

# Shell Rock River Watershed

## Watershed approach

Minnesota has adopted a watershed approach to address the state's 80 major watersheds. This approach looks at the drainage area as a whole instead of focusing on lakes and stream sections one at a time, thus increasing effectiveness and efficiency. This watershed approach incorporates the following activities into a cycle repeated on a regular basis:

1. Monitoring water bodies and collecting data over two years on water chemistry and biology.
2. Assessing the data to determine which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters.
3. Developing strategies to restore and protect the watershed's water bodies, and report them in a document called Watershed Restoration and Protection Strategies (WRAPS).
4. Coordinating with local One Watershed-One Plan efforts for implementation of restoration and protection projects.

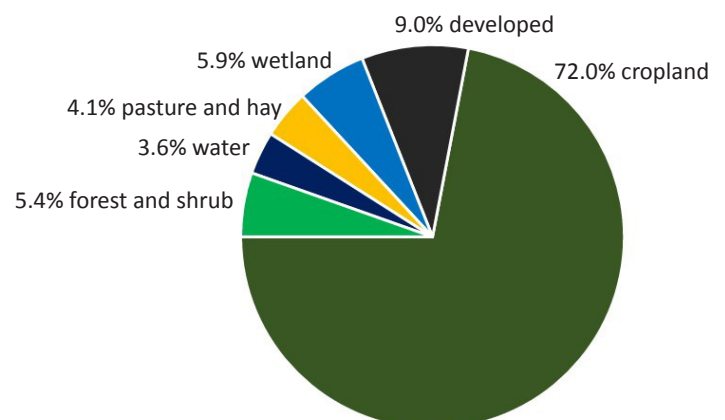
The Minnesota Pollution Control Agency (MPCA) leads the technical work and coordinates and supports strategy development with local and state partners. Watershed partners, including the City of Albert Lea, Freeborn County and Water Conservation District, and the Shell Rock River Watershed District, are leaders in implementing strategies to restore and protect water resources. Their past and current work provides promising opportunities for watershed improvement and will continue to be a critical component to overall water quality. The main purpose of the WRAPS report is to summarize all the technical information so that local partners can use it for planning and implement the best strategies in prioritized locations.



## Watershed characteristics

- Size: 246 square miles in Minnesota
- Counties: Freeborn
- Ecoregion: Western Corn Belt Plains
- Municipalities: Albert Lea, Glenville, Hayward, Manchester, Twin Lakes
- Most of the land is cropland
- Tributary to the Cedar River
- The 8-digit hydrologic unit code (HUC): 07080202

## Land use in the Shell Rock Watershed



## Assessments: Are waters meeting standards?

During the first phase of the watershed approach – intensive watershed monitoring – the MPCA and partners collected data about biology such as fish populations, chemistry such as pollutant levels, and flow to determine if lakes and streams were meeting water quality standards. Waters are “impaired” if they fail to meet standards. Impaired waters require a study called a Total Maximum Daily Load (TMDL), the maximum amount of a pollutant that a water body can accept and still meet standards.

The MPCA and partners determined the following impairments:

- Bancroft Creek and part of Wedge Creek have bacteria levels too high to meet standards. Bacteria can make water unsafe for contact recreation such as wading.
- Part of Schoff Creek has nutrient and sediment levels too high to meet standards. Nutrients can cause algae while sediment can make the water too cloudy for fish and other aquatic species.
- The Shell Rock River has low dissolved oxygen at times, making it hard for fish and other aquatic species to survive.
- The river also has nutrient, sediment and pH levels too high to meet standards. All these factors result in the number of fish and bug species being lower than expected for similar rivers. Phosphorus in the river needs to decrease by as much as 75%, depending on flow and other conditions, to meet standards. The river also has bacteria levels too high to meet standards, an impairment addressed by a 2002 study.
- Pickerel, White, Fountain and Albert Lea lakes all have nutrient levels too high to meet standards. Phosphorus levels need to decrease by 46-71% in the lakes.



The Shell Rock River Watershed is comprised of several lakes and streams, all within Freeborn County in southern Minnesota.

## Stressors and pollutants: What factors are affecting fishing and swimming?

Based on intensive water monitoring and stressor identification work, impaired waters exist throughout the Shell Rock River Watershed. Generally, impairments include the following.

- Nutrients: In streams, excess phosphorus is fueling algae growth creating difficult living conditions for fish and macroinvertebrates, which are snails, crayfish and other creatures. Excess phosphorus in lakes is also fueling algae blooms, reducing the clarity of water.
- Aquatic habitat conditions: The lack of riffle and pool structures as well stream bottoms smothered by sand and silt create limited places for fish and macroinvertebrates to live in watershed streams.
- Altered hydrology: Artificial drainage (channelized ditches and field tiling) is driving many of the problems in the watershed.
- Biology (fish and/or macroinvertebrates): There are fewer species of fish and bugs in the Shell Rock River than expected for this type of stream.



The Shell Rock River faces several water quality challenges, including high nutrient levels that lead to excessive algae growth that hurts aquatic life and recreation.

- Bacteria: *E. coli* and/or fecal coliform can indicate sewage or manure in water and also make the water unsafe for contact recreation. *E. coli* impairments exist in headwater streams (Wedge and Bancroft creeks), and the Shell Rock River.
- Nitrate: Excess nitrate/nitrogen is a stressor for fish and bugs in the Shell Rock River.

