

Project has big impact on Moody Lake health

A Comfort Lake-Forest Lake Watershed District project reduces pollution to Moody Lake by 60 percent.

CHISAGO LAKE TOWNSHIP – When the Comfort Lake-Forest Lake Watershed District (CLFLWD) worked with one farmer, to restore one wetland, that fed one small fishing lake, the result was a sixty percent reduction in phosphorous loading to Moody Lake within six months. (Excess phosphorous is the number one source of pollution to freshwater lakes and results in increased algae growth.)

The wetland restoration began by scooping out decades worth of accumulated sediment from cattle manure and farm runoff and reestablishing native wetland plants. With this one project, the CLFLWD eliminated the primary source of pollution entering Moody Lake and provided benefit to other lakes and rivers downstream that eventually flow into the St. Croix National Scenic Riverway.

Fourth-generation farmer Craig Mattson, 67, now raises 30 head of registered black Angus and about 400 acres of corn, beans and hay about a half-mile north of Moody Lake. At its peak, Mattson's dairy operation included 175 head of milk cows, steers and calves.

He sold the dairy herd in 2000, however the decades of accumulated manure and other farm runoff remained in the wetland sediment downhill from the farmyard, and continued to release phosphorous downstream with every rainfall and snowmelt.

"The way my dad poured cement around here, he poured a lot of cement to make things easier, handier and more efficient. When it rained, I didn't have to wash the cement off because (the manure) went right down to the swamp," Mattson said.

Years later, with its postcard-perfect red barn and neat white fences, the farmyard and cattail-filled water; the wetland showed no overt signs of pollution, however was actually discharging a high level of phosphorous to Moody Lake. Moody was then discharging phosphorous to nearby Bone Lake. Both lakes

are within the CLFLWD hydrologic boundary and eventually drain to Little and Big Comfort Lakes. Moody and both Comfort lakes are in Chisago County, and Bone Lake is in Washington County.

Moody Lake was first identified as a potential major source of phosphorous loading to the Bone Lake subwatershed in the CLFLWD comprehensive plan. Further intensive diagnostic work within the Moody Lake subwatershed confirmed and quantified the pollutant load and targeted the major source points.

Two main drainage areas feed Moody Lake with initial tests showing a much higher nutrient load coming from the west. Strategic monitoring over 18 months narrowed and then confirmed the primary source as the 'Mattson slough.'

"We did have a lot of cattle here. They told me there was too much phosphorus and I was polluting too much," Mattson said, referring to conversations with watershed district staff. "It was better for Bone Lake, it was better for Moody Lake, it was better for Comfort Lake. And my son-in-law is kind of an outdoors person, a hunter."

Samples taken from the wetland's upper layers showed the phosphorus was two to 10 times more concentrated than it would be under typical wetland conditions.

The Minnesota Pollution Control Agency listed Moody Lake as impaired for nutrients in 2010.

"I just couldn't believe it. The way it sounded, it was just me. I thought it was maybe from lawn services, from north of me coming this way," Mattson said. "But they said a majority was in my swamp."

So he agreed to allow the watershed district's excavation and restoration project.

The work was part of a \$537,375 wetland rehabilitation meant to cut phosphorus-loading in Moody Lake by 445 pounds a year.

A \$429,300 Clean Water Fund grant from the Minnesota Board of Water and Soil Resources and a \$78,000 MPCA grant helped cover the cost. The watershed district provided a \$107,320 match.

In October, tests confirmed the Mattson wetland excavation single handedly achieved a 60 percent reduction in nutrient loading to Moody Lake. The district's goal was an 80 percent reduction resulting from projects at two sites.

"We could literally have done hundreds of practices and never gotten to the solution," said Mike Kinney, Comfort Lake-Forest Lake Watershed District administrator.

The detailed diagnostic monitoring made it possible to focus within the Moody Lake drainage area.

Before it committed to cleaning up Moody Lake, the watershed district identified the major sources of pollution and then determined not only whether clean-up was possible but also whether it was worth the cost.

"There was always the potential, even if it was not always a clear-water state, that we could introduce the right kind of science and the practices and in-lake treatment to get it there," Kinney said.

