Clean Water Report for 2011

Annual Summary of Water Quality Monitoring Program

Shell Rock River Watershed District

What's inside:

- Water clarity in Pickerel Lake best on record
- Fountain Lake benefits from upstream improvements
- Water quality in Shell Rock River affected by Albert Lea Lake

Shell Rock River Watershed District
Working Together to Improve Water Quality

March 2012

Making a Difference: **Clean Water Initiatives**

Water quality initiatives paid off for Pickerel Lake in 2011. Clean, clear water is fueling an abundance of plant life in the lake.

Restoration efforts a major success for Pickerel Lake

Pickerel Lake, once pea-green, is now crystal clear, thanks to two successful clean water initiatives undertaken by the Shell Rock River Watershed District (the District) and the Minnesota Department of Natural Resources (DNR).

According to water quality monitoring data for 2011, Pickerel Lake—listed as an impaired waterbody by the Minnesota Pollution Control Agency—now boasts the best water clarity on record. And the difference is plain to see: what used to be green with algae is now clear enough for area residents to see all the way to the bottom.

Along with improved water clarity, the lake also boasts a thriving population of beneficial aquatic vegetation, growing numbers of desirable fish, and a host of native wildlife.

Pickerel Lake's turnaround is due primarily to two projects. The first, in 2008, was the construction of a fish barrier on Mud Lake, northwest of Pickerel Lake off of Freeborn County Road 46. The goal is to keep invasive species such as carp out of the lakes, as they adversely affect water quality and vegetation, damaging habitats in the area and contributing to algae blooms by stirring up sediments at the bottom of the lake.

The second initiative, in 2009, was the restoration of Pickerel Lake. Officials treated the lake and ditches in the system with an application of the chemical Rotenone to eliminate rough fish. In the spring of 2010, the DNR stocked the lake with thousands of desirable fish—northern fry, adult bluegills, and adult yellow perch—from neighboring lakes. Populations of game fish help maintain a healthy clear water state through the effect they have on the aquatic food chain.

As water clarity has improved, aquatic plants have also begun to thrive—a sign of a healthy shallow-lake ecosystem. Since the 2009 treatment, the DNR has identified 10 plant species that sprouted up once sunlight was able to reach them at the bottom. And wildlife that haven't commonly been seen near the lake for years—ducks, muskrats, shorebirds—have also returned.

Alan Bakken, from the District Board of Managers, stocking perch from neighboring lakes.

Pickerel Lake is more inviting to people, too. With clean and clear water, recreational opportunities such as canoeing, kayaking, fishing, and hunting abound.

As downstream waters such as Fountain Lake get a boost from Pickerel's success, District staff hope to see water quality improvements flow throughout the watershed.

Managing curly-leaf pondweed

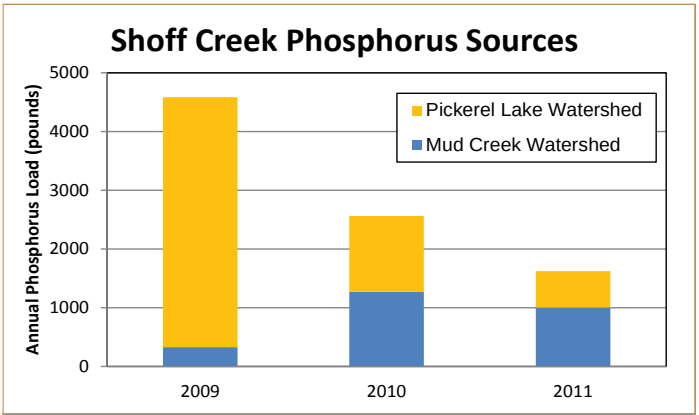
Although Pickerel Lake is greatly improved, the District is keeping an eye on curly-leaf pondweed (CLP), an invasive plant species that degrades water quality. Once established, CLP is virtually impossible to eliminate, but a diverse and healthy population of native plants makes it less likely that CLP will dominate Pickerel Lake. Small amounts of CLP will not seriously degrade Pickerel Lake's water quality. In the spring of 2011 the District identified areas of Pickerel Lake where CLP was most dense, and treated those areas with herbicide. The District will continue to assess the effectiveness of the treatment and ensure that CLP does not expand its presence in the lake.

