

## Cleaning up Serpent Lake



Serpent Lake hasn't been this clear since 1991.

That's the last time anyone could see 18 feet into the Crow Wing County Lake, which is central to a growing tourism economy, home to about 275 lakeshore residents, and next door to Cuyuna Country State Recreation Area.

"The initial data is encouraging," said Arlen Bowen of the Serpent Lake Association, who since 2004 has collected Secchi disk readings three times a month, June through September, from the same spot on Serpent Lake.

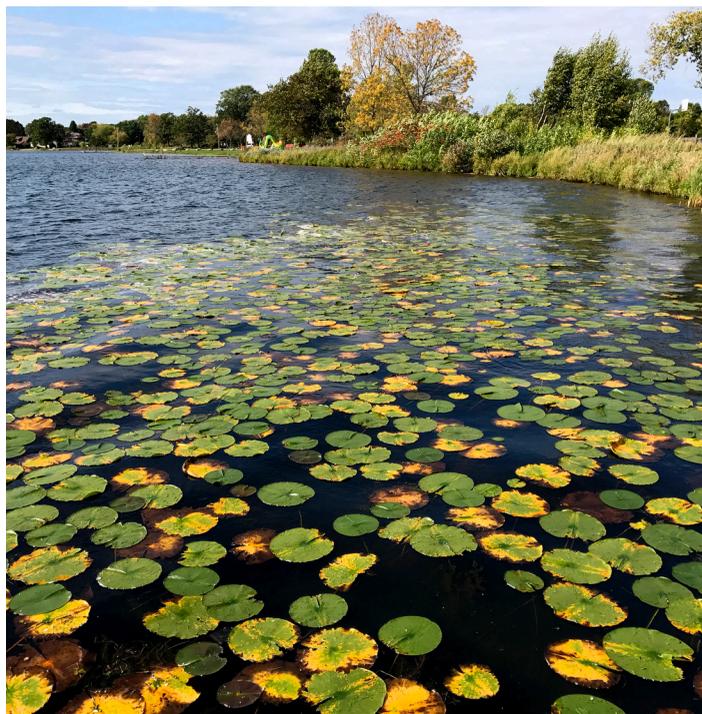
Clarity averaged 18.3 feet for the 2017 season – the fourth consecutive year it's beaten the longtime trend toward murky waters.

A former statistician, Bowen was cautious about jumping to conclusions based on four years' data.

"Maybe we did something," Bowen said.

The Minnesota Board of Water and Soil Resources in 2014 awarded the Crow Wing Soil & Water Conservation District a \$1.2 million targeted watershed grant for projects to reverse the trend in declining water quality and to preserve the regional resource.

With two phosphorus-reduction projects complete, a third scheduled for fall construction, and newly adopted ordinances in place, lake association members expect continued improvements in water quality.



*Serpent Lake will benefit from a \$1.2 million targeted watershed program grant.*

Bowen and fellow SLA member Clark Marshall sat down in mid-September to talk about how the lake got to this point.

Marshall grew up on Serpent Lake in the 1950s when iron ore mining defined Crosby's economy, only 30 percent of the lakeshore was developed, and "watersports" meant fishing and swimming.

"Back in those days, you fished out of rowboats," said Marshall, 72, a retired information systems project manager who returned to Crosby in 2006. "You could be fishing in 30 feet of water and see the bottom."

Today, tourism drives much of Crosby's economy. Nearly 100 percent of the lakeshore is developed. Watersports on Serpent Lake means everything from motorized fishing boats to stand-up paddleboards. Phosphorus made itself known in 2003, when an algae bloom turned the lake green. Water clarity dropped to 15 feet. It would get worse – dropping to 12.1 feet in 2012.



*Crow Wing Soil & Water Conservation District Manager Melissa Barrick visited the site of a stormwater treatment project in Crosby on Sept. 18 with Serpent Lake Association members Clark Marshall, left, and Arlen Bowen.*

“This 2003 event was a shock to the lake(shore) owners. That’s not what people living on the lake had expected,” said Bowen, 74, a retired electrical engineer who moved to Serpent Lake in 2000.

