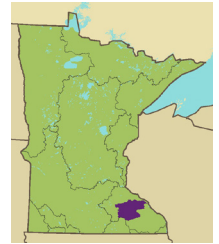


Zumbro River

Watershed Restoration and Protection Strategies (WRAPS) Report Summary



Minnesota has adopted a watershed approach to address the state's 80 major watersheds (denoted by an 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, thus increasing effectiveness and efficiency. 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.

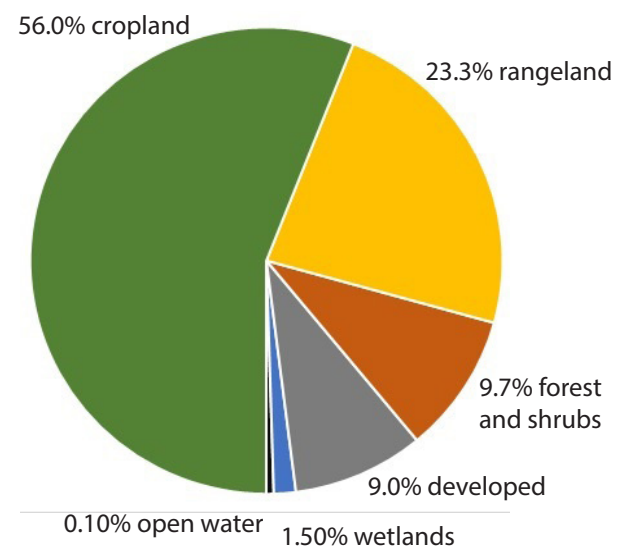
The MPCA leads the technical work and coordinates and supports strategy development with local partners. The main purpose of the WRAPS report is to summarize all the technical information so that local partners like Soil and Water Conservation Districts can use it for planning and implement the best strategies in prioritized locations.



Watershed characteristics

- Size: 1,422 square miles or 910, 080 acres
- Counties: Rice, Steele, Goodhue, Dodge, Olmsted and Wabasha
- Ecoregion(s): The western third of Zumbro River Watershed marks a transition from the Western Cornbelt Plains ecoregion to the Driftless Area ecoregion
- Municipalities: Rochester, Kasson, Byron, Zumbrota, Dodge Center and Pine Island
- Most of the land is used for agriculture (chart at right)
- Tributary to the Mississippi River: South Fork Zumbro River, Middle Fork Zumbro River and North Fork Zumbro River flow east to form the main stem of the Zumbro River, which flows northeasterly to the Mississippi River
- The 8-digit hydrologic unit code or HUC for the Zumbro River Watershed is 07040004

