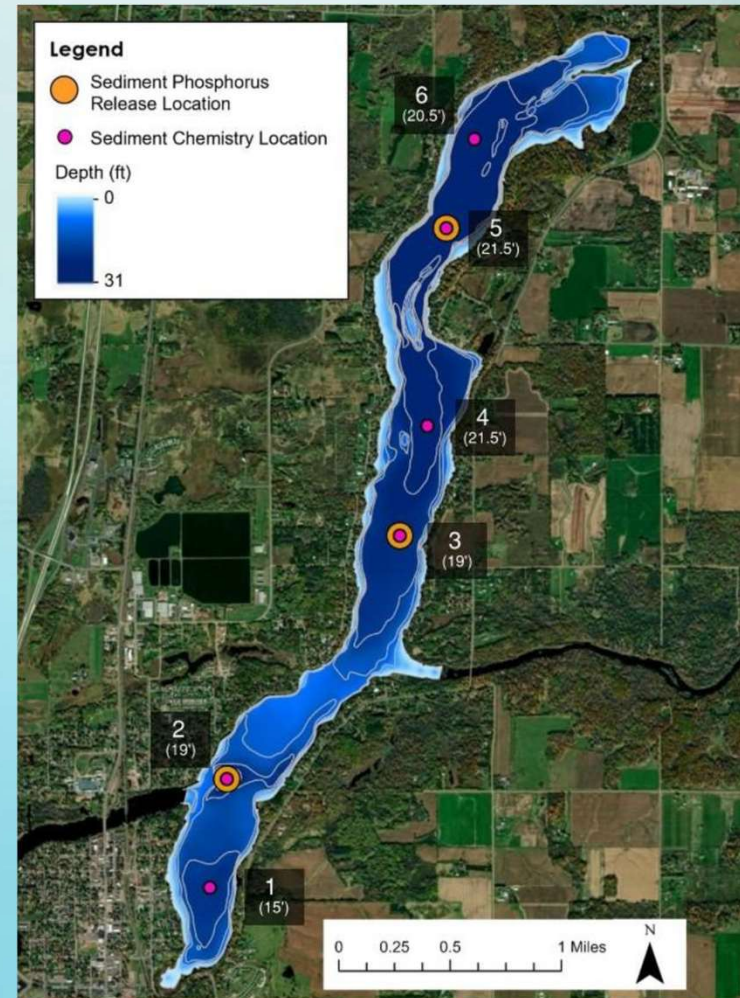
- Cross Lake is 925 acres
 - 3rd largest lake in the county
- Listed on MPCA impaired waters list in 2010
 - Excessive phosphorus (P)
- In 2013 an MPCA Total Daily Maximum Load (TMDL) Study was developed for the Snake River Watershed.
 - Determined 69% of P in Cross Lake was from internal loading

Reason For Study

- Data sets from TMDL are outdated
- Some water monitoring was done up until 2018
 - This data is quickly becoming outdated as well
- Because of the lake's impaired status, and outdated data sets, the Snake River Comprehensive Watershed Management Plan (CWMP) identified Cross Lake as a priority to have an internal loading study completed
 - Stantec was commissioned to do the study.

