Shell Rock River Watershed District

2009 Water Quality Monitoring Program Summary

March 2010

Fast Facts about SRRWD

- Formed in 2003 at the request of local citizens
- All water within the district drains to a common point – the Shell Rock River. The Shell Rock River flows into the Cedar River in Iowa, then the Iowa River, and finally the Mississippi River.

Cities and towns in the district:

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

Lakes in the district:

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

2009 water quality monitoring program:

- 18 stream sites
- Nine lake sites
- Two city stormwater sites

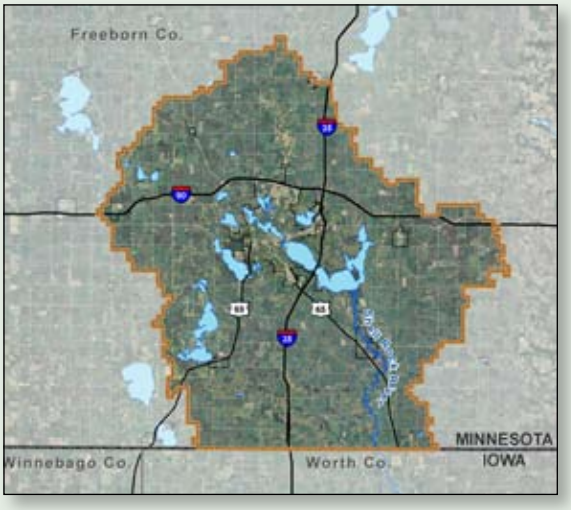
Shell Rock River Watershed District
Working Together to Improve Water Quality

What's Inside: 2009 Results of Water Quality Monitoring for Streams and Lakes

This report summarizes the results of water quality monitoring for the Shell Rock River Watershed District in 2009. On the following pages, you'll learn which lakes and streams were monitored, and how scientists assessed the quality of water in those areas.

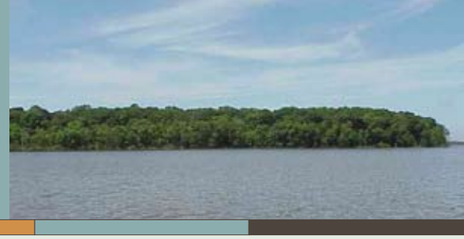
About the Shell Rock River Watershed District

The mission of the Shell Rock River Watershed District (SRRWD) is to implement reasonable and necessary improvements to the water-related and other natural resources of the district. The Board of Managers oversees many efforts to conserve, protect and manage water resources within the watershed. The SRRWD works closely with the City of Albert Lea, Freeborn County, Farm Service Agency, state agencies, and active citizen volunteers to improve water quality.



The Shell Rock River Watershed is located in southern Minnesota along the Iowa border. All water within the watershed eventually drains to the Mississippi River.

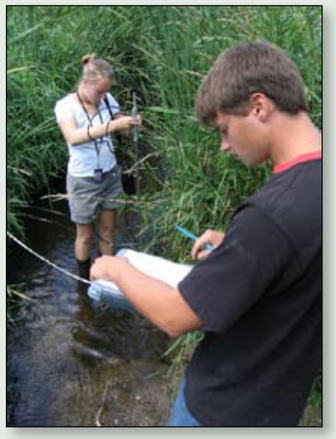
History of the Shell Rock River Watershed District Monitoring Program



1960-1980

A series of studies were completed related to the water quality of Albert Lea and Fountain lakes and their corresponding watersheds. The studies, driven by the City of Albert Lea, Freeborn County, and concerned citizens, involved monitoring the lakes and tributaries and addressed the following:

- Sources of bacterial and chemical pollution to the lakes
- Sediment and nutrient loading and historic sedimentation
- Recommendations for watershed practices to improve water quality
- Feasibility of different phosphorus-removal techniques



2002-2003

Freeborn County began a stream monitoring program in 2002. In 2003, the program was expanded to include several area lakes (Pickerel, Fountain, Albert Lea).

2006

Stream monitoring program expanded to include bacterial analysis (fecal coliform). Lake monitoring continued.