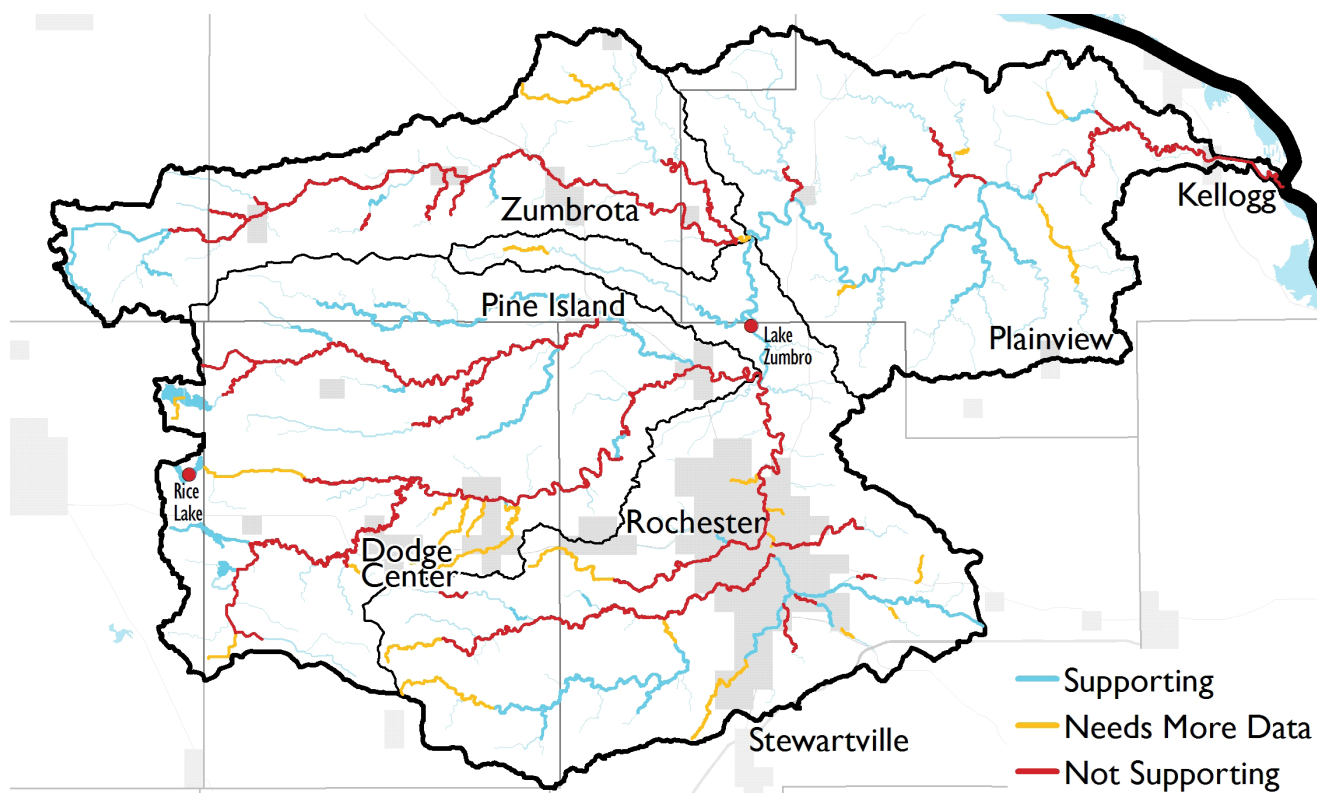
Land use in the Zumbro watershed



Moving west to east, this watershed consists of gently rolling plains that change to rolling hills and dramatic blufflands like much of southeast Minnesota. This topographic shift, along with underlying geology, gives rise to several springs that supply cold water for trout streams. The trout population and challenging river course make the Zumbro watershed popular for recreation like fishing and paddling. The underlying geology is called karst, where only a thin layer of soil covers the porous bedrock underneath. Karst features include sinkholes and caves. This type of landscape is vulnerable to pollution because contaminants can easily reach groundwater used for drinking.

Like adjoining watersheds with karst features, the Zumbro has few natural lakes and several reservoirs. The most prominent reservoir is Lake Zumbro, created by a dam that is still used to generate electricity.

Assessments: Are waters meeting standards?



During the first phase of the watershed approach – intensive watershed monitoring – the MPCA 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 designed to ensure that waters are fishable and swimmable. Waters are “impaired” if they fail to meet standards. While impairment indicates that lakes and streams are not meeting water quality standards, it does not mean that they are always unfit for recreation like swimming. Restoration and protection goals in the Zumbro River Watershed are set according to both local (within the watershed) and downstream considerations. The map above shows the assessment results for streams and lakes in the Zumbro River Watershed:

- **Supporting:** Stream conditions support the water quality standards for aquatic life (fish and bugs) and aquatic recreation (swimming and wading). These streams need protective strategies to maintain their healthy conditions.
 - **Needs more data:** The MPCA and partners lack enough data to determine if the waters meet standards. The agency will try to gather these data in its second round of monitoring, scheduled for 2022.
 - **Not supporting:** Streams and lakes fail to fully support the standards at all times. These waters need restoration strategies to return them to healthy conditions.
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Conditions stressing water quality

Excessive levels of sediment and bacteria are the major issues that need to be addressed in the Zumbro River Watershed, according to the monitoring, assessment and stressor identification work. High levels of phosphorus, sediment and bacteria can hurt aquatic life and recreation:

- Excessive sediment can cloud the water which reduces light penetration for beneficial plants and favors undesirable algae species.
- Excessive sediment can also interfere with proper gill functioning of fish and macroinvertebrates (bugs).
- Bacteria levels in streams indicate sewage or manure in the water, and may create conditions where water is unsafe for swimming.
- High phosphorus levels can cause excessive algae growth (“algae blooms”) leading to high pH and low dissolved oxygen. High pH and low dissolved oxygen can be harmful to aquatic life.
- The stress on fish and macroinvertebrates leads to less diversity of species.
- Algae blooms can also degrade aesthetics and recreational use of lakes and streams.

Overall, the streams studied had healthy fish and macroinvertebrate populations. But bacteria levels continue to a focus of research to determine their sources and impact to aquatic life and recreation.

This study also looked at two lakes in the watershed: Rice Lake in Steele County and Lake Zumbro in Olmsted County. Rice Lake, managed for waterfowl, has nutrient levels too high to meet the recreation standard. The MPCA is developing site specific water quality goals for Lake Zumbro because it is a reservoir that drains a large area.

Restoration and protection strategies

This watershed is so diverse that the strategies to restore and protects waters vary by location. Several common strategies would help improve water quality throughout the Zumbro watershed, including the following:

- Improve soil health
- Maintain current acres used as pastures
- Maintain current acres of wetlands
- Reduce fertilizer inputs through using Best Management Practices (BMPs) recommended by the University of Minnesota
- Greatly increase cover crops and perennial cover
- Increase conservation tillage

Because most of the land in this watershed is used for agriculture, that is where most of the strategies need to be implemented, including:

- Buffers where required
 - Converting marginal cropland to perennial cover
 - Expanding cover crops
 - Improving fertilizer management
-

Key conclusions of first cycle

Some waters in the Zumbro watershed are in good condition and need protection, while many waters are impaired and need restoration.

Nearly 90% of streams sampled for fish show good conditions.

About 55% of streams examined for bugs show good conditions. Water monitoring data show a decreasing trend in phosphorus and sediment from runoff.

Trout streams are in good condition, though ensuring a base flow of water is an important protection strategy.

Data also show significant decreases in phosphorus from wastewater treatment facilities, including the city of Rochester's plant. However, during low flows, wastewater treatment facilities may need to further decrease their phosphorus discharges, depending on future research.

Data and modeling show many instances of high nitrogen levels in the Zumbro and tributaries, with increasing trends in some streams and springs. These levels are a priority concern because of the potential impact to drinking water sources. Leaching of nitrogen fertilizer is the main source of nitrogen in waters in this watershed, and thus fertilizer management is a key strategy to reducing levels of this pollutant.

Stakeholders identified Lake Zumbro as a priority. Local partners and landowners need to make a long-term commitment to reduce phosphorus and sediment going to the lake in order to improve water quality and prevent the upper part from filling in with sediment.

More living cover on the land is a strategy that offers multiple benefits, including reducing pollutants that reach waters and providing wildlife habitat.

While 9.0% of the land here is developed for housing and other urban amenities, Rochester is the third largest city in Minnesota with a population of 111,402, and growing rapidly. This growth means stormwater and wastewater management will be more important as the area develops.

People have changed many of the streams and much of the land here to accommodate drainage for farming and urban development. Despite these changes, 56% of the streams remain natural while the rest have been altered. The drainage has also significantly impacted wetlands, with only 13% of the original 168,000 acres remaining. Keeping streams natural and increasing wetland acreage are two important protection strategies.



Next steps and measuring results

The MPCA and partners will conduct intensive watershed monitoring in the Zumbro watershed every 10 years, using the data for planning as well as providing another measurement of whether strategies implemented are working to restore and protect waters.

Full report

Full report www.pca.state.mn.us/water/watersheds/zumbro-river or go to www.pca.state.mn.us and search for "Zumbro River."

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The Clean Water, Land and Legacy Amendment is funding a large part of the MPCA's watershed approach.