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## Restoration and protection strategies

Headwater streams in the Shell Rock River Watershed are predominantly impacted by agricultural land use. Focused implementation of practices in priority agricultural areas will help improve stream water quality.

The impaired lakes within the Shell Rock River Watershed are all connected through a series of water channels. Because of this lake chain connection, the condition of upstream lakes impact the condition of downstream lakes. Continued restoration implementation in headwater upland areas paired with in-lake management will aid in meeting lake water quality goals.

General strategies recommended for the Shell Rock River Watershed include:

- Reducing nutrients, particularly phosphorus, from regulated sources such as wastewater treatment plants and city stormwater. The City of Albert Lea will likely need to upgrade its wastewater treatment facility to reduce the phosphorus it discharges to the river. The Albert Lea facility discharged 32 tons of phosphorus in 2019 to the Shell Rock River. This phosphorus discharge was the third highest of wastewater facilities in Minnesota.
- Reducing phosphorus and nitrogen from non-regulated sources such as cropland through better managing nutrients and incorporating cover crops. The Freeborn County Soil Health Team, led by the local Soil and Water Conservation District (SWCD), promotes practices that build soil health and help water quality.
- Increasing water storage through wetland restorations, controlled drainage structures, drainage ditch system management, and soil health practices. The SWCD and Freeborn County are already working on these initiatives with several other partners.
- Reducing bacteria levels by fixing failing septic systems, improving animal manure management and ensuring animal feedlot compliance. The Shell Rock River Watershed District has already worked to fix failing septic systems, with more than 700 homeowners upgrading or replacing their systems, an investment of at least \$7 million.
- Continuing to implement lake management strategies for shallow lakes such as rough fish control, native aquatic plant restorations, and water level drawdowns. The watershed district has also been working on these strategies. For example, the district has installed barriers on several lakes to keep out carp and other fish that stir up the bottom sediment.



**Water monitoring shows high levels of phosphorus that cause algae throughout waters in the Shell Rock River Watershed.**

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## Key conclusions of first cycle

- Excess phosphorus is causing severe algal blooms in several lakes throughout the watershed.
- Chemical responses from excess nutrients are leading to low dissolved oxygen levels and high pH that are negatively impacting fish and macroinvertebrates in the Shell Rock River.
- Algae growth is fueled by excess phosphorus in the Shell Rock River, also causing a turbidity impairment, meaning the water has sediment levels that clog fish gills and make the water too cloudy for fish to find food, avoid predators, reproduce and perform other life functions.

- Altered hydrology causes low stream baseflows and high peak flows, worsening habitat conditions and intensifying low oxygen and high pH levels throughout the year.
- Nitrates are negatively impacting fish and macroinvertebrates in the Shell Rock River.
- Bacteria impairments are not widespread, but exist in two headwater streams and the Shell Rock River.
- The MPCA and partners now have data from water monitoring to assess additional lakes and streams in the watershed for meeting standards.

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## Next steps

The Shell Rock River Watershed approach began in 2009 and the first cycle was completed in 2020 with publication of the WRAPS report. The restoration and protection strategies listed in the WRAPS report will be the basis for developing local implementation plans, through the Shell Rock River/Winnebago One Watershed One Plan, to restore and protect water resources. The report lays out goals, milestones and responsible entities to address protection and restoration priorities in the watershed. The targets are intended to provide guidance and “measuring sticks” to assess the watershed’s health and success of actions taken. The MPCA and local partners began conducting the second round of intensive water monitoring in this watershed in 2019 and plan to finish it in 2020.

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## Full report

To view the full report, go to [www.pca.state.mn.us/water/watersheds/shell-rock-river](http://www.pca.state.mn.us/water/watersheds/shell-rock-river) or search for “Shell Rock” on the MPCA website at [www.pca.state.mn.us](http://www.pca.state.mn.us).

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## Contacts

### Minnesota Pollution Control Agency

Emily Zanon, watershed project manager: [emily.zanon@state.mn.us](mailto:emily.zanon@state.mn.us)  
507-206-2613

### Minnesota Department of Natural Resources

Jeanine Vorland, area wildlife supervisor: [jeanine.vorland@state.mn.us](mailto:jeanine.vorland@state.mn.us)  
507-668-7071

### Shell Rock River Watershed District

Andy Henschel, administrator: [andy.henschel@co.freeborn.mn.us](mailto:andy.henschel@co.freeborn.mn.us)  
507-377-5785

### Freeborn Soil and Water Conservation District

Brenda Lageson, district administrator: [Brenda.Lageson@mn.nacdnet.net](mailto:Brenda.Lageson@mn.nacdnet.net)  
507-373-5607 Ext. 3

### Freeborn County Environmental Services

Rachel Wehner, water planner: [Rachel.Wehner@co.freeborn.mn.us](mailto:Rachel.Wehner@co.freeborn.mn.us)  
507-377-5186

### City of Albert Lea

Steve Jahnke, city engineer: [sjahnke@ci.albertlea.mn.us](mailto:sjahnke@ci.albertlea.mn.us)  
507-377-4325