



Rapid 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 (2017-2018).
2. Assessing the data to determine which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters (2018-2019).
3. Developing strategies to restore/protect the watershed’s water bodies, and report them in a document called Watershed Restoration and Protection Strategies (WRAPS) (2019-2021).
4. Coordinating with local One Watershed-One Plan efforts for implementation of restoration/protection projects (2021-beyond).

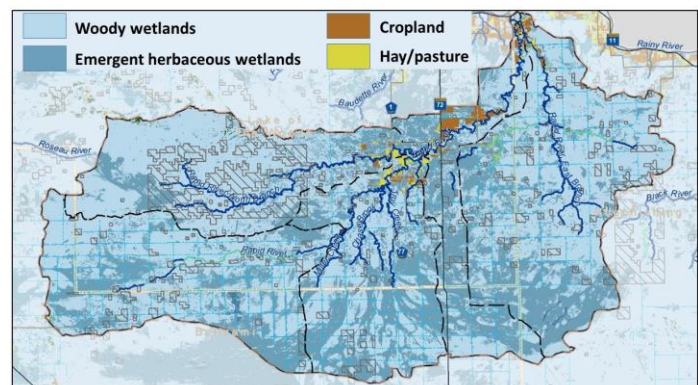


The Minnesota Pollution Control Agency (MPCA) leads the technical work and coordinates and supports strategy development with local, state and federal partners. Watershed partners are leaders in implementing strategies to restore and protect waters. Their past and current work provides opportunities 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 such as the Lake of the Woods and Koochiching County soil and water conservation districts (SWCDs) can use it for planning and implementing the best strategies in prioritized locations.

Watershed characteristics

- Size: 1,765 square miles
- Counties: Lake of the Woods, Beltrami, Koochiching
- Ecoregions: Laurentian Mixed Forest
- Major streams: Rapid River (branches include the Lower, East Fork, and North), Miller Creek, Troy Brook, Christy Creek, Barton’s Brook, Wing River
- Towns: With a total population of less than 1,000, the watershed has very little development and few towns
- Land cover: wetlands 97%, agriculture 2%.
- The 8-digit hydrologic unit code (HUC): 09030007

Land use in the Rapid River Watershed



Assessments: Are waters meeting standards and providing beneficial uses?

In general, water quality conditions in the Rapid River Watershed are good, although low-flow conditions during the intensive water monitoring effort in 2017 and 2018 limited the ability to do sampling in some river sections.

In 2019, 12 streams were assessed for aquatic life (fish and aquatic insects) and aquatic recreation (swimming) use support. Ten of the streams fully support aquatic life, one stream did not support aquatic life use, and one stream had inconclusive data (no fish or macroinvertebrate samples were collected in this stream).

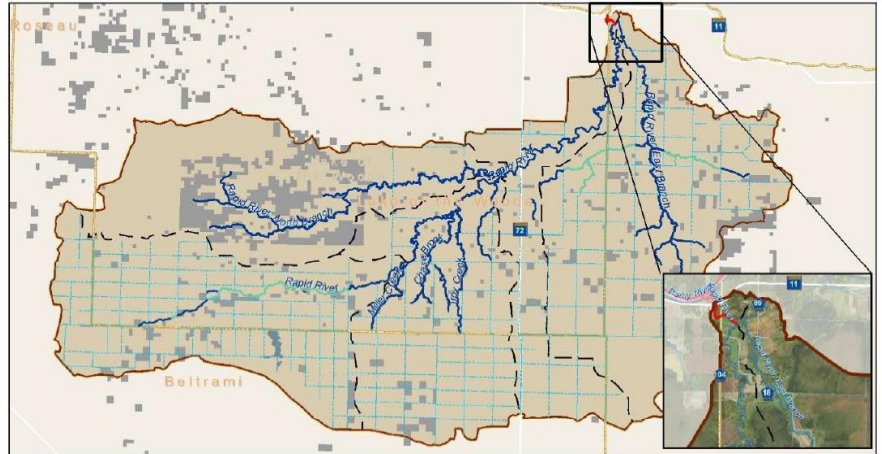
The MPCA determined that four streams fully support aquatic recreation and the remaining eight streams did not have sufficient data to assess for aquatic recreation.

