

CEDAR LAKE MANAGEMENT PLAN

July 2017

The process to develop the 2014 Cedar Lake Management Plan began with a thorough three-year study of the lake and its watershed. We discovered that about 90% of the phosphorus that causes algae growth in summer comes from the lake sediments. This source must be controlled to have a visible impact on lake quality.

The 2017 update was needed for two main reasons:

- 1) The discovery of Eurasian water milfoil in Cedar Lake in 2015 and
- 2) Modifications to the alum treatment strategy.

The update was guided by a committee of lake residents, and DNR and consulting advisors. Advisory Committee members are listed on the back cover.

This summary document presents an overview of lake concerns, plan actions, and expected results.

Vision for Cedar Lake in the Year 2030

Cedar Lake is a healthy lake that provides clear water, excellent aquatic and nearshore fish and wildlife habitat, and quality recreation.

The Cedar Lake Management Plan guides an active Protection and Rehabilitation District Board and a broad range of partners.

NOT SCUMMY GREEN WATER

If we do nothing, scummy green water is what we will continue to get. Lake water quality on Cedar Lake has been degraded for years. DNR files include reports of “pea soup” conditions way back in 1938. Cedar Lake family memories include retreating from the lake in the 1950s because of foul odors from lake algae.

A sediment core study revealed that clearing the land for agriculture impacted the lake as early as the late 1880s. And tilling land and using commercial fertilizer for crops led to a build-up of nutrients in lake sediments over the years. The good news is that farmers in the Horse Creek Watershed (which flows to Cedar Lake) now use best management practices such as cover crops that keep Horse Creek much cleaner than in the past!

WE WANT CLEAN WATER for FUTURE GENERATIONS

Clear water with substantially less algae growth is a major goal of the lake management plan. Clear water will make Cedar Lake a better place to share with friends and family. Cedar Lake property owners surveyed reported that algae growth is by far the top negative impact to Cedar Lake.

Clear Water Benefits:

Lower Risk from Algae Toxins

Increased Property Values

Increased Aquatic Plant Growth for

Better fish and wildlife habitat

Stabilized lake sediments

Reduced shoreline erosion

Better lake health

Fresh Air – Reduced Lake Odor

Better Recreational Opportunities

Relaxing Lake Experiences

Better Swimming



ACHIEVING CEDAR LAKE MANAGEMENT PLAN GOALS

Achieve and maintain clear water throughout the summer.

Phosphorus is the main nutrient that leads to algae growth in Cedar Lake. Significant improvements in water clarity will result only if the release of phosphorus from the lake sediments is controlled. An alum treatment is recommended to reduce phosphorus release from lake sediments by 90%. Clear water is not possible if sediment phosphorus is not controlled. Reducing phosphorus that flows to the lake from the watershed even further is also helpful to ensure a successful, long-term result.

Phosphorus is released from lake sediments when the oxygen levels decrease at the bottom of the lake. In many lakes, the phosphorus circulates to the lake surface to cause algae growth in the fall. Cedar Lake occasionally mixes during the summer bringing phosphorus to the surface and dramatically increasing algae growth. An alum application leaves a thin layer of alum at the lake sediment surface to bind the phosphorus and prevent release to the water.

Alum applications are safe as long as the pH is kept in a close to neutral range. Because alum doses will be split into multiple dosage periods, pH will stay in a safe range.

The science of alum application rates has advanced greatly in recent years. After careful study, an application rate was recommended with higher concentrations applied in areas where water is over 25 feet deep and lower concentrations applied in areas where water depth is between 20 and 25 feet.

Recent scientific information led to updates in the strategy for 2017. 1) The full alum dose will be split into 5 application periods to enhance alum binding efficiency. 2) A mid-June application is planned to further increase alum effectiveness.

Planned Actions

- Conduct alum treatment. according to updated strategy.

Clear Water Expectations

In-lake total phosphorus objective:

Achieve and maintain a summer total phosphorus mean of less than 40 ug/L.

(In 2016, the total phosphorus mean was 133 ug/L)

This objective is achievable with the alum treatments alone. Watershed reductions will ensure that the alum treatments are successful in the long-term.

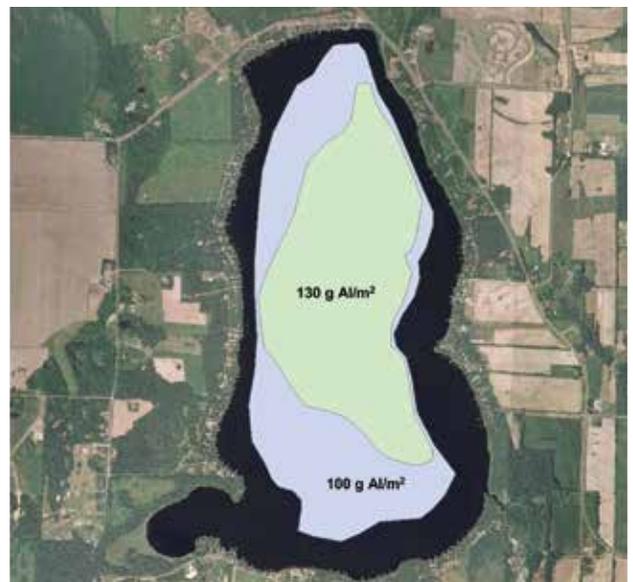
Lake quality varies greatly from year-to-year with changing rainfall, wind, temperature and other factors. On average we predict* significant changes following the alum treatments:

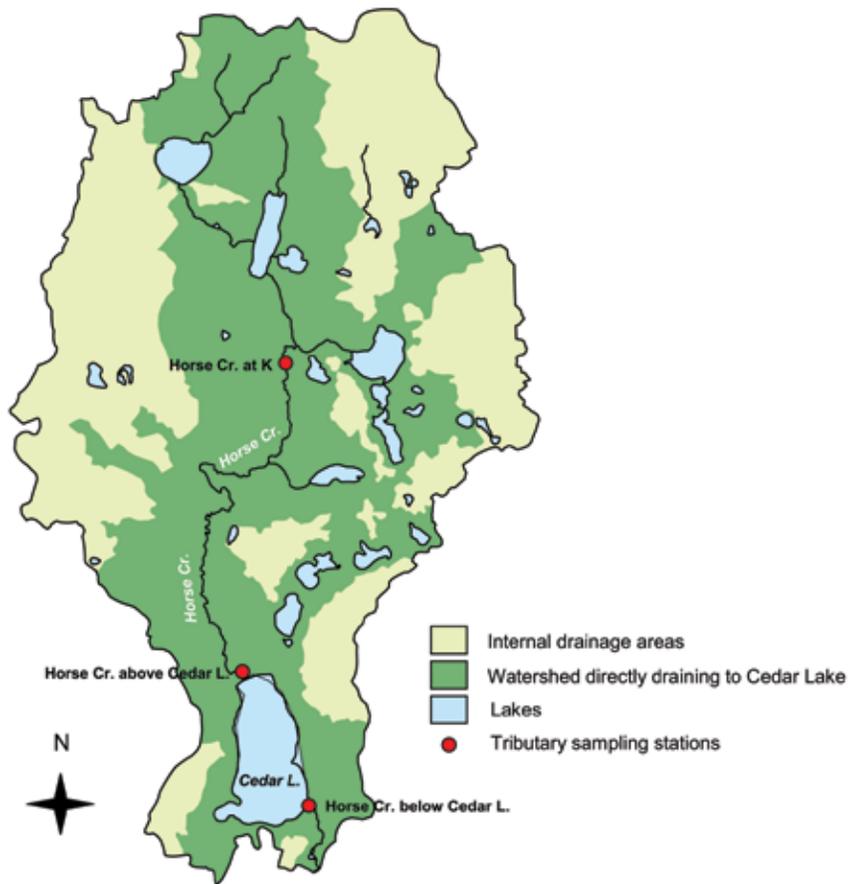
- Summer water clarity will increase from an average secchi depth of 5 feet in 2010 to 10 feet.
- The frequency of nuisance summer algae blooms will decrease from 55% to less than 5 percent of the time.
- The threat of blue-green algae toxin production will be minimized.

*predictions are based upon mathematical water quality models



HAB (Cedar Lake's selected contractor) Alum Barge





Horse Creek Farmer-Led Council

The Horse Creek Watershed is home to one of the most progressive farmer-led watershed projects across the state. Farmers in the watershed are using information from an inventory conducted by the Polk County Land and Water Resources Department to develop incentives for on-farm measures for water quality improvements. The inventory found that phosphorus levels leaving farm fields and draining directly to Horse Creek average only about 1/6 of the allowed state standard.

The primary goal of the pilot project is to allow members of the agricultural community an opportunity to become actively involved in the process of developing a strategy to improve water quality, adopting that strategy, and ensuring its success.

Cedar Lake's watershed includes agricultural and residential areas.

Planned Actions

- Support farmer-led watershed efforts and encourage installation of best management practices.
- Encourage residential best management practices.
- Monitor the lake to assess the effectiveness of alum treatments and watershed projects.



Cover crops improve soil health, increase infiltration, and reduce soil erosion.



Rain gardens capture water briefly to prevent runoff to the lake.

ACHIEVING CEDAR LAKE MANAGEMENT PLAN GOALS

Prevent the introduction of aquatic invasive species and effectively manage those introduced into the lake.

When Eurasian water milfoil was discovered in Cedar Lake in 2015, the Lake District had a Rapid Response Protocol in place. The 2015/16 response included extensive monitoring, a chemical treatment, and hand pulling (when water clarity was good enough). The plan update refined these methods using advice from experts and study results from across the state. One major change was to select an herbicide expected to perform better with the shorter contact time resulting from a small treatment area. We expect increased water clarity from the alum treatments to increase visibility and aid in hand removal efforts. An important new addition to our strategy is a Volunteer Monitoring Team to look for Eurasian Water Milfoil throughout the lake. The Team will be seeking volunteers from around the lake.



