Root River
Watershed Restoration and Protection Strategies (WRAPS) Summary

Introduction

Minnesota has adopted a "watershed approach" to address the state's 81 major watersheds (denoted by 8-digit hydrologic unit code or HUC). This approach looks at the drainage area as a whole instead of focusing on lakes and stream sections one at a time. This watershed approach incorporates the following activities into a 10-year cycle:

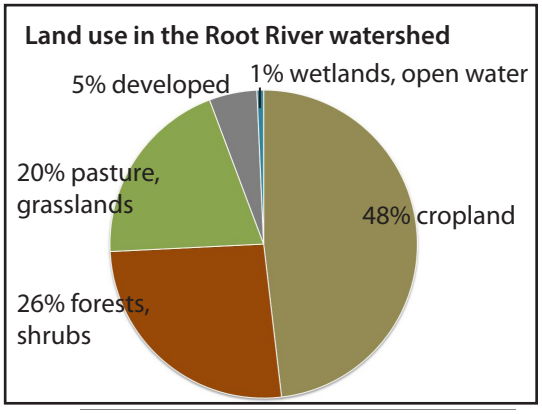
1. Monitoring water bodies and collecting data over two years on water chemistry and biology.
2. Assessing the data to determine which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters.
3. Developing strategies to restore and protect the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

The MPCA leads the monitoring, assessment and strategy development with local partners usually playing a major role. Local partners, like Soil and Water Conservation Districts, implement the strategies to restore and protect water resources. They also engage citizens throughout the process.

When a watershed's 10-year cycle is completed, a new cycle begins. The Root River watershed approach began in 2008 and culminated with the WRAPS document published in April of 2016. The watershed is scheduled for its next intensive water monitoring in 2018.

Watershed characteristics

- Size: 1,664 square miles or 1,064,961 acres.
- Counties: Dodge, Fillmore, Houston, Mower, Olmsted, Winona
- Ecoregion(s): Majority is in the Driftless Area; small western portion in Western Corn Belt Plains
- Communities: Chatfield, Rushford, Stewartville, Preston, Spring Valley, Houston, Lanesboro, Grand Meadow, Harmony, Hokah, and Mabel
- Land use: Mostly cropland and pasture or grassland
- The 8-digit hydrologic unit code or HUC for the Root is 07010204



The Root River watershed is one of the largest in the state, and is famous for trout fishing. The Root River starts as a drainage ditch in Mower County, then winds 81 miles from intensely farmed areas through more wooded, rolling terrain, and finally through towering bluffs before emptying into the Mississippi River south of La Crescent. Near Forestville State Park, the river disappears underground and resurfaces at the Mystery Cave near Preston.

The river flows through some of the most unique geology in the world – karst. In karst, only a thin layer of soil covers the porous bedrock underneath. Here the erosive effects of water have sculpted thick layers of limestone over thousands of years. The landscape is characterized by abundant sinkholes, springs, caverns, and underground waterways. Karst is like the Swiss cheese of rock. As water flows through karst, it mixes above and below ground. This mixing means pollutants on land can easily reach groundwater used for drinking. For more information about karst, visit the MPCA website: www.pca.state.mn.us/water/karst-minnesota.

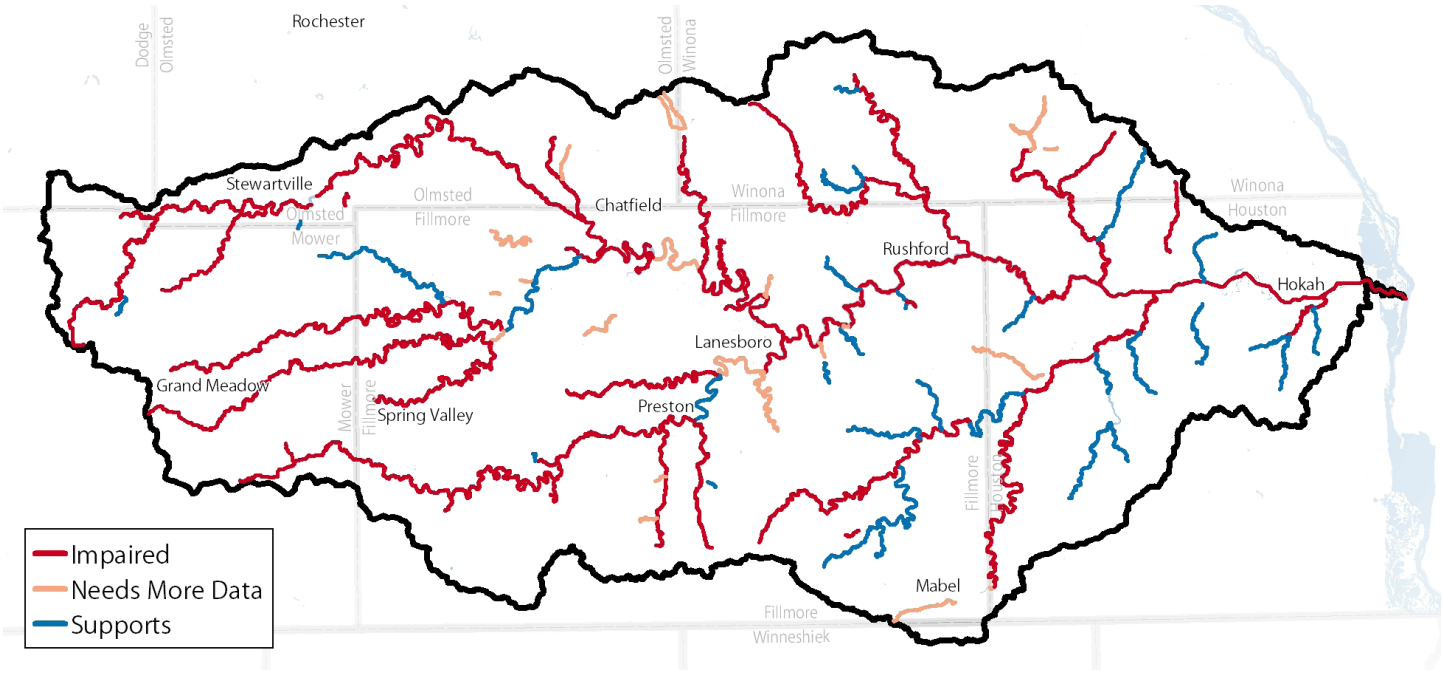
Assessments: Are waters meeting standards and providing beneficial uses?

