

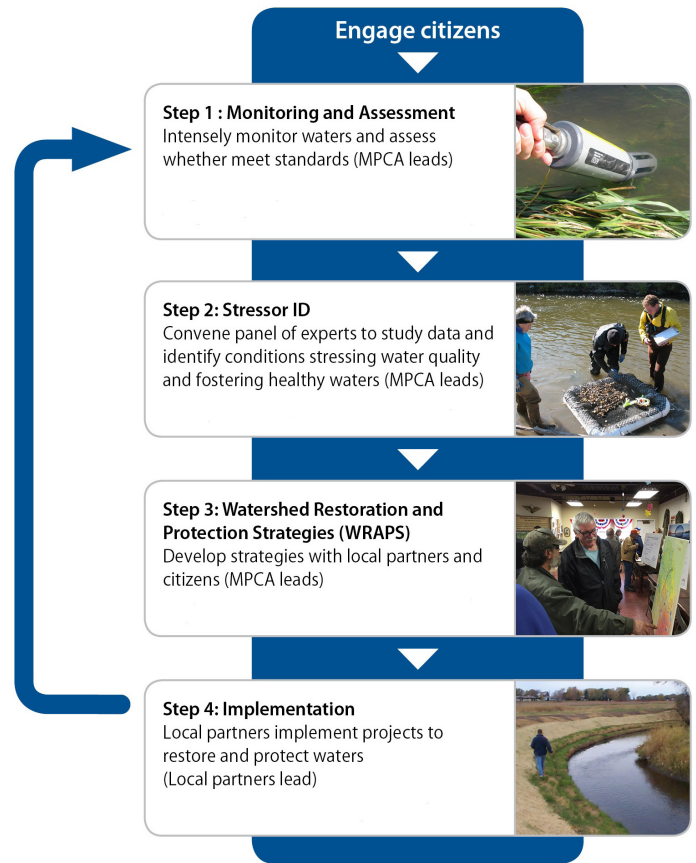
# Mississippi River-Headwaters Watershed

## 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 10-year cycle:

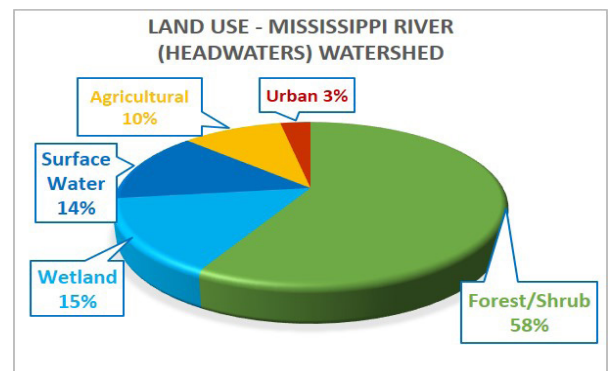
1. Monitoring water bodies and collecting data over two years on water chemistry and biology.
3. Assessing the data to determine which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters.
3. Developing strategies to restore and protect the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

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

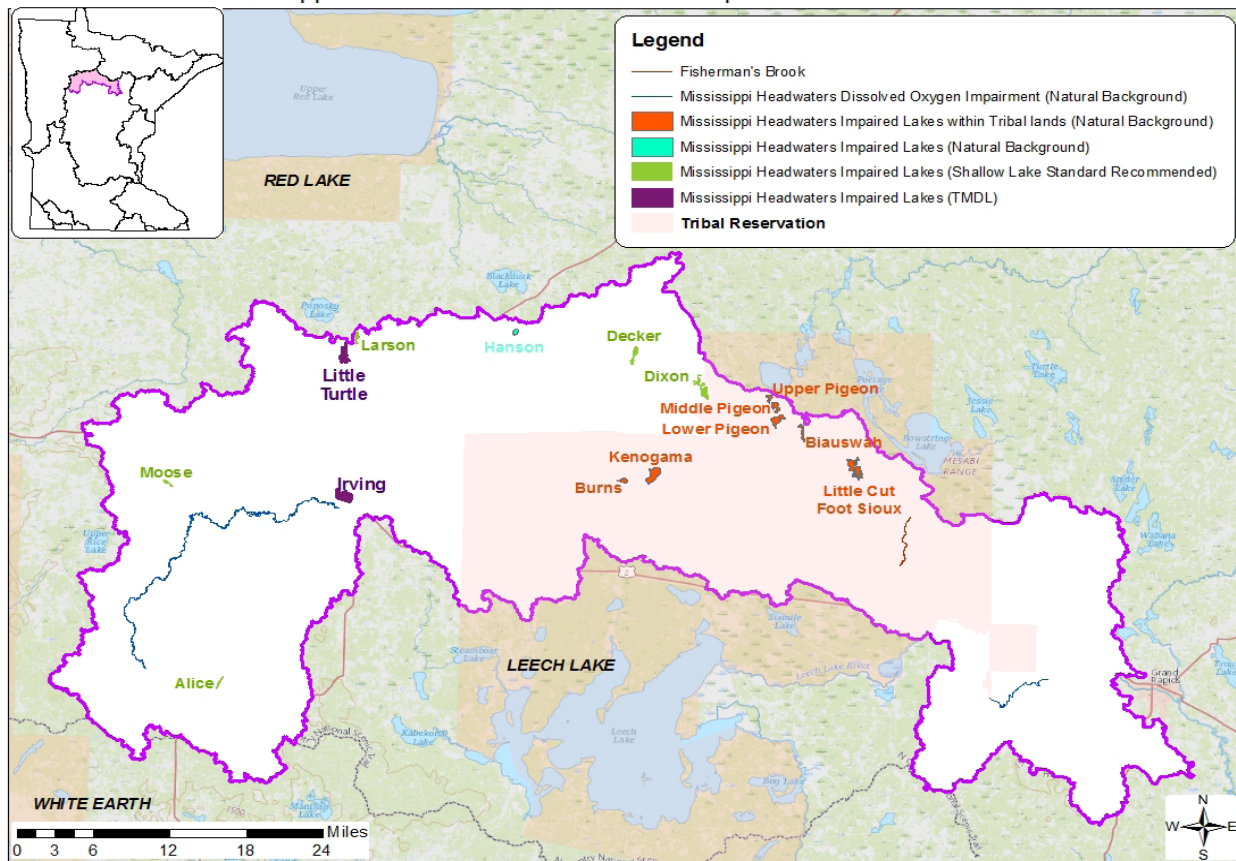
- Size: 1961 square miles or 1,255,040 acres.
- Water: ~Over 1000 lakes >10 acres and 685 perennial river miles.
- Counties: Becker, Beltrami, Cass, Clearwater, Hubbard and Itasca.
- Ecoregion: Northern Lakes and Forests
- Land use: Predominantly forested, with only about 3% urban development.
- Municipalities in the watershed include Bemidji, Cohasset, Deer River, and Cass Lake.
- The 8 digit hydrologic Unit Code (HUC) for the Mississippi River (Headwaters) Watershed is 07010101.