2007

The SRRWD added a volunteer monitoring program to its routine annual monitoring. Volunteer monitoring was conducted at Albert Lea, Fountain, and Pickerel lakes (in addition to the SRRWD's routine monitoring), as well as White (Chapeau) Lake, and Upper and Lower Twin Lakes. Stream monitoring continued.

1960 1970 1980 1990 2000 SRRWD formed (June 2003) 2009 *(not to scale)*

Mid-1980s through 1990s

Albert Lea and Fountain lakes periodically sampled by local citizen volunteers through an MPCA volunteer monitoring program.

2004

SRRWD assumed water quality monitoring from Freeborn County.

1992-1993

Assessments of Albert Lea and Fountain lakes were completed by the MPCA in partnership with Freeborn County and the Albert Lea Technical College. The studies assessed the condition of Albert Lea Lake nine years after upgrades to the city's wastewater treatment plant and established baseline conditions for upstream Fountain Lake.

2005

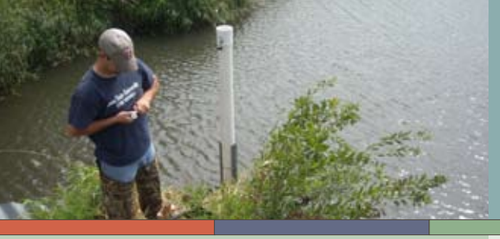
SRRWD expanded the stream monitoring program to include flow measurements and additional water quality parameters. Lake monitoring continued at six sites on the three lakes throughout the summer.

2008-2009

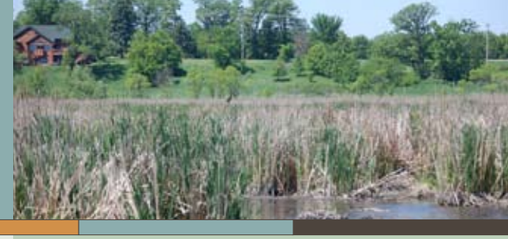
Volunteer monitoring focused solely on the lakes with limited historic data (White, Upper Twin and Lower Twin). In support of the MPCA's TMDL for the Cedar River and its tributaries, the SRRWD stream monitoring program expanded in the following ways:

- 8 stream-gauging stations added to characterize the amount and quality of watershed runoff
- 2 stormwater-discharge monitoring sites in Albert Lea added to help quantify the pollutant loading to waterbodies from the urban areas
- Automatic sampling equipment installed at new and existing stream monitoring sites to collect continuous flow and water quality data
- 4 tipping bucket gauges installed at waste water ponds to collect rainfall depth and intensity data

2009 water quality monitoring includes 18 stream sites, 9 lake sites, and 2 storm sewer sites in Albert Lea.



Water Quality in the District: Where and How It Is Monitored



How is stream water quality measured?

The SRRWD contains a vast network of ditches and creeks. Many of these flow into the district's lakes, transporting pollutants from the upstream watershed.

Stream monitoring data is used to determine the amount of sediment and pollutants being transported to downstream waterbodies. The data is also used to assess long-term water quality trends, determine achievable water quality management goals, and track the SRRWD's progress toward those goals.

Flow

Flow was measured using automated stations at 18 locations in the SRRWD. The monitored flow is used to estimate the amount of runoff from the watershed, which is typically referred to as a watershed yield (inches of runoff over the watershed area).

Turbidity

Turbidity, a measurement of stream clarity, uses the passage of light through water as an indicator of the amount of suspended material (soil particles, algae, plankton, microbes) in the stream. Sources of turbidity include soil erosion, waste discharge, urban runoff, eroding stream banks, algae, and large numbers of bottom feeders (e.g., carp).

Suspended Solids

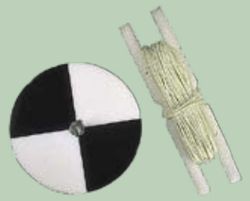
Another way to determine the amount of suspended material in a stream (stream clarity) is to measure the total suspended solids. Although there is not a specific water quality standard for in-stream total suspended solids, an MPCA factsheet indicates that a target threshold of 58 milligrams per liter (mg/L) is generally thought to be consistent with the turbidity standard for this region of the state (25 nephelometric turbidity units).

How is lake water quality measured?