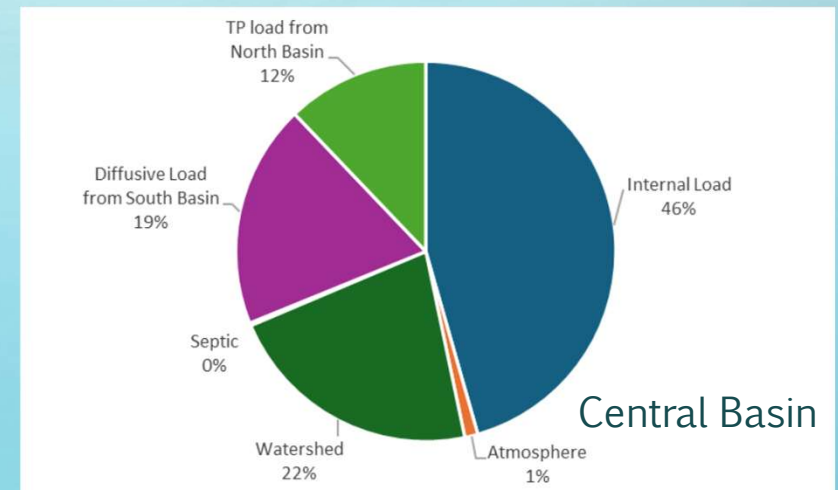
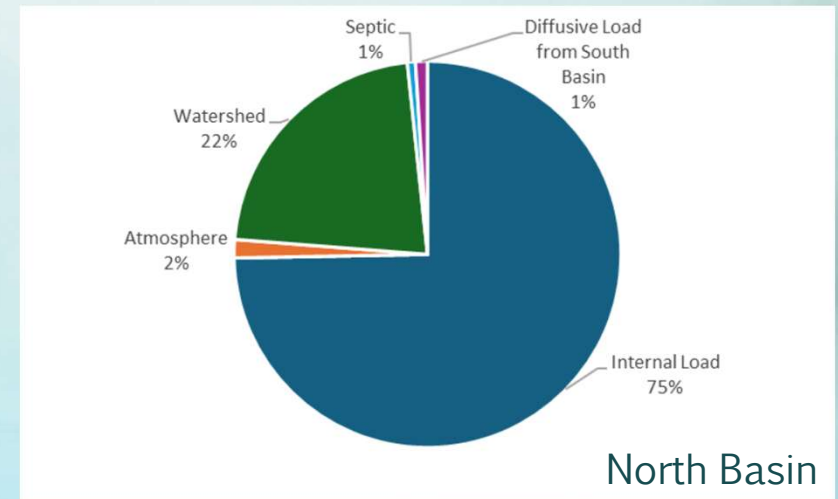
Study Results

- Results identifying P loading was determined through a series of water samples and sediment cores collected Summer and Fall of 2025.
 - The Lake was divided into North, Central, and South basins
 - Because of low water residence time in the South basin, the study focused on the North and Central basins.



Study Results

- P Release Rates
 - The allowable threshold for internal P release in deep lakes for Minnesota is 2mg/m²/day
 - Cross Lake P release rates by basin
 - North basin 16.9mg/m²/day
 - Central basin 15.7mg/m²/day
 - South basin 16.5mg/m²/day
 - The average P release rates for deep lakes in MN
 - 12mg/m²/day



Study Results

- Based off the information provided in the study
 - 70%-75% of P in the lake derives from internal loading
 - The remaining 25%-30% comes from external sources
- Alum Treatment Feasibility
 - Because of the high internal loading of P in Cross Lake, Stantec determined that an alum treatment in the North and Central basins would be a feasible solution to reduce P loading in Cross Lake.
 - Stantec recommends Alum treatment in those basins in areas greater than 20 feet in depth.



Alum Treatments

Alum is applied to lakes to bind with phosphorus

- Adapted from water treatment technologies
- Has been applied to hundreds of lakes since the 1970s
- Settles to the sediment surface
- Binds with P diffusing from beneath the alum layer
- Safe for aquatic organisms
- Alum can be found in the grocery store baking aisle

Next Steps: 3 Major Points

- Water Monitoring
 - A key component to maintain the most accurate and up to date conditions of the lake
 - Helps identify progress being made with any water quality projects being done
 - Generally done by trained volunteers
 - Work with MPCA to set up regular testing schedules
- Management Plan for External Loading
 - What efforts have been done in recent years?
 - Last 5 to 10 years
 - What efforts are being currently done?
 - Potential projects on the lake and in the lake shed
 - What lake homeowners are doing to reduce their contribution to P in the lake?
 - SWCD can play a role here.

Next Steps: 3 Major Points

- Is an alum treatment realistic? If so, how do we see it happen?
 - Are steps 1 and 2 active and in motion?
 - Both will need to be in place for best chances at grant funding
 - Is there community buy in?
 - Is an alum treatment something that is generally accepted as the best path forward by lake residents?
 - Funding. Where can we look for it?
 - Local, state, and federal funds will all need to be looked at.
 - A combination of funding sources is the best chance at allocating enough funding for an alum treatment.

In Summary

- The study completed by Stantec helps us better understand what is going on in Cross Lake.
- Internal loading plays a substantial part in excess phosphorus levels.
 - External loading can't be ignored
- An alum treat was found as a feasible way to address internal P loading.
- This is the first step in a long journey to reduce P in Cross Lake. It will take many years and partner collaboration to accomplish.



Thank You

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