Success in Pickerel Lake bodes well for downstream chain of lakes

The District placed a high priority on completing the improvements to Pickerel Lake in hopes that success would flow downstream, boosting water quality in Fountain and Albert Lea lakes.

When lakes are connected by creeks and channels—as many are in the Shell Rock River watershed—water quality upstream naturally affects the lakes downstream. Problems in Pickerel Lake, which feeds into the chain of lakes, negatively affected Fountain Lake for years. Shoff Creek carried large amounts of phosphorus and algae from Pickerel and Mud lakes to Fountain Lake.

Before the Pickerel Lake restoration project, Shoff Creek contributed more phosphorus to Fountain Lake than the neighboring Wedge Creek, even though its watershed is half the size of Wedge Creek's. Two years after the restoration project, the annual phosphorus load carried by Shoff Creek to Fountain Lake has declined by more than 60%.



Above: A three-year comparison shows how a healthy Pickerel Lake benefits Fountain Lake. Bars on the graph represent the pounds of phosphorus that flowed past the Shoff Creek monitoring station. The blue portions represent the amount that came from the watershed upstream of Mud Lake, while the yellow portions represent the phosphorus load that came from Pickerel Lake and Mud Lake.

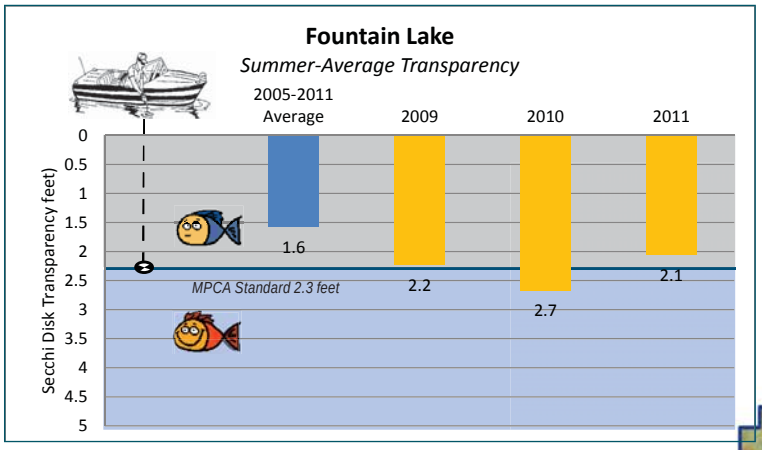
District's Chain of Lakes

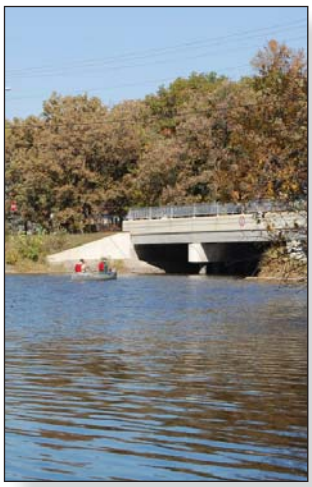
White Lake restoration planned

On the heels of success in Pickerel Lake, the District is pursuing plans to rehabilitate White Lake. Similar to Pickerel Lake of three years ago, White Lake has poor water quality resulting from carp continuously stirring up the sediment. To remedy this, an electric fish barrier was installed between White Lake and Fountain Lake in 2009, and the DNR is prepared to conduct a fish kill on White Lake and then restock it with gamefish. Based on the Pickerel Lake recovery, White Lake should experience a rapid return of native aquatic plant species. Residents can look forward to seeing more wildlife as waterfowl and aquatic animals return to feed on the new plants.

School Section, Halls, and Goose lakes considered for additional projects

Rehabilitation projects are also under consideration for School Section Lake, Halls Lake, and Goose Lake. A fish barrier installed on Wedge Creek in 2009 already keeps Fountain Lake carp from entering School Section and Halls lakes. The District conducted water quality monitoring on School Section and Halls lakes in 2011 to assess the need for further action. Although Goose Lake is inaccessible for sampling, District staff have measured poor water quality in downstream Goose Creek for several years. A fish barrier has yet to be installed on Goose Creek, and carp are often observed swimming back and forth between Goose Lake and Fountain Lake.