From May to October, volunteers and district personnel collected lake water samples. The samples were analyzed for multiple water quality indicators, including water clarity, total phosphorus and chlorophyll *a*.

Water Clarity (Secchi Disk)

One method of measuring a lake's water quality is by Secchi disk transparency. A Secchi disk is a black and white disc 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. Perceptions and expectations of people using a lake are generally correlated with water clarity.

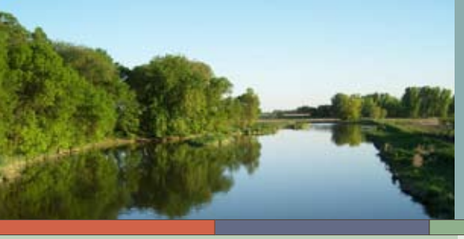


Phosphorus

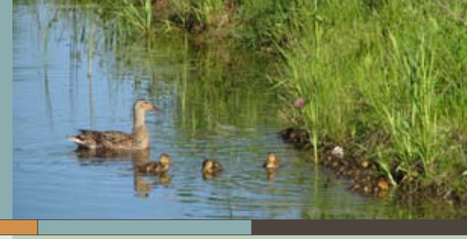
Phosphorus is the plant nutrient that most often stimulates the growth of algae. A lake that is rich in phosphorus has the potential for abundant algal growth, which can reduce water clarity and cause odor and aesthetic problems.

Chlorophyll *a*

Chlorophyll *a* is the main photosynthetic pigment in algae. Too much chlorophyll *a* indicates an abundance of algae in the lake.



Water Quality Monitoring Results

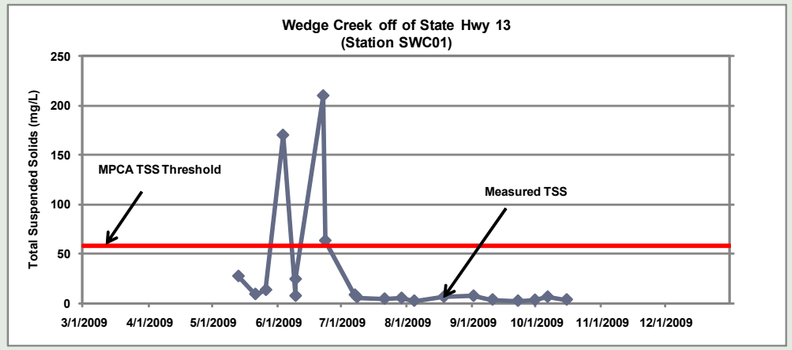


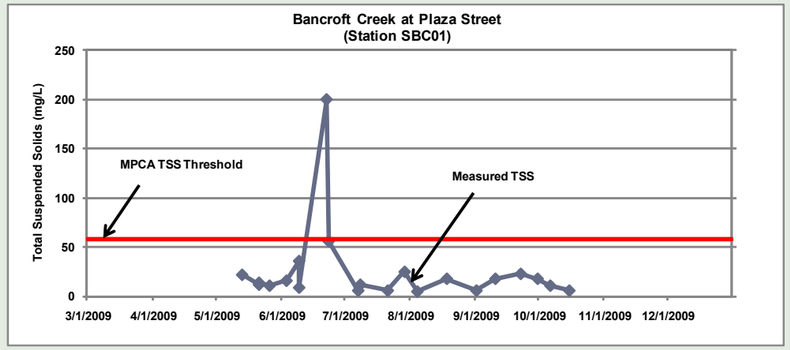
Stream Monitoring Summary

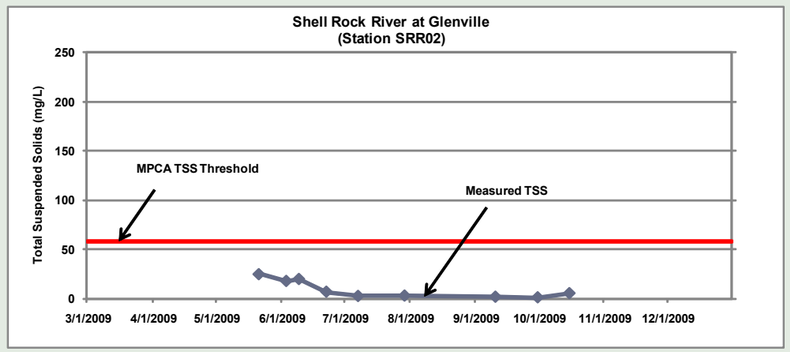
The adjacent figures summarize the 2009 monitoring results for one of the many parameters measured at three stream monitoring sites. At a glance:

