The Shell Rock River Watershed District’s mission is to implement reasonable and necessary improvements to the water-related and other natural resources of the District.
Focus on Flow Monitoring

The Shell Rock River Watershed District (SRRWD) maintained 13 automated flow monitoring stations during 2016. Data collected at these stations is used to compute the total annual water volume and pollutant mass or “pollutant load” transported by each stream. The automated stations measure water elevation or “stage” at 15-minute intervals throughout the open-water season. Automated stage measurements are used to estimate flow rate by comparing them to physical flow rate measurements made by measuring stream depth and velocity at regular intervals across the entire width of the stream. After converting stream stage to flow rate, the results are plotted versus time to create a special chart called a “hydrograph” (see below).

Because high-flow events can account for a significant proportion of a creek’s annual water volume and pollutant load, accurate manual flow measurements during high-flow periods are particularly important. Manual flow rate measurements performed while wading the stream are time-consuming and on large rivers or during high-flow conditions can be hazardous or impossible.

For 2017, the SRRWD plans to purchase a SonTek RiverSurveyor®, a high-tech instrument that records water depth and velocity while being towed across the stream on a floating platform. Using the RiverSurveyor®, SRRWD staff can: (1) safely measure flow rate during high-flow events and (2) make more frequent measurements during periods of low flow to ensure that the stage-flow rate relationship for a station has not changed over time.

The RiverSurveyor® instrument is towed across streams on a floating platform. GPS technology keeps track of its position while sonar measures water depth and velocity.

The Wedge Creek 2016 hydrograph shows that frequent summer rainstorms up to 2 inches rarely resulted in high stream flow, likely due to high water use by crops. After the growing season ended, large rainstorms caused sharp stream flow peaks in September and October.
Abundant growth of a native floating aquatic plant commonly known as “duckweed” blanketed parts of Fountain Lake at times during the summer of 2016.

A Shifting Balance between Algae and Aquatic Plants

The SRRWD’s water monitoring program reveals that several District lakes, including Fountain Lake, have shown improved water clarity in recent years due to decreased algal growth. When water clarity improves, rooted and floating aquatic plants (macrophytes) receive more sunlight and can grow more densely. These macrophytes provide desirable habitat for fish and for microscopic animals known as zooplankton that feed on algae, reinforcing the shift from an algal-dominated, murky lake to a clear-water lake.

Don’t Dump the Aquarium!

A carp survey and tagging operation in September 2016 revealed some surprising finds—large goldfish that have thrived in White Lake after escaping from a pond or being released from an aquarium. Like the common carp, these non-native fish can upset the natural ecology of lakes and streams. Over the years, several exotic plants and animals that enjoy popularity as aquarium specimens have established themselves as pests in Minnesota after they were intentionally or accidentally released. The SRRWD would like to remind everyone to avoid dumping aquariums or bait buckets into water bodies. See the Minnesota Department of Natural Resources (DNR) website at http://www.dnr.state.mn.us/invasives/aquatic.

Carp Update

During the September 2016 survey, several common carp captured in Albert Lea Lake and Fountain Lake were fitted with radio tracking tags and released. Because carp congregate in tight schools during the winter months, the tagged fish can be used to guide under-ice netting operations by commercial fisherman.

Fountain Lake’s water clarity has met the state shallow lake standard during each of the past 4 years.

Periodic surveys help show changes in macrophyte communities. An August 2014 macrophyte survey of Fountain Lake showed that macrophyte growth was sparse throughout much of the lake. In the figure above, each marker represents a survey location. Larger dots indicate higher macrophyte density, measured by dragging a rake through the water.

Three similar-looking species were captured during the September survey: big mouth buffalo (top), common carp (middle), and goldfish (bottom). The big mouth buffalo is a native of Minnesota waters; the others are non-native invasive species.
Fountain Lake

Fountain Lake met the MPCA shallow lake water clarity standard, but missed the phosphorus concentration standard. The SRRWD is hopeful that watershed and lake management projects, including the upcoming Fountain Lake dredging project, will result in further improvements in water quality.

