WRAPS report summary
Watershed Restoration and Protection Strategy

Mississippi River-Brainerd Watershed (MRBW)

Watershed approach

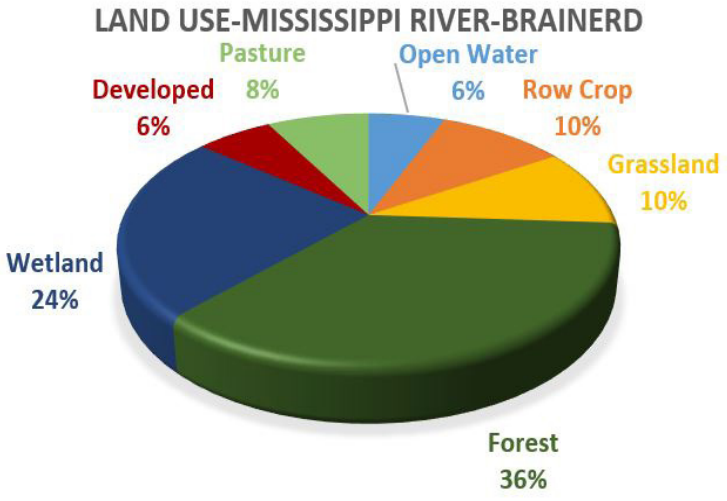
Minnesota has adopted a watershed approach to address the state's 80 major watersheds. This approach looks at the drainage area as a whole instead of focusing on lakes and stream sections one at a time, thus increasing effectiveness and efficiency. This watershed approach incorporates the following activities into a 10-year cycle:

1. Monitoring water bodies and collecting data over two years on water chemistry and biology. (2016, 2017)
2. Assessing the data to determine which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters. (2017-2018)
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). (2019-2020)
4. Coordinating with local One Watershed-One Plan efforts for implementation of restoration and protection projects. (2020-beyond)

The Minnesota Pollution Control Agency (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

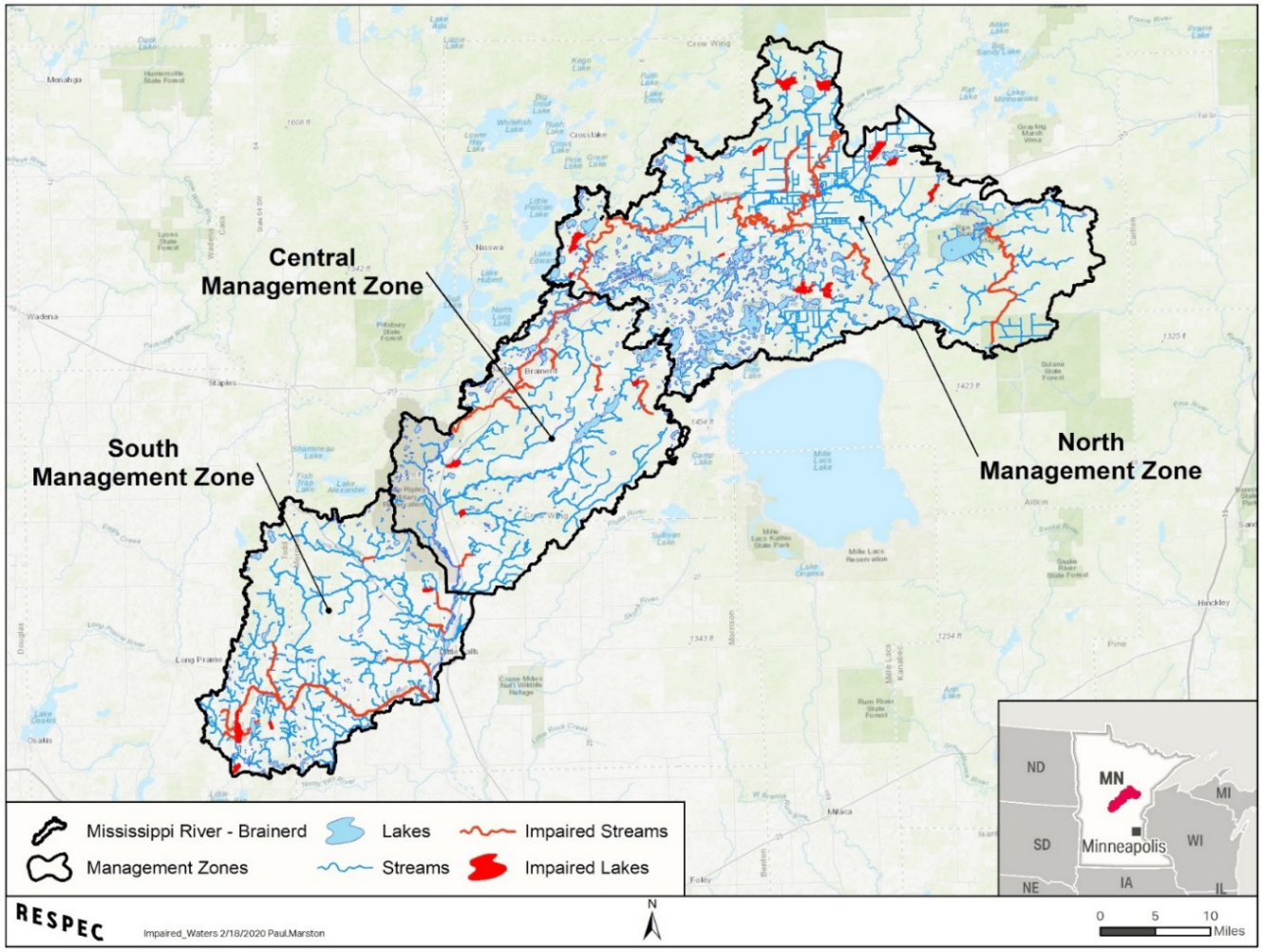
- Size: 1,687 square miles
- Counties: Aitkin, Crow Wing, Morrison, and Todd
- Ecoregion: Northern Lakes and Forest & North Central Hardwood Forest
- Most of the land is wetland and forested (chart at right)
- 212 lakes over 10 acres and 2,149 miles of streams
- The 8-digit hydrologic unit code (HUC): 07010104