- Wedge Creek, Bancroft Creek and the Shell Rock River have been monitored for total suspended solids since the onset of the SRRWD's monitoring program. Total suspended solids (TSS) is a measurement of the amount of suspended material (e.g., soil particles, algae, plankton, microbes) in a waterbody, and is often used as a surrogate measurement for turbidity (cloudiness of water).
- TSS concentrations in Wedge Creek exceeded the threshold during three sampling events during 2009.
- TSS concentrations in Bancroft Creek were generally less than the threshold, with the exception of one sampling event in late June. This late-June sampling event corresponded to the highest observed flow during 2009.
- TSS concentrations observed in the Shell Rock River at Glenville were significantly below the threshold during the entire monitoring period.

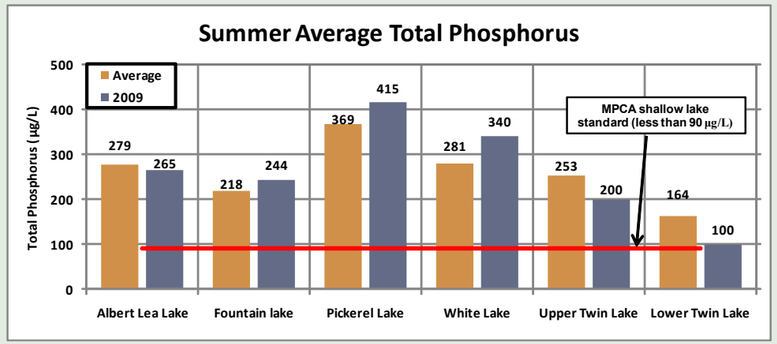
2009 Stream Results

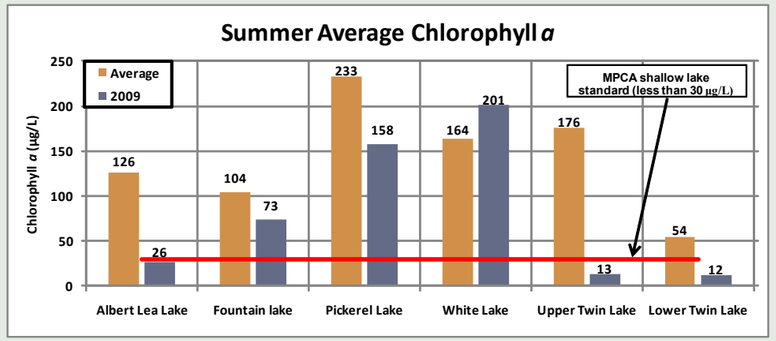


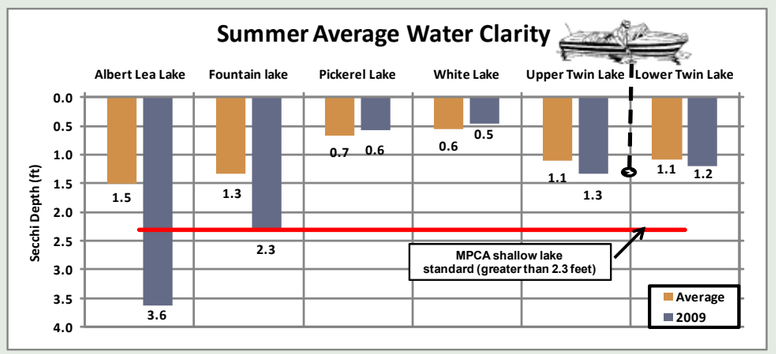




2009 Lake Results







Lake Monitoring Summary

The adjacent figures show the total phosphorus, chlorophyll *a* and water clarity monitoring results for the lakes.