White Lake

Summer-average water clarity and phosphorus concentrations in White Lake were better than their long term averages, narrowly missing the state standards. On two occasions the Secchi disk, used to measure transparency, was visible on the lake bottom.

Pickerel Lake

Water quality in Pickerel Lake suffered a surprising decline in 2016. Water clarity failed to meet the MPCA shallow lake standard for the first time since 2009, while phosphorus also failed to meet the standard. An algal bloom that began in early July and continued through September was responsible for the decline in water clarity.

Albert Lea Lake

Water quality in Albert Lea Lake was much improved in 2016. Summer-average phosphorus concentration was less than half the long-term average, barely missing the MPCA shallow lake standard, while water clarity met the MPCA shallow lake standard.

### Phosphorus Concentration (μg/L)

<table>
<thead>
<tr>
<th>Year</th>
<th>Long-term avg.</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2.0</td>
<td>2.6</td>
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</table>

### Water Clarity (feet)

<table>
<thead>
<tr>
<th>Year</th>
<th>Long-term avg.</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1.4</td>
<td>2.0</td>
</tr>
</tbody>
</table>

The SRRWD regularly monitors its lakes for several factors, including algae (an algal indicator), and water transparency (for clarity). These data are collected from June through September. The water clarity and phosphorus concentrations observed in SRRWD lakes during the summer of 2016 are summarized on this page, in cooperation with the Minnesota Pollution Control Agency (MPCA). These data will help track the impact of previous projects, gain a better understanding of lake behavior, and identify waterbodies that need attention.
water quality indicators, including phosphorus, chlorophyll-a (an algal indicator), and water transparency (for clarity). Average summer values are computed based on measurements of phosphorus concentrations observed in SRRWD lakes during the comparison with historic water quality and the Minnesota Pollution Control Agency (MPCA) standard for shallow lakes in this region of the state. Comparisons provide valuable information, allowing the SRRWD to track the impact of previous projects, gain a better understanding of natural variability in water quality due to climatic conditions, and identify waterbodies that need attention.

### Upper Twin Lake

The 2016 summer-average phosphorus concentration in Upper Twin Lake was below the long-term average for the lake, and lower than in any of the previous 5 years. Summer-average water clarity was lower than the long-term average. After drying out in the summer of 2012, water quality in Upper Twin Lake was much improved for two seasons, but has now returned to pre-2012 levels.

### Lower Twin Lake

Water quality in Lower Twin Lake, as measured by summer-average phosphorus and clarity, was very similar to its long-term average. However, a closer look at the data shows that Lower Twin Lake had relatively low levels of algae through much of the summer, heavy algal blooms did not appear until August.

### Halls Lake

Halls Lake had very good water quality in 2016, with summer-average phosphorus meeting the MPCA shallow lake standard. Halls Lake will likely never meet the MPCA standard for clarity because it is usually shallower than the 2.3 foot standard. Halls Lake is protected from invasive carp by the Wedge Creek fish barrier at Fountain Lake.

### School Section Lake

School Section Lake remains a target for SRRWD lake management efforts after another year of poor water quality. Both summer-average phosphorus and water clarity failed to meet the state shallow lake standards. While its depth is only about 2 feet, the bottom was never visible due to heavy algal blooms throughout the monitoring season.
After six consecutive years of meeting the MPCA shallow lake clarity standard, Pickerel Lake failed to meet the standard in 2016. While summer-average phosphorus concentrations were greatly reduced following the 2009 Pickerel Lake Reclamation Project, they remain high enough to trigger algal blooms.

State-sponsored grant funding will help the SRRWD implement water quality projects in the Pickerel Lake subwatershed.

The new variable-crest Pickerel Lake Dam under construction in February 2017 replaces a failing concrete fixed-crest water control structure. The variable crest allows lake elevations to be raised or lowered to achieve lake management objectives.

Pickerel Lake is a shallow wildlife lake of about 620 acres on the southwest border of Albert Lea. Past SRRWD projects for Pickerel Lake, including the Pickerel Lake Reclamation Project (2009–2010) and the Pickerel Lake Dam Replacement Project (ongoing, see photo above) have focused on lake management practices.