Assessments: Are waters meeting standards and providing beneficial uses?

During the first phase of the watershed approach – intensive watershed monitoring – the MPCA and local partners collect data about biology such as fish and aquatic insect populations, chemistry such as pollutant levels, and flow. Waters are considered “impaired” if they fail to meet standards.

The map below shows all of the aquatic life and recreation impairments in the Mississippi River Brainerd Watershed, including those determined to be impaired prior to the latest assessment cycle.



Forty-one of the 46 uniquely identified stream/river reaches in the watershed were assessed in 2018. Throughout the watershed, 25 streams do not support aquatic life and/or recreation. Of those, 16 do not support aquatic life and nine do not support aquatic recreation. The streams that do not support recreation all show elevated bacteria concentrations. Seventy-four lakes fully supported aquatic recreation and 18 did not support aquatic recreation. Fifty-seven of the 61 lakes that were assessed for aquatic life supported that use; four lakes failed to meet the aquatic life standards.

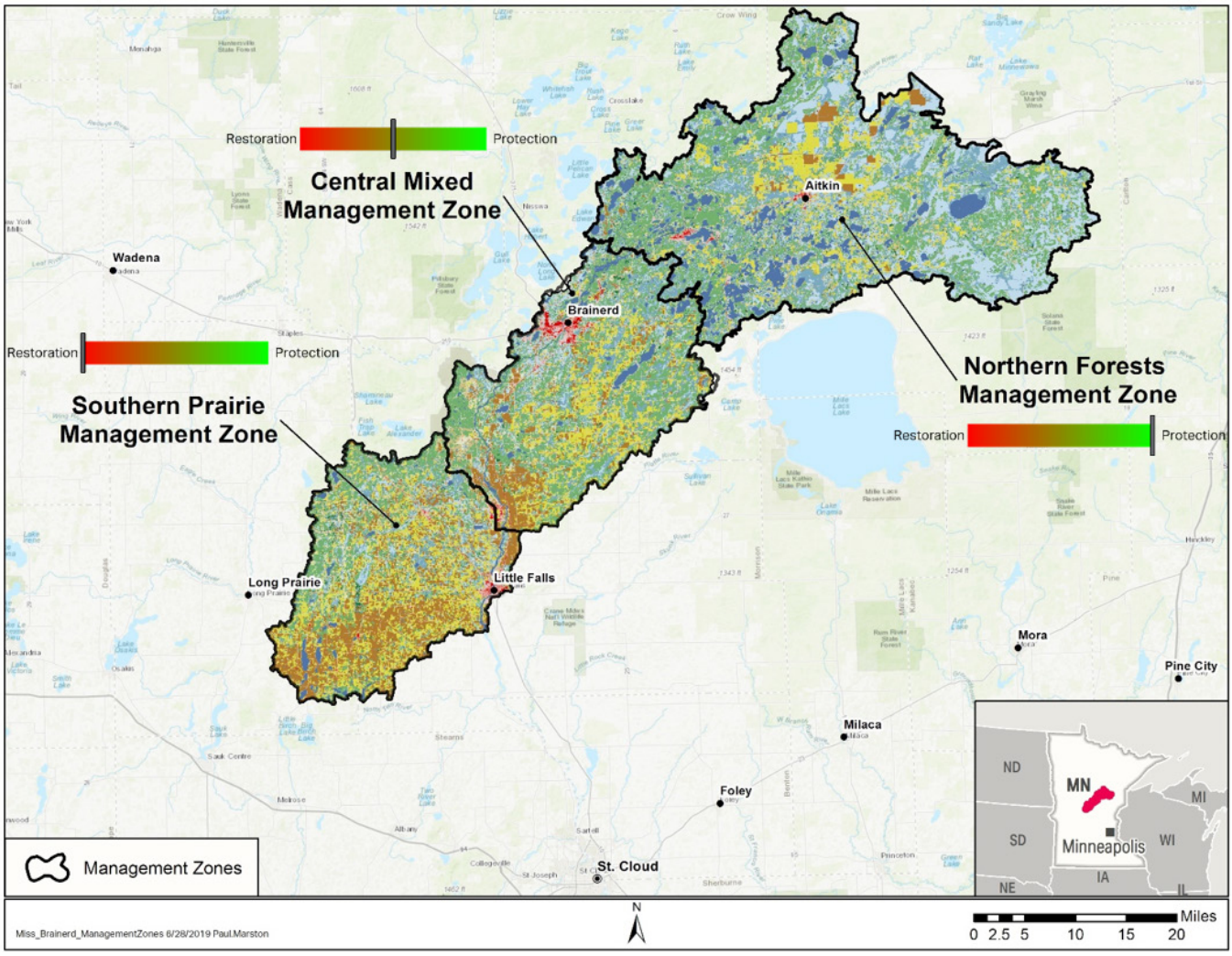
Conditions stressing fish and bugs, and affecting water quality