- Lake water quality was generally poor in 2009, as indicated by high summer average concentrations of phosphorus and chlorophyll *a* as well as low water clarity. However, the water quality of Albert Lea Lake was significantly better than past conditions. 2009 is the first time in the historic record that the MPCA Secchi Disk standard of 2.3 feet was achieved.
- 2009 summer average phosphorus concentrations ranged from 100 µg/L in Lower Twin Lake to 415 µg/L in Pickerel Lake, all of which exceed the MPCA standard.
- 2009 summer average chlorophyll *a* concentrations ranged from 12 µg/L in Lower Twin Lake to 201 µg/L in White Lake. The summer average chlorophyll *a* concentrations in three of the six lakes (Albert Lea, Upper Twin, and Lower Twin Lakes) met the MPCA standard.
- Summer average water clarity values ranged from 0.5 feet in White Lake to 3.6 feet in Albert Lea Lake. During 2009 the water clarity in Albert Lea and Fountain Lakes is sufficient to meet the MPCA standard for shallow lakes (2.3 feet).

2009 and Beyond

SRRWD Board of Managers
Gary Pestorious, Chair
Bruce Haugsdal, Vice Chair
Clayton Petersen, Treasurer
Art Ludtke, Secretary
Alan Bakken, Manager
Brett Richards, Manager
Roger L. Peterson, Manager

SRRWD Staff
Brett Behnke, Administrator
Andy Henschel, Watershed Conservationist
Connie Kaupa, Office Manager
Carmen Christensen, Financial Clerk and Recording Secretary
Jerad Stricker, Conservation Technician

Local Partners
Freeborn County
City of Albert Lea
Freeborn County SWCD
Cedar River WD
Mower County SWCD
Turtle Creek Watershed District

Citizen Volunteers
Dave Irwin (2009)
Floran Peters (2009)
Jerry Morstad (2009)
Jim Jahnke (2009)
Mary Alice Hanson (2009)
Kristen, Mark & Carson McGivern (2007)
Wendy Hagen (2007)
Dave Mullenbach (2007)
Ben Bangert (2007)
Wayne T. Hanson (2007)
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Tim Sosebee (2007)
Larry Schroader (2007)
Carol Colstrup (2007)
Tom Tubbs (2007)
Randy & Lora Low (2007)
Kenneth L. Nelson (2007)
Jason Howland (2007)
Dave Thorsheim (2007)
Don Sorensen (2007)

For more information, contact:
Brett Behnke, Administrator
Shell Rock River Watershed District
Freeborn County Government Center
P.O. Box 1147
Albert Lea, MN 56007
Telephone: 507-377-5785
Fax: 507-377-4494
www.shellrock.org

Highlights of 2009

The following water quality improvement projects were undertaken in 2009:

- Installation of electric fish barriers at Fountain Lake, White Lake, and Wedge Creek
- Pickerel Lake Fisheries Reclamation Project (in cooperation with the Minnesota DNR)

Aerial view of the South Industrial Park Improvement Project on the southwest side of Albert Lea Lake.

- South Industrial Park Flood Mitigation and Water Quality Project
- Main Street Stormwater Park Project (in partnership with the City of Albert Lea)
- Edgewater Park Reclamation (in partnership with the City of Albert Lea)

Looking Ahead

Continuing to Support TMDL Development

In 2008, the MPCA began development of a total maximum daily load (TMDL) study for the Cedar River and its tributaries, including the Shell Rock River and upstream Pickerel, Fountain, and Albert Lea Lakes. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards. In 2009, the SRRWD continued its stream monitoring program in support of the ongoing TMDL. The comprehensive water quality monitoring program will continue during 2010. The SRRWD will re-evaluate their monitoring program based on the outcome of the TMDL and the SRRWD's water quality management priorities.

Volunteers Play Essential Role in Monitoring

The citizens within the SRRWD have long been actively involved in efforts to protect and restore their local waterbodies. To capitalize on the interest of watershed residents and encourage public participation, the SRRWD implemented a volunteer monitoring program in 2007. The volunteer program was primarily funded by a Surface Water Assessment Grant (SWAG) from the Minnesota Pollution Control Agency (MPCA). The data collected by the volunteers through the SWAG program were submitted to the MPCA in 2009. Those data will be used by the MPCA to evaluate the waterbodies for water quality impairments during the 2012 assessment cycle.

Designed and developed by Barr Engineering Co.