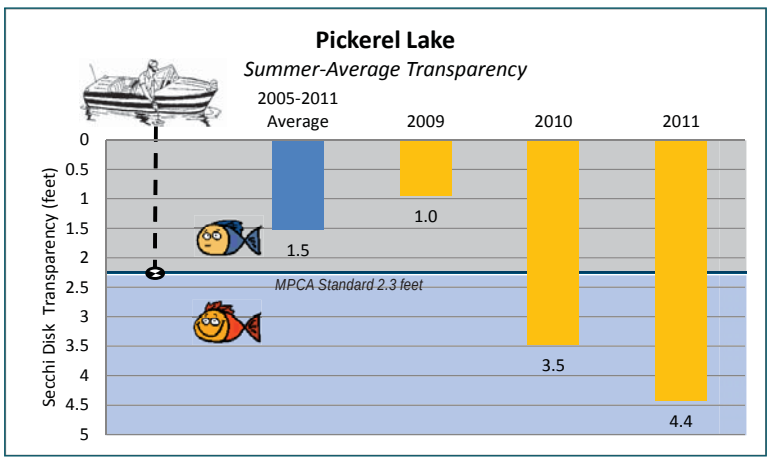




Fountain Lake

Water clarity levels get a boost from upstream improvements

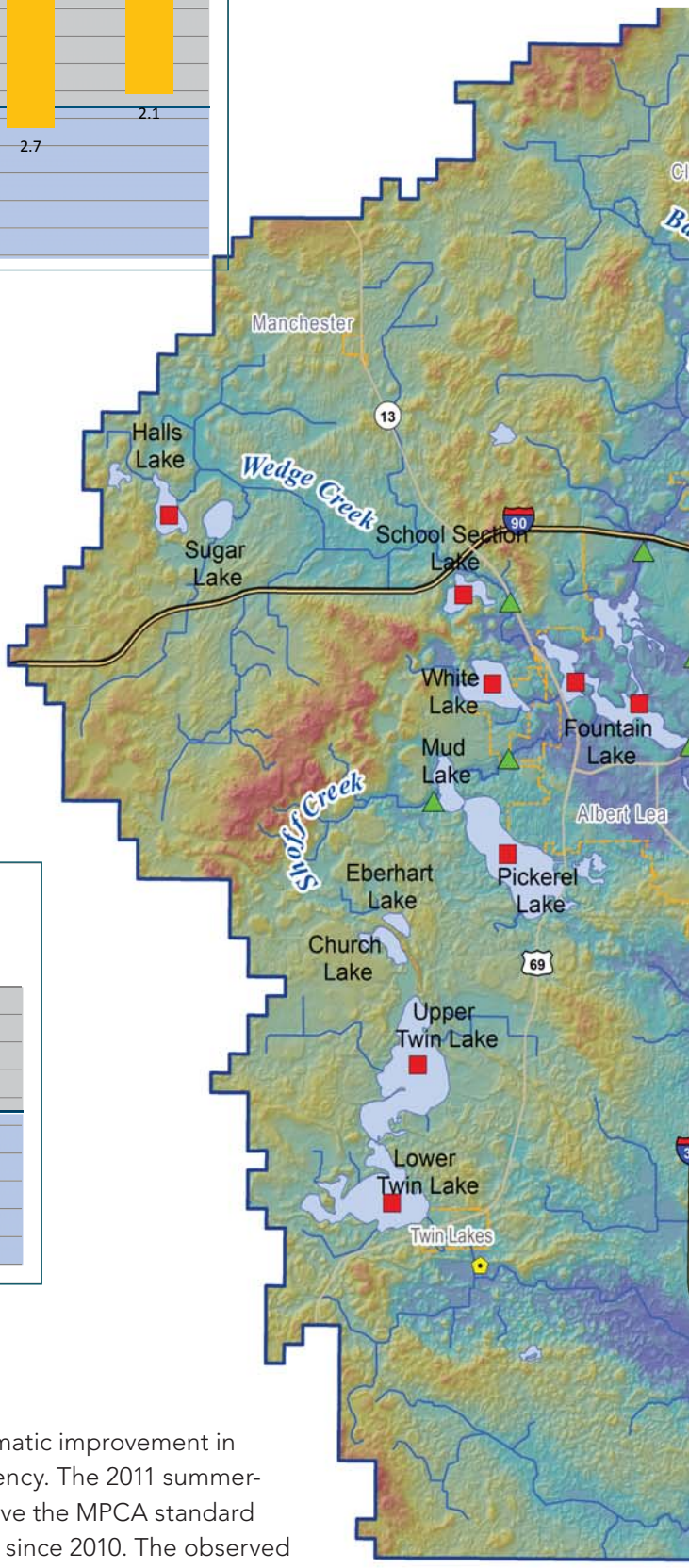
The summer-average water clarity in Fountain Lake in 2011 was 2.1 feet, which is close to the MPCA's standard. Clarity in 2011 was slightly worse than in 2010, but better than the long-term average. The District intends to maintain Fountain Lake's long-term improvement through ongoing watershed management activities.