The watershed district has always sought sustainable solutions and emphasizes adaptive management principals, supported by sound scientific technologies and methods, and to develop fiscally responsible and integrated approaches to water management.

The CLFLWD years of diagnostic and scientific research has concluded that major shifts in lake, stream, and river health within the District are primarily from man-made changes to land use. As a result, the District set long term goals of pre-development conditions for all water bodies within the District to clean-up the existing damage, and by introducing and installing best management practices, prevent future damage from occurring.

To establish predevelopment conditions, the District contracted with the St. Croix Watershed Research Station in February 2016 for a deep core analysis of three lakes, including Moody at the very top of the District's hydrology boundary. A 6 foot sediment core sample was taken from a deep point in Moody Lake and reveals Moody Lake's trophic history – and the sediment changes in the lake over time. The District analysis was limited to nutrient loading changes and lake ecology changes as measured by the type and amount of algae present since the 1840s.

“It provides us with some understanding as to whether the system was always highly impaired, or if it operated under an environment that was capable of being at a clear-water state,” Kinney said.

Moody Lake was likely more clear before European settlement. While algae levels moved from moderate to high after the 1960s, the rate at which sediment and nutrients entered the lake and settled to the bottom has dropped to 1800s levels. Better agricultural practices, less feedlot runoff and other nutrient reductions within the drainage area have resulted in less pollution to Moody Lake.

“We're aiming at a goal, and the goal is the state standard. But the question simply remains: Is it a realistic goal? Or are we aiming for something that we couldn't possibly achieve? So that kind of analysis gives you a high level of confidence that all right, yes, we're on a path where we can use the public's trusted Clean Water Fund money and make improvements that will be lasting,” Kinney said.

The District's long term goal for Moody Lake is 5 feet of clarity and 40µg/L of phosphorus. Moody had measured at 167µg/L when it was placed on the impaired waters list in 2010.

Monitoring will continue at culverts by the Mattson wetland and points closer to the lake. Meanwhile, the small alum treatments planned for the open-water wetlands will bind the remaining phosphorus to the wetland bottom.

This winter, improvements are planned at the next wetland downstream, owned by Mattson's son-in-law, Mark Zaruba.

The District is considering a weir that would raise water levels 6 to 12 inches, allowing more sediment to filter out. Later, an in-lake alum treatment is planned. The in-lake alum treatment would bind with the phosphorus in the lake bottom, making it inert and thereby preventing future release and source of future algae blooms.

Zaruba, 54, a banker at First State Bank of Wyoming and Mattson's son-in-law, has been farming with Mattson for more than a dozen years, and has purchased two parcels of land from him.

“I guess it's good that we can contribute to the improvement of the whole watershed with our property,” Zaruba said.

During a late-October visit to Mattson's farm, Canada geese swam on open water once filled with cattails. A pile of excavated sediment was visible beyond the fence. Mattson said he was generally happy with the way things turned out.

"It's nice to see the geese and ducks come in. If it helps out, I'm glad for it, I guess," Mattson said. "I don't want to leave my life and say, 'Oh Craig did this wrong,' and, 'Craig should have done that.' I want to leave on a happy note."

More information on this project including photographs and video can be found online at:
http://www.clflwd.org/Moody_Lake_Wetland_Rehabilitation_Project.php

The Comfort Lake-Forest Lake Watershed District's mission is to protect and improve its water resources through adaptive management approaches and education of local stakeholders. The District encompasses about 49 square miles in northern Washington County and southern Chisago County. Website: www.clflwd.org.

Engineering, Scientific, and Technical support to CLFLWD is provided by EOR, Emmons & Olivier Resources, Inc., Oakdale, MN.

The Minnesota Board of Water and Soil Resources' mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. Website: www.bwsr.state.mn.us .

ABOUT MOODY LAKE: Moody Lake was added to the impaired waters list in 2010. The 45-acre lake lies within the 49-square-mile Comfort Lake-Forest Lake Watershed District. Its drainage area encompasses 2,315 acres. "It is a major drainage into Bone Lake, which is also impaired," Kinney said.

STAND-ALONE QUOTE:

"There was a very high amount of organic matter in the upper several feet of these wetlands, 2,3,4 feet, and they were particularly high in phosphorus concentration – at least four times higher than you would see under anything close to natural conditions." – Mike Kinney