## 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 populations, chemistry such as pollutant levels, and flow to determine if lakes and streams are meeting water quality standards. Waters are “impaired” if they fail to meet standards. The map below shows the impairments for streams and lakes in the Mississippi River-Headwaters Watershed (MRHW). Using data from these sampling efforts, it was determined that 15 lakes do not support the state aquatic recreation standard (nutrient/eutrophication biological indicators). Of the 15 lakes, a TMDL was completed for two lakes (Irving and Little Turtle, Beltrami County). Five lakes do not meet aquatic recreation standards, but are being considered for a possible future separate shallow lakes or site specific standard, and eight did not meet the aquatic recreation standards due to predominantly natural background causes. There were 3 stream reaches that scored low for their fish or macroinvertebrate communities and were investigated in the Stressor Identification report, and one reach (Fisherman’s Brook) that did not meet aquatic life standards. Fisherman’s Brook is wholly located within the Leech Lake Indian Reservation. Waters that are wholly within reservation boundaries that are identified as impaired are not placed on the 303d list but are instead placed on a separate list that is sent to EPA with the notation that the assessments are to be considered advisory in nature.

Mississippi River Headwaters Watershed Impaired Lakes and Streams



## Impairments in the Mississippi River-Headwaters Watershed

### Impairments:

- Two lakes (Irving and Little Turtle, Beltrami County) were found to be impaired for nutrients in the Mississippi River Headwaters Watershed, and a Total Maximum Daily Load study (TMDL) was developed for these lakes during this Intensive Watershed Monitoring (IWM) cycle.
- One stream (Fisherman’s Brook- Leech Lake Reservation) was found to be impaired for aquatic life.

See Section 2.4 (TMDL Summary) of the Mississippi River Headwaters WRAPS report for additional information on these impairments.

## Conditions stressing fish and bugs, and affecting water quality

To develop strategies for restoring or protecting water bodies with biological impairments, agencies and local partners must first identify the possible causes, or stressors, of the impairments. The table below summarizes the predominant stressors in the indicated streams in the MRHW.

Stream	AUID	Reach Description	Biological Impairment <sup>+</sup>	Primary Stressor		
				Connectivity	Altered Hydrology*	Iron
Sucker Creek	07010101 - 663	Gould Creek to Mississippi River	MI			◇
Gull River	07010101- 551	Erickson Lake to Nelson Lake Outlet	Fish	o		
Sugar Brook	07010101- 692	Unnamed Lake (31-0553-00) to Pokegama Lake	Fish	o		

+ These are not officially impaired but did have one of the two biological communities with IBI scores below the threshold value.