Pickerel Lake

Best water clarity on record

Pickerel Lake continues to show dramatic improvement in observed summer-average transparency. The 2011 summer-average clarity was 4.4 feet, well above the MPCA standard and an improvement of nearly a foot since 2010. The observed improvement can likely be attributed to the success of the Pickerel Lake restoration project (details on page 1).

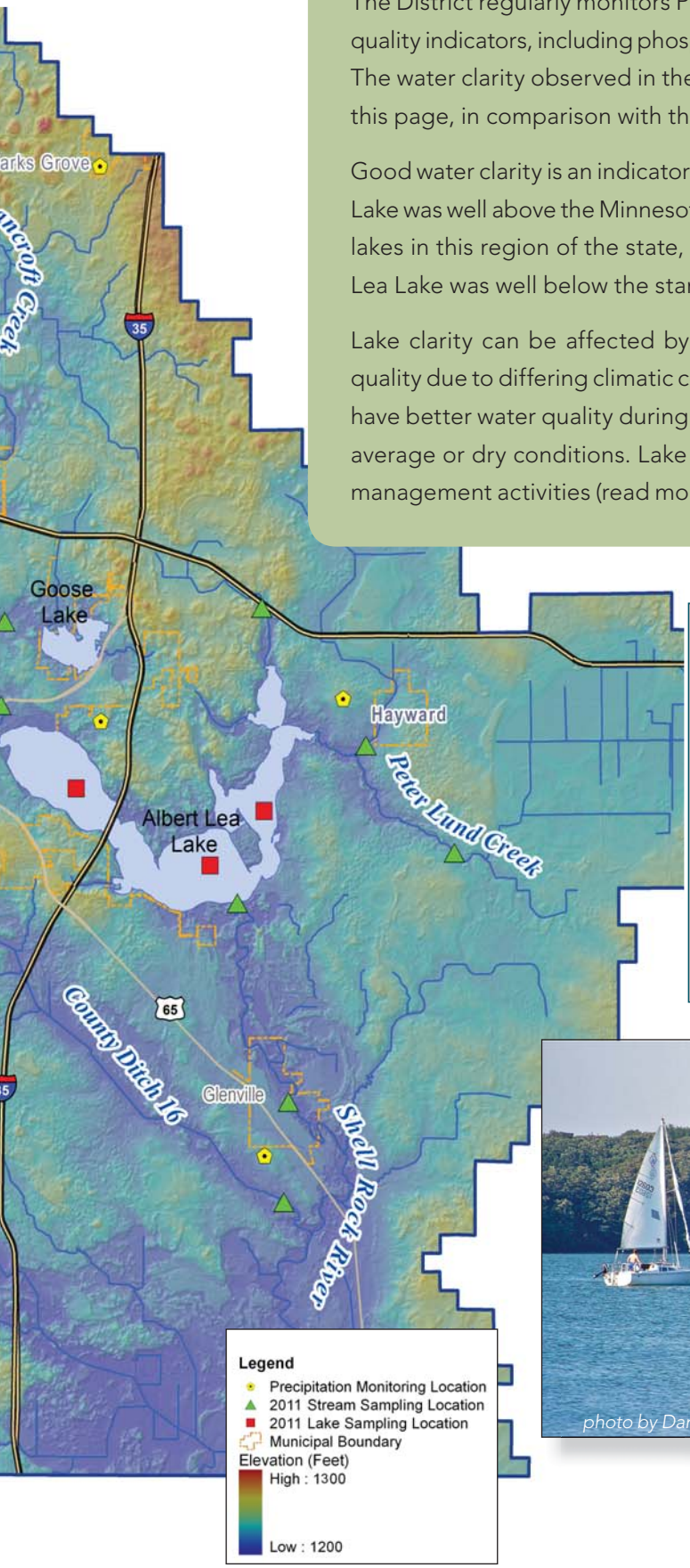


At a glance: 2011 lake water quality

The District regularly monitors Pickerel, Fountain, and Albert Lea lakes for several water quality indicators, including phosphorus, chlorophyll-a, and water transparency (or clarity). The water clarity observed in these three lakes in the summer of 2011 is summarized on this page, in comparison with the observations from recent years.

Good water clarity is an indicator of low levels of algae in the lake. Water clarity in Pickerel Lake was well above the Minnesota Pollution Control Agency (MPCA) standard for shallow lakes in this region of the state, while Fountain Lake was near the standard and Albert Lea Lake was well below the standard.

Lake clarity can be affected by many things; there is natural variability in lake water quality due to differing climatic conditions and rainfall patterns. For example, some lakes have better water quality during years with a lot of rainfall, while others do better under average or dry conditions. Lake water quality is also influenced by watershed and lake management activities (read more about the District's clean water initiatives on page 1).