The Serpent Lake Association had been monitoring, off and on, since 1971.

“We thought it was a nice, clear beautiful lake,” Bowen said. “That fall, I experienced my first algae bloom. It was a doozy. It covered 80 percent of the north shore.”

Serpent Lake Association members mobilized. Bowen led intensified monitoring efforts, adding upstream test sites. The SLA promoted shoreline buffers, rain gardens and non-phosphorus fertilizers. When tests of 143 septic systems showed 30 were failing, owners replaced all 30.

With a Minnesota Pollution Control Agency grant, the SLA and Crow Wing SWCD identified the main sources of phosphorus – untreated stormwater runoff sites in Crosby and Deerwood; and water flowing in from Cranberry Lake, which had served as Deerwood’s 1970s sewage discharge pond.

“This lake is still meeting water quality goals, but we know that runoff is causing more algae. The effort was to stop the runoff before it becomes a bigger

problem,” said Melissa Barrick, Crow Wing SWCD manager.

The headwaters of the Cuyuna Lakes Area, Serpent Lake lies within the Upper Mississippi River Basin. Through Serpent Creek, it feeds into Cuyuna Country State Recreation Area – a nationally recognized single-track mountain bike destination that draws about 177,650 annual visitors. In Cuyuna, a city park provides public lake access.

“It’s definitely an economic driver for these communities. Even for Crow Wing County, this region is becoming more and more popular for recreational opportunities,” Barrick said during a Crosby site visit.

Waves ruffled lily pads along the shore, where corrugated plastic pipes and a black plastic drum awaited installation. Lengths of concrete pipe stretched up the hill to Second Street Southeast, the replacements for a 1928 system that sent 14 acres of untreated Crosby stormwater directly into the lake.

The grant provided \$200,000 for the Crosby project, which was projected to cut the lake’s total yearly phosphorus load by nearly 12 percent. It’s projected to finish under budget.

“This was the project that we had No. 1 on our list as a priority,” said Crosby Clerk/Treasurer Lisa Sova. “We’re a small town. We don’t have a large tax base.”

Crosby, population 2,386, contributed \$50,000.

“It solves an issue for the city,” Sova said. “It’s something we’ve had on our radar as something we’ve been working to resolve. By partnering with Crow Wing (SWCD), and through the grant we have the funds available to address that issue now.”

The new system will filter runoff through sediment traps and rain gardens outside City Hall.

“Cumulatively what we’ve figured out so far, not including the Crosby project, we have reduced 16 tons of potential algae growth in the lake – or 67 pounds of phosphorus,” Barrick said.

Together, the Crosby, Deerwood and Cranberry Lake projects were projected to cut annual phosphorus loading by more than 40 percent, bringing levels within acceptable limits.

Cranberry Lake responded almost immediately to a grant-funded, \$90,000 alum treatment, which bound phosphorus to the lake bottom and prevented more than 40 pounds of phosphorus a year from flowing into Serpent Lake. Cranberry Lake's phosphorus levels decreased from 90 micrograms per liter before the 2016 treatment to 30 mg/l after.

Deerwood's \$500,000 stormwater treatment project was completed in 2016.

Marshall was most enthusiastic about the ordinances. In Crosby, it represents how far the SLA, SWCD and city have come in building partnerships. Initially, even small projects such as establishing a rain garden in Crosby were met with stiff opposition.

Crosby and Deerwood adopted ordinances that require new development to include stormwater runoff plans. Irondale Township is in the process. With \$90,000 in grant funds, the SWCD hired a consultant to meet with elected officials, draft ordinances and organize public meetings. That project came in under budget.

"There's a future view to what's going on here with this ordinance, which says we don't want to create any more runoff now that we're going to get our 50 pounds of phosphorus out" Marshall said. "We don't want to start having more problems."