Habitat for fish and aquatic insects was deemed fair in the streams assessed. Many water quality issues in the watershed link back to the legacy of a large-scale ditching campaign undertaken at the beginning of the 20th century to create agricultural land. The ditches failed to create usable farmland and fundamentally altered the hydrology of streams in the watershed creating less favorable conditions for fish and insects. This is due to the fact the altered streams now experience higher flows during spring runoff and summer rain events and often low-flow conditions at other times due to the ditching. The effects of climate change amplify these conditions by producing more frequent and intense rain events.

Monitoring revealed only one impairment in the watershed: the Lower Rapid River in the northeastern portion of the watershed does not support aquatic life (fish and aquatic insects) due to elevated levels of total suspended solids (TSS, or sediment comprised of soil and other fine particles) that causes excessive cloudiness in the water. Impaired waters require a study called a Total Maximum Daily Load (TMDL), a federal Clean Water Act requirement. The goal of a TMDL study is to quantify pollutant reductions needed to meet water quality standards. Most of the TSS is the result of in-stream or near-stream erosion and is expressed at the higher flows. Implementation should focus on addressing ditching and channelization in the subwatersheds that are identified as the highest yielding.

Elements are in place to make progress toward needed pollutant reductions in this TMDL study. Partnerships among local governmental units, state, and federal agencies aid in the success of implementation efforts. A range of local partners are involved in water resource management and implementation, including SWCDs and county governments from Lake of the Woods, Beltrami, and Koochiching counties. State agencies (MPCA, Board of Water and Soil Resources, Minnesota Department of Natural Resources and Minnesota Department of Agriculture) receive Clean Water Funds for various water resource management duties, including technical assistance. Federal agencies such as the Natural Resources Conservation Service and U.S. Fish and Wildlife Service also have programs that can help address pollutant loads.

Map of aquatic life use impairment in the Rapid River Watershed



Red line highlights river reach impaired for aquatic life use (fish and aquatic insects) due to elevated levels of total suspended solids (TSS).



With more than 90% of the land cover being wetlands and with only one impaired reach of river, water managers in the Rapid River Watershed are focused on protecting areas at risk of becoming degraded or impaired.

Restoration and protection strategies

The WRAPS process includes a means to categorize water bodies for restoration and varied levels of protection. With minimal impairments in the watershed, the Rapid River WRAPS is mainly focused on protection strategies. Since there are no lakes in the watershed, the focus is on streams.

The generally good water quality in streams is derived from well-managed forestlands, including forested wetlands. Forestland and forested wetlands rank among the best land cover in providing clean water by absorbing rainfall and snow melt, slowing storm runoff, recharging aquifers, sustaining stream flows, filtering pollutants from the air and runoff before they enter the waterways, and providing critical habitat for fish and wildlife. Fortunately, many subwatersheds are already forested and protected by public ownership and management.

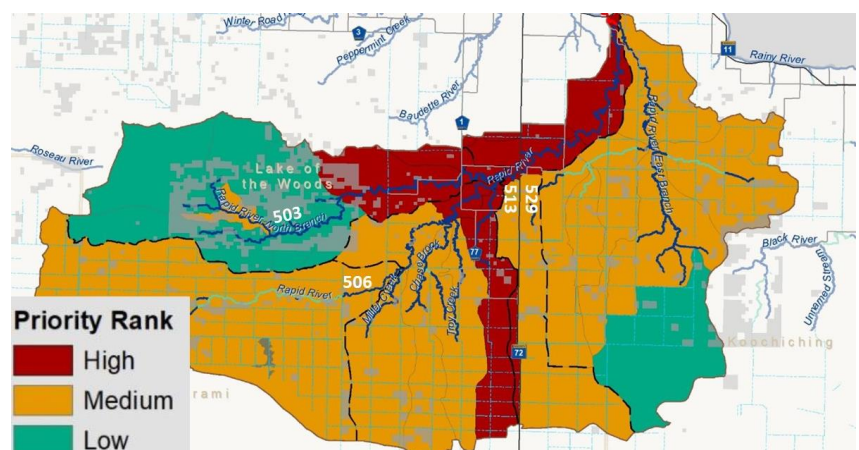
Additional protection activities include maintaining or expanding:

- **Timber harvesting best management practices (BMPs)** – Erosion during and after timber harvesting can be a major source of sediment in forested areas.
- **Beaver dam management** – While beavers are a key component of the local ecosystem, they can also pose challenges for watershed managers. Beaver dams have flooded and killed significant timbered acreage along the length of the river. The most common beaver management option involves removal of the beaver followed by removal of the dam.
- **Rice paddy management** – Wild rice production occurs primarily near Highway 72 between County Roads 1 and 16. These wild rice growers should be encouraged and provided financial support to continue to improve the quality of water discharged from rice paddies.
- **Pasture/manure management** – Pasture and manure management strategies tend to focus on manure containment. There are currently very few registered feedlots and most animals are located in feedlots with fewer than 50 animals.
- **Nutrient management** – While row crop agriculture is not a prevalent land use in the watershed, in areas where row crops are grown, nutrient management plans could be developed as a strategy to reduce nutrient runoff to streams.
- **Grade and ravine stabilization** – Building water and sediment control basins can trap agricultural runoff water, sediment, and sediment-borne phosphorus and keep the watercourse from becoming a field gully. Ravines can be stabilized by various means depending on the size of the drainage area.
- **Restoring ditched wetlands** – Over time, a great deal of work was done to dig trenches through large areas of northern Minnesota's abundant peatlands, which resulted in numerous negative downstream impacts. The remedy would seem to be restoring peatland hydrology; however, restoring peatlands is a complex task and should be done in consultation with experienced hydrologists.

Prioritizing areas for protection

In 2020, a small working group of local resource professionals developed a ranking system to prioritize areas of focus based on their contribution to the problems facing the watershed and their potential to achieve meaningful improvements (see map).

Stream areas ranked high priority for protecting fish and aquatic insects include an unnamed ditch (reach 529, 4.75 miles), Rapid River North Branch (reach 503, 45 miles), Rapid River (reach 506, 36 miles), and Christy Creek (reach 513, .8 miles).



Key conclusions of first cycle

- Overall, streams within the Rapid River Watershed are in good health (there are no lakes in the watershed). Of 12 streams assessed for aquatic life (fish and aquatic insects) and aquatic recreation (swimming) use support, 10 fully support aquatic life, one stream did not support aquatic life use, and one stream had inconclusive data (no fish or macroinvertebrate samples were collected in this stream). Four of the streams fully support aquatic recreation and the remaining eight did not have sufficient data to assess for aquatic recreation.
- Only one stream segment was found to be impaired. The Lower Rapid River in the northeastern portion of the watershed does not support aquatic life (fish and aquatic insects) due to elevated levels of total suspended solids (TSS).
- The good water quality in the watershed is generally attributable to little development and extensive areas of wetlands and forested wetlands that are largely state owned and managed. Population in the watershed is less than 1,000.
- The large-scale ditching campaign undertaken at the beginning of the 20th century to create agricultural land failed to create usable farmland but fundamentally changed the streams, creating less favorable habitat for fish and aquatic insects because of higher flows during spring runoff and summer rain events and low-flow conditions at other times. The effects of climate change are amplifying these conditions by producing more frequent and intense rain events.
- With few impairments in the watershed, local water management efforts are focused on implementing strategies to protect areas at risk of becoming degraded or impaired.

Next steps

The Rapid River Watershed approach began in 2017 with monitoring, and has progressed to the publication of the WRAPS report in December 2021. The restoration and protection strategies listed in the WRAPS report will be the basis for developing comprehensive local water management plans that include implementation efforts to restore and protect water resources. The WRAPS report lays out goals, milestones and responsible entities to address protection and restoration opportunities in the watershed. The targets are intended to provide guidance and “measuring sticks” to assess the watershed’s health and success of actions taken.

Full report

To view the full WRAPS report, search “Rapid River Watershed” on the MPCA website at <https://www.pca.state.mn.us>.

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