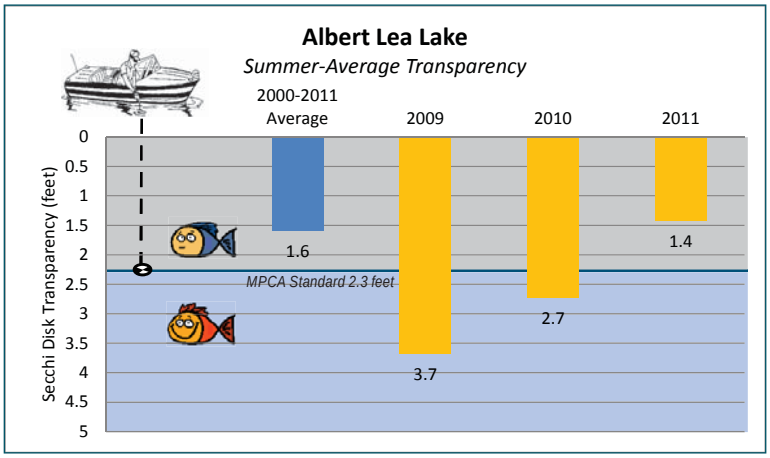


photo by Dan Borland

Albert Lea Lake

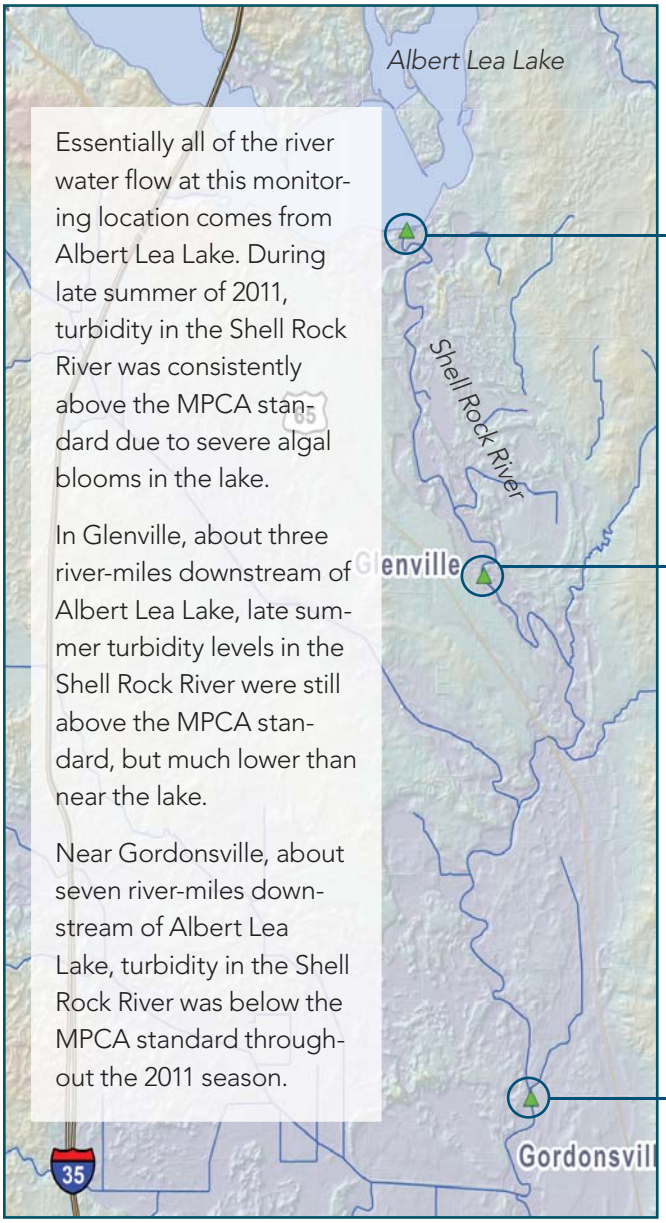
Dry summer fuels algae growth

The summer-average water clarity in Albert Lea Lake in 2011 was 1.4 feet—below the long-term average and well below the two previous years. Water clarity in Albert Lea Lake was good during the early part of summer but declined rapidly due to heavy growth of algae during the abnormally hot and dry August and September.

A look at the Shell Rock River

The District monitors turbidity—a measure of how cloudy water is—in several places throughout the watershed, including the Shell Rock River. Typical causes of high turbidity include algae (most common in lakes) and suspension