The next phase for improving water quality in Pickerel Lake includes reducing phosphorus and sediment inputs from the surrounding area. On May 25, 2016, the SRRWD was awarded $825,610 by the Minnesota Board of Water and Soil Resources (BWSR) to develop water quality projects in the Pickerel Lake subwatershed.

The SRRWD sees watershed management as a logical next step. Pickerel Lake’s water clarity was noticeably improved following the 2009 Pickerel Lake Reclamation Project (see graph, top left). However, since 2009 Pickerel Lake’s summer-average phosphorus concentrations have consistently remained near the MPCA shallow lake standard of 90 micrograms per liter (see graph, middle left)—high enough to stimulate algal blooms under the right conditions. Algal blooms during the summer of 2016 prevented Pickerel Lake from achieving the MPCA water clarity standard.

Planning and design activities are underway for a wetland restoration and ditch/stream stabilization project to the south of Pickerel Lake (see map at bottom left), the first activities to be funded by the grant. Future activities are expected to include establishing grass waterways to reduce soil erosion and filter runoff before it reaches the lake.
The Shell Rock River is the predominant water feature in the southern half of the SRRWD. Winding for about 12.5 miles through a flat, largely agricultural landscape from Albert Lea Lake to the Iowa border, the river receives water and pollutant contributions from a number of sources. The SRRWD monitors three locations along the river to track the impacts of these contributions on water quality.

Albert Lea Lake is the source of the Shell Rock River. All the water from the upper part of the SRRWD flows through the lake, where it can be influenced by the characteristics of the lake. For example, on windy days the lake bottom is stirred up, resulting in high quantities of suspended solids being transported from the lake to the river.

Albert Lea Lake Dam maintains water levels in Albert Lea Lake at a predetermined minimum elevation, while providing for rapid conveyance downstream during high water periods to minimize flooding issues at neighboring properties. The SRRWD monitors flow and water quality at the County Road 19 Bridge above the dam.

The Albert Lea Wastewater Treatment Plant processes wastewater from the City of Albert Lea, removing solids and converting toxic ammonia to nitrate, then disinfecting the water before discharging it to the Shell Rock River.

The town of Glenville lies on the western bank of the Shell Rock River. The SRRWD maintains a second flow and water quality monitoring station here.

County Ditch 16 (CD16) flows into the Shell Rock River about 1 mile south of Glenville. Like many of the river’s tributaries, CD16 has been modified to improve conveyance of agricultural drainage water. The SRRWD maintains a monitoring station on CD16 to assess its contributions to the river’s water quality.

The Minnesota DNR maintains a flow monitoring station near Gordonsville. The SRRWD monitors water quality at the same site and uses the DNR flow data to determine pollutant transport just before water leaves the SRRWD.
Local Option Sales Tax Renewal

On November 8, 2016, over 72% of Albert Lea’s voters supported a renewal of the half-percent sales tax for the next 15 years or until $15 million has been raised. If approved by the Minnesota State Legislature, the money raised by the tax will go towards watershed projects, sustaining a stable local funding source that the SRRWD has used to secure additional state and federal clean water grants.

State Water Trail Dedication

On June 25, 2016, a ribbon-cutting ceremony at Frank Hall Park in Albert Lea was held to celebrate the dedication of the Shell Rock River State Water Trail (SRRSWT). The SRRSWT runs for 20 miles from the Highway 13 boat ramp at Fountain Lake’s Edgewater Bay to the Iowa border. Maps and information can be found on the Minnesota DNR website, or go to https://www.facebook.com/SRRSWT.

Fountain Lake Restoration

In 2016 and early 2017, the SRRWD achieved several important milestones with the Fountain Lake Restoration Project:

- Completed the Fountain Lake Environmental Assessment
- Purchased land for the confined disposal facility (CDF)
- Selected Frattalone Company to construct the CDF

During 2017 the SRRWD and its contractors plan to move forward by:

- Completing project permitting
- Finalizing the dredging design
- Completing construction of the first of three CDF cells

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.

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