Data collection and analysis found that sixteen streams had impaired biology (aquatic life). Seven streams did not support healthy fish populations, and eight streams did not support adequate macroinvertebrate (bug) population. After examining many candidate causes for the biological impairments, the following stressors were identified as probable causes of stress to aquatic life: low dissolved oxygen (DO) concentrations, excess nutrients, watercourse connectivity, flow alteration, excess sediment, and lack of habitat. Low DO concentrations are found throughout the impaired stream sections, and many of the low DO concentrations are linked to watersheds that have a high percentage of wetland acres that export low DO water. Ditching is also prevalent in a number of the low DO reaches. Ditching has altered how water is delivered through the stream system by increasing peak flow or by diminishing low flow. Ditching is also playing a role in the lack of suitable habitat in certain stream sections. In a few cases, cattle pastured in riparian areas have caused channel instability and habitat degradation. Biological impairments in the urban areas are affected by stormwater runoff.

Restoration and protection strategies

Strategies for addressing the identified issues in the MRBW include promoting lake and stream protection through keeping or establishing native vegetation, easements and forest stewardship; reducing stormwater runoff in urban areas and around lakes; managing livestock and associated wastes in a manner that protects lakes and streams; and restoring altered stream hydrology.

Total Maximum Daily Load (TMDL) studies were developed for nutrients in eleven lakes, macroinvertebrate biological impairments in two streams, and bacteria in eight stream reaches. These studies identify known and likely sources of the pollutants and reductions needed to bring these reaches back into compliance with state standards.



To target the prioritization efforts for the restoration and protection, the MRBW was divided into three separate management zones: the north, central and south. The north management zone is comprised of high-quality waterbodies, with a natural landscape of forest and wetlands with minimal stress from anthropogenic disturbances. The impairments in this zone are mostly the result of natural causes, such as low DO water discharging from large wetland complexes and fish connectivity issues. Conservation efforts to protect the high-quality resources that are abundant in this region of the watershed are the focus for this zone. The central management zone is unique as it is not dominated by any one distinct landscape, and is the transition zone from the heavily forested northeast region of the watershed to the agricultural southwest. The central management zone is also where the largest population center (Brainerd/Baxter) is located within the watershed. Priority in this management zone is to balance protection of the high-quality water resources from future stresses and restoration of impaired waterbodies. The south management zone is differentiated from the other two management zones because of the landscape largely consisting of agriculture and the presence of a majority of the watershed's feedlots. As such, the overarching priority for this management zone is focusing efforts on restoration of the degraded waterbodies. The figure above highlights these zones.

Key conclusions of first cycle

- Overall, the MRBW is quite healthy. The lakes and streams that are impacted in the watershed are due to stormwater runoff in cities and around highly developed lakeshore, improper management of livestock and manure adjacent to lakes and streams, and streams that have been changed from their natural state by ditching.
- Nine of the 41 assessed streams were found to have high levels of bacteria, while another 16 streams don't meet standards for aquatic life (fish and/or bugs). 61 lakes had their fish populations assessed, and four of those lakes didn't meet the expected standards. There are 18 lakes (of 74 assessed) that have high nutrient levels.
- In order for impaired lakes and streams to meet water quality standards, the majority of pollution reductions will need to come from non-point sources.
- Best Management Practices that will be most effective at addressing non-point pollution include maintaining buffers, livestock management, streambank stabilization along streams, septic system compliance, and managing historical impacts for lakes.
- To target the prioritization efforts for restoration and protection, the MRBW was divided into three separate management zones, each with an appropriate focus: the north (protection focus), central (protection and restoration) and south (restoration).

Little Buffalo Creek – Impaired for fish, invertebrates and E.coli bacteria due to impacts from urban stormwater runoff.

Nokasippi River - an Exceptional Use Stream. Forested buffers adjacent to lakes and streams is essential for good water quality.

Full report

Full reports as well as supporting documents can be found at: https://www.pca.state.mn.us/water/watersheds/mississippi-river-brainerd or search "Mississippi River Brainerd Watershed" on the MPCA website.

Contacts

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