of sediment. Not only is turbid water unpleasant to look at, it's also detrimental to many forms of aquatic life. To protect aquatic life, The Minnesota Pollution Control Agency has established a turbidity standard of 25 nephelometric turbidity units (NTU) for this region of the state.

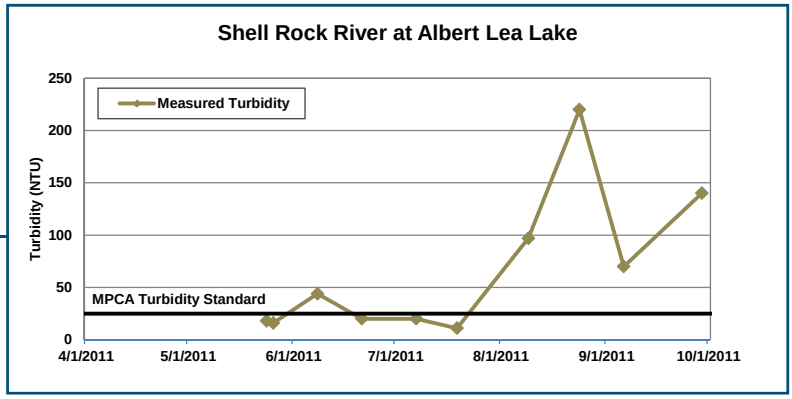
The graphs below show the turbidity of the Shell Rock River throughout the 2011 monitoring season at three monitoring locations downstream of Albert Lea Lake. As can be seen, turbidity in the upper portion of the Shell Rock River was highly influenced by the late-summer algal blooms in Albert Lea Lake. Clarity improved farther downstream as less-turbid tributaries contributed flow to the river.