Eurasian water milfoil, an aquatic invasive species

Planned Actions

- Control Eurasian Water Milfoil with chemical and hand removal methods. Monitor EWM growth and results of control methods.
- Establish and support a Volunteer Monitoring Team to monitor the lake for Eurasian Water Milfoil and other aquatic invasive species.
- Continue a Clean Boats, Clean Waters Program to prevent invasive species introduction.
- Regularly review and update the Rapid Response Protocol for newly introduced invasive species.
- Work with Polk Burnett Electric Cooperative and lake residents to control Japanese and giant knotweed in the shoreland zone.
- Carry out educational activities to reach residents and visitors to the lake.

Maintain a high quality sport fishery in Cedar Lake.

Planned Actions

(these are DNR-led activities supported by the Lake District and other partners)

- Use effective regulations to improve game and pan fish populations/size structure.
- Complete fish habitat improvement projects.
- Stock musky in alternate years
- Conduct in-lake and creel surveys to assess fish populations and effectiveness of management efforts.



Photo by Marty Engel

Management objectives vary by fish species. Walleye, musky, and pan fish are especially prized fish for Cedar Lake anglers.

Carp have frustrated lake residents and commercial fisherman for years after being implicated for water quality problems. In 2002 a viral disease brought carp populations down to a low level where they remain today. A barrier at the dam keeps carp from re-entering the lake at the Cedar Creek outflow. Carp are also present in upstream lakes including Horse and Lotus.

ACHIEVING CEDAR LAKE MANAGEMENT PLAN GOALS

Protect and improve near shore habitat both in the water and on the land.

Planned Actions

- Encourage restoration of near shore (shoreline) habitat.
- Provide education about the importance of maintaining vegetation on the land and in the water.
- Encourage preservation of existing high quality habitat.



Balance recreational uses so that residents and lake users can enjoy the natural benefits Cedar Lake provides.

Planned Actions

- Inform lake users about ways to use the lake without conflicts with other users and damage to the lake environment.

Carry out the Cedar Lake Management Plan effectively and efficiently with a cooperative spirit.

Planned Actions

- Provide information to lake residents to increase understanding about lake management plan actions.



INVESTING IN LAKE MANAGEMENT

The alum treatment costs are expected to be \$2.5 million over the next fifteen years. The Lake District received two WDNR grants to pay about 70 percent of the cost of the 2017 treatment. Extensive monitoring of lake water and sediments from 2017-2019 to assess treatment effectiveness is also supported by grants from WDNR and donated laboratory costs from UW-Stout. Monitoring may be used to adjust future treatments for greatest efficiency.

Lake residents are paying the remaining costs of the alum treatment through a special assessment that is established following state requirements through 2026. The special assessment establishes parcel assessment classes based on benefits to each parcel including size and proximity to the lake. The Lake District will continue to seek grant funding to pay for portions of the remaining alum treatments. The next alum treatment is planned for 2020.

Eurasian water milfoil monitoring and treatment currently cost about \$6,000 per year. A WDNR Rapid Response Grant pays 75% of these and management plan update costs for 2017.

CEDAR LAKE PROTECTION AND REHABILITATION DISTRICT BOARD

Donald DemullingChair (Plan Advisory Committee)
Dan DavisonSecretary
Nick Rude Treasurer (Plan Advisory Committee)
Joe Demulling Polk County Representative (Plan Advisory Committee)
Ted Johnson Town of Alden Representative
Dan Early Alum Committee Chair (Plan Advisory Committee)
Warren WoodPlan Advisory Committee

2017 ADVISORY COMMITTEE AND VOLUNTEER MONITORING COMMITTEE

Regan BrownVolunteer Monitor
Tom DeansVolunteer Monitor
Robert GoodladVolunteer Monitor
Tamara EarlyCBCW Lead
Dennis Peterson Volunteer Monitoring Lead
Jim Reckinger Volunteer Monitoring Lead

PLANNING CONSULTANT

Cheryl Clemens Harmony Environmental

MONITORING CONSULTANT

Steve Schieffer Ecological Integrity Service

ADVISORS

William James UW Stout
Scott Provost Wisconsin Department of Natural Resources
Buzz Sorge Wisconsin Department of Natural Resources (retired)
Eric Wojchik Polk County Land and Water Resources

TO LEARN MORE ABOUT THE CEDAR LAKE MANAGEMENT PLAN:

Go to cedarlake-wi.org or townofstarprairie.com

Attend the **Cedar Lake Protection and Rehabilitation District Annual Meeting**
August 5, 9 a.m. at the Star Prairie Town Hall, 2118 Cook Drive, Somerset, WI

PLEASE SEND WRITTEN COMMENTS TO:

Harmony Environmental, 516 Keller Ave. S, Amery, WI 54001
or harmonyenv@amerytel.net by July 15th