During the first phase of the watershed approach – intensive watershed monitoring – the MPCA collected data about biology such as fish populations and chemistry such as various pollutant levels to determine if streams were meeting water quality standards designed to ensure that waters are fishable and swimmable . Data from this monitoring were used to examine 110 stream sections in the watershed. Waters are "impaired" if they fail to meet standards.

The map below shows the impairments for streams in the Root River Watershed. (There are no lakes within this watershed.) Under federal and state laws, impaired waters must have Total Maximum Daily Load (TMDL) studies done. These studies determine the total load or amount of a pollutant that a water body can accept and still meet water quality standards. They also determine the reductions of pollutants needed to meet standards and outline ways to achieve that restoration.

In this first WRAPS cycle for the Root River watershed, the MPCA and local partners completed 38 TMDL calculations for 30 stream sections. Additional impairments are covered in other MPCA studies or the WRAPS document.

Impairments in the Root River



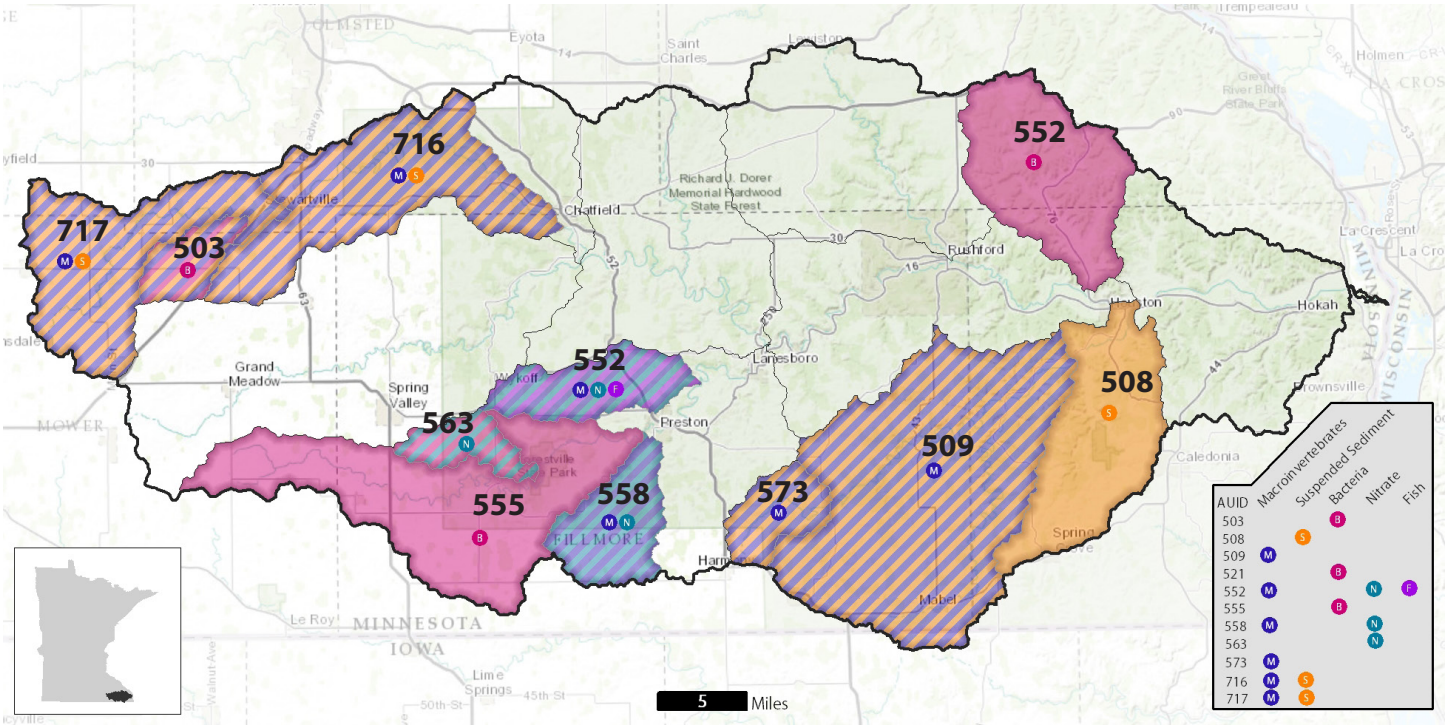
Streams in red fail to meet water quality standards that they were assessed for, are considered impaired, and need restoration. Those in tan need more data collected to assess their conditions. Streams in blue meet water quality standards and need protection to maintain their conditions.