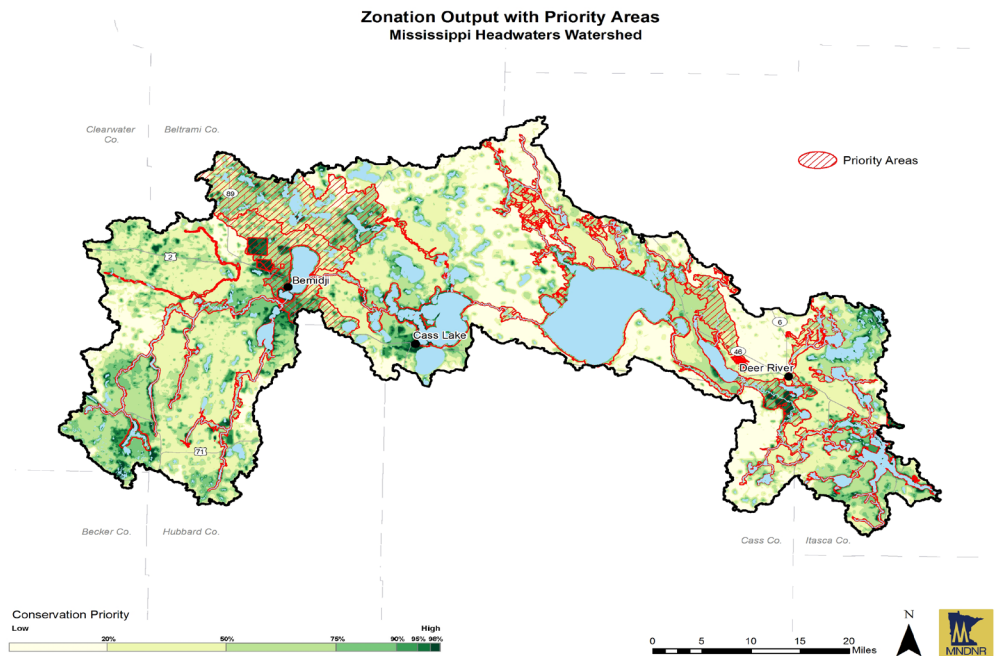
\* Includes intermittency and/or geomorphology/physical channel issues.

◇ Possible contributing root cause.

o Stressor, but has little to no anthropogenic cause. Includes natural wetland/groundwater inputs/beaver dams as natural stressors.

## Restoration and protection strategies

The WRAPS project team (Team) created the strategy map (Map output from the Zonation Model and synthesis) shown here using HUC-12 subwatersheds – drainage areas within the larger HUC-8 MRHW – to help identify priority areas for targeting actions to protect water quality. Multiple sources of data, maps and analysis tools including Hydrologic Simulation Program Fortran (HSPF) were combined to create the final prioritization map. This map identifies several focused priority areas. First, priority was given to the riparian lands associated with the Mississippi River corridor (lands within 300 feet of the river or the landward side of its floodplain as determined by DNR terrain analysis, whichever is greater). Second, priority was given to lands in the Lake Bemidji catchment and lands associated with the City of Bemidji’s drinking water supply management areas. Third, priority was also given to lands associated with the EPA superfund site in the City of Cass Lake, and numerous stream riparian and floodplain areas.





## Next steps and measuring results

The restoration and protection strategies listed in the WRAPS report will be the basis for developing local implementation plans. The report lays out goals, milestones and responsible entities to address strategies in the MRHW. The targets are intended to provide guidance and “measuring sticks” to assess the watershed’s health and success of actions taken.

Water quality in some areas in Minnesota has declined over many decades. While restoration activities continue, new problems develop, such as converting land to intensive cropping that negatively impacts water quality. The perpetual challenge is to make improvements and keep up with new problems.

Impacts from other factors such as climate change are still not completely understood. Consequently, it may take decades to fully restore impaired waters. For these reasons, it is much more cost-effective to protect clean waters while we can, such as those in the MRHW.



## Key conclusions of first cycle

- The MRHW is rich in surface water resources. This wealth of water resources includes some of the state’s most famous lakes and streams. Each year, thousands of anglers travel to this watershed in search of walleye and other game fish.
- Water quality data collected on Lake Bemidji suggests that it is currently near the state impairment threshold for nutrients. Collaboratively working together towards improving the water quality upstream within the Lake Irving sub-watershed (Lake Irving TMDL) will help towards protecting Lake Bemidji.
- The MRHW overall has very good water quality and to preserve it, forest protection is critical. The watershed is heavily forested (58%) and has a large number of rare or declining plant and animal species that are dependent on aquatic resources of features.
- The WRAPS report data and findings provide a base for developing the One Watershed One Plan.
- Sixty lakes and/or basins were evaluated for water quality trends based on long-term transparency monitoring. Results suggest the following: 44 (no trend), 11 (improving) and 5 (declining).
- The primary goal in this watershed is to maintain the current water quality status and improve where possible. A 5% reduction goal is achievable for many of the priority lakes and provides an incentive for citizen engagement in achieving those goals.
- A watershed model was used to link land use changes to watershed responses in water quality, hydrology, hydrogeology and natural features.
- Land conservation practices such as conservation easements on threatened/sensitive parcels, stormwater best management practices and managing forest health are priority protection strategies.
- The next WRAPS project cycle for the MRHW is expected to begin in 2023.

## Full report

Full report as well as supporting documents can be found at: <https://www.pca.state.mn.us/water/watersheds/mississippi-river-headwaters>

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