2012

Cedar Lake Implementation Plan—Executive Summary

Scott Watershed Management Organization, Cedar Lake Improvement District, Scott Soil and Water Conservation District

Cedar Lake—Current Conditions

Learn:

* About the Plan to improve the lake
* What you can do
* How to find additional information

For those of you who live next to, or use Cedar Lake, its no surprise that the lake is considered water quality impaired. During part of the summer the lake is so choked with aquatic plants its almost impossible to go boating. Other times of the year exhibit smelly, slimy paint green algae blooms.

What may be news is that the Cedar Lake Improvement District, the Minnesota Pollution Control Agency and the Scott Watershed Management Organization have studied the lake and have an Implementation Plan to improve conditions. The study found that the main problems are: 1) an overabundance of the nutrient phosphorus which feeds the algae blooms; 2) the presence of non-native invasive plants and animals, particularly Curly Leaf Pondweed, and common carp; and 3) the fact that the lake is shallow.

This Executive Summary provides an overview of the findings of the study, identifies where the phosphorus is coming from, explains why carp and Curly-leaf Pondweed are problems, and describes the Implementation Plan for improving the lake.

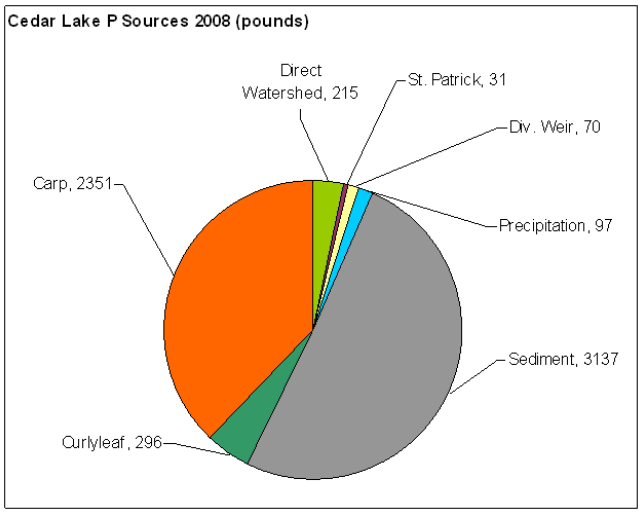
In general Cedar Lake can be improved. However, it will be challenging and it will take time. The challenges arise from the fact that the lake is shallow and has invasive species.

Additional information can be obtained from the Scott Watershed Management Organization or the Minnesota Pollution Control Agency, including the detailed study using the contact information on the back page.

Inside this issue:

Where does phosphorus in Cedar Lake come from?

The study found that most of the phosphorus comes from within the lake, particularly from suspension caused by carp, recycling from the Curly-leaf pondweed, and re-release from lake sediments. Lakes sediments are a reservoir of past phosphorus pollution coming into the lake and can be re-released by wind re-suspension and under certain chemical conditions. Watershed sources from the direct watershed, St. Patrick wetland and the diversion watershed are small compared to in-lake sources. Having this information on where phosphorus comes from allows corrective actions to focus on the primary sources.



Relative Contributions of Phosphorus to Cedar Lake in 2008

The problem with carp

Common carp are one of the most damaging aquatic invasive species. As part of their feeding behavior they root around in the substrate re-suspending sediment and dislodging aquatic plants. This mobilizes phosphorus in the water column enabling algae blooms, increasing turbidity, limiting light and photosynthesis, and submerged plant growth.

Control of carp is challenging. Complete elimination is not possible without killing off the entire fishery and starting over. However, there is a significant amount of research currently being completed. Some of this research is pointing to improved methods for reducing populations of carp through harvesting, or by controlling access to spawning areas.

Additional research is also underway to find a specific chemical attractant (i.e.,, a pheromone) similar to that used for insect control. Such a chemical could be used to attract carp to traps or removal points.

For Cedar Lake the plan is to harvest to reduce the population, while waiting for research results.

Carp Management is currently the focus of a lot of research in Minnesota—we are hoping to learn from this research

Curly-leaf Pondweed

Curly Leaf Pondweed is an exotic, invasive, submerged aquatic plant commonly found in Minnesota Lakes. In Cedar Lake it is the dominant plant. It begins growing in the late fall, grows aggressively in the spring, and dies back in early July.

This life cycle has a number of negative impacts. First, it forms dense mats that affect recreation in early summer. Second, the aggressive growth crowds out native plants severely affecting the food web in the lake. Third, with the die-off in July comes odors, and decomposing vegetation along shorelines. Four, more importantly with the die-off the lake is left with little submerged vegetation just when the lake is warm and algae is starting to bloom. Further competitive advantages are provided for algae as the dead vegetation decomposes releasing the nutrient phosphorus to the water column on which algae thrive.

Lakes and aquatic plants

Lakes should have aquatic plants—just not Curly Leaf Pondweed. Native aquatic plants provide habitat for fish and other aquatic organisms, stabilize sediment, protect shorelines, and to some extent compete with free-floating algae for phosphorus.

For Cedar Lake we want to limit Curly Leaf Pondweed while enabling native plants. It takes a number of years to accomplish this, but there are success stories where this has happened—with a couple of these occurring in Scott County at O'Dowd and Spring Lakes. The trick is to use herbicides in late spring to control Curly Leaf Pondweed before native plants have germinated.