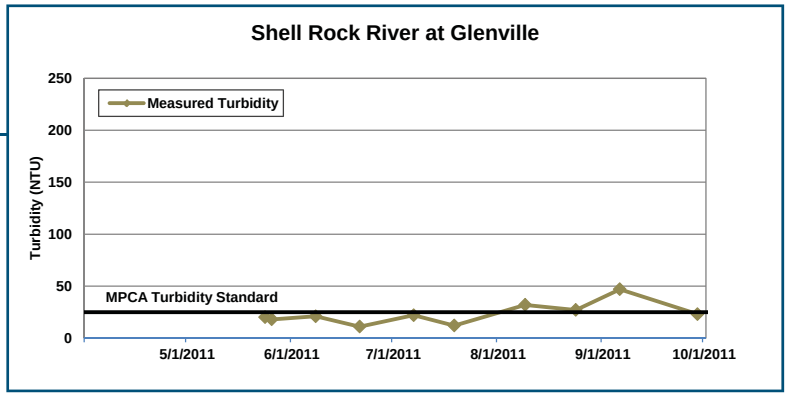


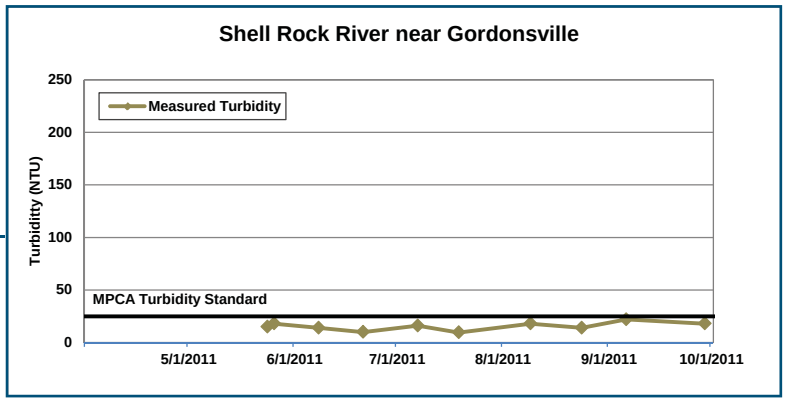
Essentially all of the river water flow at this monitoring location comes from Albert Lea Lake. During late summer of 2011, turbidity in the Shell Rock River was consistently above the MPCA standard due to severe algal blooms in the lake.

In Glenville, about three river-miles downstream of Albert Lea Lake, late summer turbidity levels in the Shell Rock River were still above the MPCA standard, but much lower than near the lake.

Near Gordonsville, about seven river-miles downstream of Albert Lea Lake, turbidity in the Shell Rock River was below the MPCA standard throughout the 2011 season.







How is water quality measured?

From May to October, District personnel collect lake water samples. The samples are analyzed for multiple water quality indicators, including water clarity, total phosphorus, and chlorophyll-a. The District also monitors streams, creeks, and ditches, many of which flow into area lakes, transporting pollutants from the upstream watershed.

Water clarity

To most people, clear water means clean water. One method of measuring clarity is by Secchi disk transparency. A Secchi disk is a black and white disk that is lowered into the water until it disappears from view. The depth at which the disk is no longer visible is measured numerous times each season.

Phosphorus

Samples of water are analyzed for phosphorus, the plant nutrient that most often stimulates the growth of algae. A lake that is rich in phosphorus has the potential for abundant algal growth, which can reduce water clarity.

Chlorophyll-a

District personnel also monitor levels of chlorophyll-a, the main photosynthetic pigment in algae. Too much chlorophyll-a indicates an abundance of algae in the lake.

Precipitation data

The District has installed four tipping-bucket rain gages throughout the watershed. These gages measure rainfall amounts and help the District track the variability of precipitation and identify links to water quality.