Generally, impairments include the following:

- Bacteria: Presence of *E. coli* and/or fecal coliform can indicate sewage or manure in water and also make the water unsafe for swimming (20 impaired stream sections in the watershed).
- Biology: Number and type of creatures are indicators of water's health. The MPCA and local partners examine fish and macroinvertebrate (bug) communities to see if they're stressed or healthy (43 impaired stream sections in the watershed).
- Turbidity and Total Suspended Solids: Soil and other particles make the water murky (17 impaired stream sections in the watershed).
- Nitrate: High levels in drinking water sources can pose health problems, particularly to infants, and high levels in streams can harm fish (6 impaired stream sections in the watershed).

Restoration and Protection Strategies

The MPCA and local partners developed criteria to determine priority levels for each impaired parameter, with high priority areas considered synonymous with critical areas. Colors indicate the critical parameter for the area, such as pink indicates bacteria and yellow indicates sediment. Hashed areas have more than one parameter.



Critical areas for restoration in the Root River watershed			
Subwatershed location	**Stream section number**	**High priority impairment(s)**	**Example strategies**
North Branch (Robinson Creek)	503	• Bacteria	• Feedlot management • Manure management
South Fork	508	• Suspended sediment	• Community septic system compliance
South Fork	509	• Macroinvertebrates	• Stream habitat improvement
Money Creek	521	• Bacteria	• Community septic system compliance • Karst sinkhole treatment
South Branch (Watson Creek)	552	• Nitrate • Fish • Macroinvertebrates	• Cover crops • Streambank protection
South Branch	555	• Bacteria	• Karst sinkhole treatment
South Branch (Willow Creek)	558	• Nitrate • Macroinvertebrates	• Nutrient management • Pasture management
South Branch (Forestville Creek)	563	• Nitrate	• Cover crops
South Fork	573	• Macroinvertebrates	• Increased perennial cover • Nutrient management
North Branch	716	• Suspended sediment • Macroinvertebrates	• Wetland restoration
North Branch	717	• Suspended sediment • Macroinvertebrates	• Buffers around side inlets for drainage tile

Next steps and measuring results

The restoration and protection strategies listed in the WRAPS report will be used for developing local implementation plans to restore and protect water resources. The report lays out goals, milestones and responsible entities to address protection and restoration priorities in the Root River watershed. The targets are intended to provide guidance and "measuring sticks" to assess the watershed's health and success of actions taken.

Key conclusions of first cycle

The Root River's unique topography, geology and location make it an outstanding example of a river in need of extra consideration.

The main issues that need to be addressed in the Root River Watershed for restoration are:

- Reducing nitrate in water resources by applying less fertilizer to land used for corn and soybean production, and minimizing leaching of fertilizer from cropland via runoff and tile drainage.
- Reducing sediment loss from upland areas and stabilizing flood plains and terraces.
- Further research to determine why bacteria concentrations remain high in many streams despite numerous efforts to decrease levels.
- Addressing physical habitat issues that are negatively affecting fish and other aquatic life communities of the streams.

Local, state and federal organizations in the watershed have formed strong partnerships and have long worked together to protect and restore the Root River and its tributaries. Two notable partners are the Fillmore Soil and Watershed Conservation District and Friends of the Root River, a newly formed non-profit group in the watershed.

Many tools are in place to guide implementation, including modeling (computer simulations) of changes in land practices; the statewide strategy to reduce nutrients in rivers contributing to hypoxia in the Gulf of Mexico; and the Nitrogen Best Management Practices tool.

Full report

See the complete report on the MPCA website by going to at www.pca.state.mn.us and searching for "Root River."

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Minnesota Pollution Control Agency

The watershed approach adds a protection component for water resources meeting standards rather than focusing entirely on restoration of impaired waters. It also saves time and money while increasing effectiveness and efficiency. The Clean Water Legacy Amendment is funding a large part of this effort.