This still leaves one question for Cedar Lake—which is given that the lake is dominated with Curly Leaf Pondweed will the native plants come back? As bad as Curly Leaf Pondweed is, eliminating it without having native plants could make things worse. Cedar Lake is large, shallow, and open to the wind. The Curly Leaf Pondweed is what controls wind re-suspension of sediment late spring and early summer. Thus, control of Curly Leaf Pondweed needs to start as a 3-year pilot effort to determine if native plants will come back. The pilot is focused on the northeast bay of the lake where efforts will be isolated. If successful the plan is to expand the effort moving around the lake to reduce the dominance of Curly Leaf Pondweed and increase native plants.

Toxic algae blooms

Algae range from microscopic aquatic plants to large ocean kelp. They are everywhere, are a natural part of any aquatic environment, and are an important part of the food web..

Blue-green algae are also known as *cyanobacteria*, and are not a plant but a photosynthetic bacteria. They grow best with plentiful nutrients and warm temperatures, and blooms are known to occur on Cedar Lake. Blue-green algae are a concern beyond the unappealing slicks, mats and paint-like color, because they contain powerful natural poisons. Contact with water containing these toxins has resulted in rashes, respiratory problems, and gastroenteritis in humans. Dogs, livestock, and wildlife are also highly susceptible to the toxins.

It is not unusual to hear of animals getting sick or dying after drinking or swimming in water that contains blue-green algae.

Alum Treatment—is it safe and "long lasting"?

Alum (aluminum sulfate) is a nontoxic material commonly used to clarify drinking water. In lakes alum is used to reduce the amount of phosphorus in the water, or bind it in the sediment so it cannot be re-released.

Re-release from sediment is a large source of phosphorus in Cedar Lake. Typically phosphorus is bound to iron in lake sediments. However, when dissolved oxygen levels decrease in bottom waters, the iron bond weakens and large amounts of phosphorus trapped in the bottom sediments are released into the overlying water. Alum works to control the release since the aluminum will replace iron as the preferred bonding site, and the bond between aluminum and phosphorus (as phosphate) is insoluble.

Alum treatments have been shown to be non-toxic to aquatic organisms when completed at proper dosing rates.

Applications in deep lakes are effective and long lasting. They are not always as effective in shallow lakes like Cedar. This is hypothesized as due to wind re-suspension of the sediment after treatment with deeper sediment being moved around where eventually phosphorus from untreated deeper sediments can be released in to the overlying water. Recently this has been managed by splitting the treatment into two separate treatments years apart with the second treatment hitting the resorted sediment

Sequencing of management for Cedar is important. Curly Leaf Pondweed and carp need to be controlled, and watershed loads of phosphorus further reduced, before completing the alum treatment.

Implementation Plan

The Implementation Plan includes both short and long-term goals. In the short-term the goal is to reduce phosphorus loading by about 70%, with the long-term goal being an 85% reduction. There is also a goal to reduce the dominance of Curly Leaf Pondweed and restore native plants.

To accomplish these goals the Plan envisions that the initial work will focus on controlling Curly Leaf Pondweed and carp. Reducing phosphorus loads from watershed runoff will also be initially targeted since, the lower the watershed load, the better the in-lake controls will work.

These efforts will be accompanied by what is called "adaptive management" which basically means monitoring the response of the lake, learning and adapting accordingly. When sufficient progress is observed a decision will be made about completing the alum treatment. This cycle will then be repeated with a second alum treatment anticipated 5 to 10 years after the first treatment.

The estimated cost for the plan is $1,390,000 to $2,430,000. depending on how long it takes to control the Curly Leaf Pondweed, and whether two alum treatments are needed. Local sponsors anticipate applying for funding assistance from the State of Minnesota Clean Water Fund.

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HOW TO LEARN MORE

- **To read the Total Maximum Daily Load Study and the Implementation Plan visit the Scott County website" www.co.scott.mn.us Parks, Library & Environment tab, Watershed Management Organization, Sand Creek Impaired Waters Investigation**
- **About carp: http://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=4**
- **About Curly Leaf Pondweed: http://www.lakewashingtonassn.com/pdfs/curlyleaf.pdf**
- **About Toxic Algae: http://www.dnr.state.mn.us/volunteer/julaug10/algae.html**
- **About Alum Treatment: http://www.dnr.state.wi.us/org/water/fhp/papers/alum_brochure.pdf**

What residents can do

Lakeshore residents play an important role in cleaning up the lake. Phosphorus is more likely to reach the lake from lands that are close to the water. With that in mind how you manage your lawn and shoreline is very important. Most lawns in Minnesota already have an adequate amount of phosphorus to grow a healthy lawn. Remember these tips to keep the lake clean!

- Get a soil test before you apply fertilizer to your lawn to see if any extra nutrients are needed.
- It is illegal to apply fertilizers containing phosphorus to lawns in Minnesota, or to spread any fertilizer on hard surfaces. If you accidentally spill or spread fertilizer on a hard surface, clean it up immediately.
- To determine if there is phosphorus in fertilizer look for a string of three numbers, The middle number indicates the phosphorus content and should read "0".
- Having an area along your shoreline with perennial native plants helps slow and filter runoff, stabilizes the shoreline, provides habitat, enhances aesthetics, increases property value, and discourages geese from congregating.
- Technical and financial assistance is available from the Scott Soil and Water Conservation District for shoreline improvements (see left column for contact information).

Scott Soil and Water Conservation District

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