Stream flow and water quality

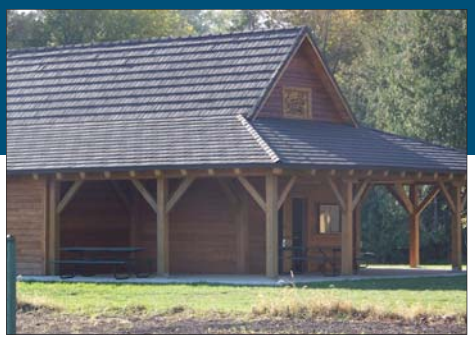
The District monitors stream flows at 18 locations using automated gaging equipment. The flow data is used to determine the amount of runoff that is conveyed to downstream water bodies. The District also collects water quality samples from its streams to assess the pollutant levels of the streams and estimate the amount of pollution being carried to downstream water bodies.

Prioritizing clean water initiatives

The District uses monitoring data to identify the areas of greatest concern—and prioritize clean water initiatives to maximize the benefit to the entire watershed. High-priority efforts in the last 10 years have included:

- 2004-2007: Implementing best management practices such as filter strips, waterways, and basins, in the agricultural community.
- 2005-2010: Constructing rain gardens in partnership with local schools and government to treat stormwater and educate the public about water pollution.
- 2007-2009: Constructing a stormwater pond and treatment wetland in the South Industrial Park area of Albert Lea to provide flood control and water quality treatment.
- 2007-2011: Implementing a pollution-prevention program, which requires septic system compliance inspections.
- 2008-2009: Assisting with an intensive cleanup of a 30-acre landfill site along the shoreline of Fountain Lake.
- 2008-2010: Overseeing the restoration of Pickerel Lake (including the fish barrier installation and rough fish management).
- 2011-1012: Developing a Total Maximum Daily Load (TMDL) implementation plan to prioritize lake management activities throughout the watershed to improve water quality and ecosystem health.

Spotlight on Fountain Lake



Above: the Brookside Boathouse and Experiential Learning Center along the shore of Fountain Lake. The boathouse serves as a trail-head for the shared user path around the lake, and is home to a variety of education programs. A hub for recreation and community gatherings, it houses canoes, kayaks, and stand-up paddleboards, and hosts small-group events.

Funding request for Fountain Lake dredging presented to legislators

In October of 2011, members of the Minnesota House bonding committee visited Albert Lea to learn about the $7.5 million request to dredge Fountain Lake.

The House Capital Investment Committee considered this and other requests while on a tour across southern Minnesota. During their visit, the state representatives met community leaders, including city and county representatives and District officials, at Edgewater Pavilion.

The City of Albert Lea and the District requested state funding for the dredging in hopes of removing one million cubic yards of sediment and pollutants, such as phosphorus, which are conveyed to the lake through streams, ditches, and storm sewer pipes. Historically, large deposits of sediment and phosphorus in the lake have hampered water quality. Over the past 10 years, the summer-average water clarity in Fountain Lake has been only 1.5 feet—well below the Minnesota Pollution Control Agency's standard.

In late-February of 2012, the House Energy, Environment and Natural Resources Committee heard a presentation on why $7.5 million ought to be included in the state bonding bill for the dredging. In March, the committee will produce a score for the project, which will go to the bonding bill committee and, ultimately, Governor Mark Dayton.

Above: District Director of Field Operations Andy Henschel presents details of the dredging project to visiting legislators in October.

About the Shell Rock River Watershed District

The mission of the Shell Rock River Watershed District is to implement reasonable and necessary improvements to the water-related and other natural resources of the District.

Board of Managers

Gary Pestorious, Chair
Bruce Haugsdal, Vice Chair
Clayton Petersen, Treasurer
Art Ludtke, Secretary
Alan Bakken
Dan DeBoer
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Staff

Brett Behnke, Administrator
Andy Henschel, Director of Field Operations
Connie Kaupa, Office Manager
Carmen Christensen, Financial Clerk and Recording Secretary
Jerad Stricker, Conservation Technician

For more information:
www.shellrock.org

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Cities and towns in the District:

- Albert Lea
- Hayward
- Glenville
- Twin Lakes
- Manchester
- Clarks Grove (partial)

Lakes in the District:

- Pickerel and Mud
- White (Chapeau)
- Fountain
- Albert Lea
- Goose
- School Section
- Upper and Lower Twin
- Halls
- Sugar
- Church
- Eberhart

Prepared for the Shell Rock River Watershed District by Barr Engineering Company • March 2012

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