



# Lake Superior- North 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 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.

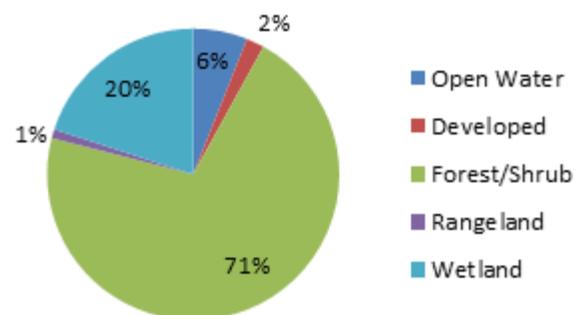
The WRAPS process began in this watershed in 2013.



## Watershed characteristics

- Size: 1,570 square miles in Minnesota
- Counties: Lake and Cook
- Ecoregion(s): Northern Lakes and Forests
- Most of the land is forested, rural residential/recreational, managed forests, parks and wilderness. Low percent of privately-owned lands (chart at right)
- Population: Sparse with fewer than 6,000 permanent residents (2010 census). Towns include Schroeder, Tofte, Lutsen, Grand Marais and Grand Portage
- The 8-digit hydrologic unit code (HUC): 04010101

Land use in this watershed

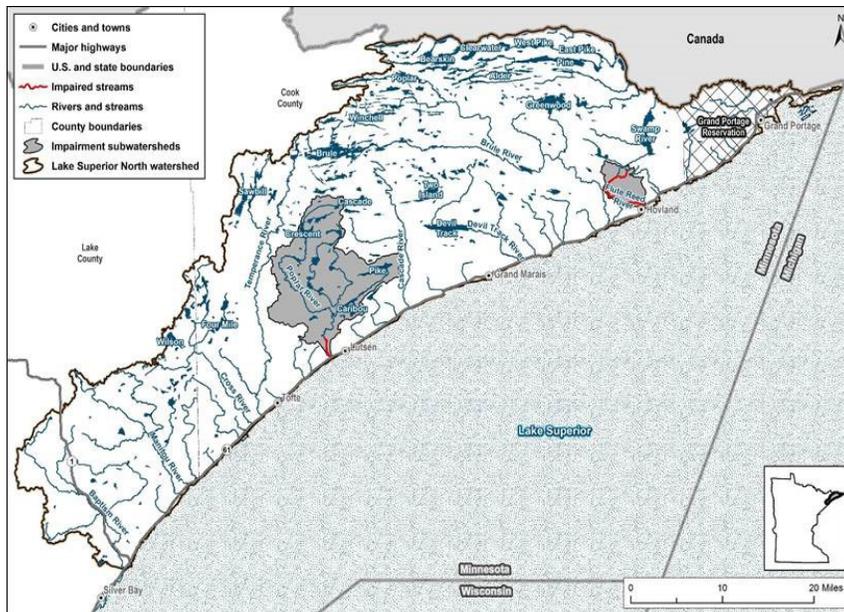


Watershed soils and subsurface geology are dominated by bedrock, glacial till and deposits of sand, gravels, clay and silt. Complex bedrock structure contributes to the spectacular mountains and ridges that slope toward Lake Superior. Numerous streams flow from forested uplands through bedrock cracks, forming waterfalls, cascades and rapids. Wetlands and lakes are found throughout the watershed.

These high-quality water bodies support sensitive aquatic species and provide clean water for recreation and other uses. Lakes exhibit excellent water quality, and are enjoyed by many for fishing, boating, and other forms of aquatic recreation.

Geography and ownership patterns shape the watershed's development potential. In general, development levels are low and mostly concentrated along the Lake Superior shoreline. However, development has increased in some areas, particularly along certain lakeshores, and may be negatively affecting water quality.

## 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 collected data about habitat, biology such as fish and macroinvertebrate populations, chemistry such as pollutant levels, and flow to determine whether lakes and streams were meeting water quality standards. These standards are 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 Lake Superior - North watershed are set according to both local (within the watershed) and downstream considerations. The map above shows the watershed's conventional pollutant impairments. Under federal and state laws, impaired waters must complete Total Maximum Daily Load (TMDL) studies to determine pollutant reductions needed to meet water quality standards. During this project, the MPCA and local partners completed TMDL studies for one stream, the Flute Reed River. A TMDL was completed for the Poplar River in 2013.

Post-assessment results for streams and lakes in this watershed indicated:

- The Flute Reed River does not meet water quality standards due to excess sediment; a TMDL report has been completed.
- The Poplar River has been restored and proposed for removal from the impaired waters list.
- The remaining assessed water bodies meet all conventional water quality standards. Many of the mercury-impaired lakes are addressed in the statewide mercury TMDL report.
- The watershed contains many high quality lakes and rivers, some are rated as exceptional for water quality and biological health.

## Conditions stressing water quality

To develop strategies for improving or protecting water bodies now and into the future, agencies and local partners identified the possible causes, or stressors, that can negatively impact biology and water quality.

As with the Lake Superior - South watershed, the North is not a nested system of tributaries that eventually reach one drainage outlet. The watershed is a complex series of many individual streams of varying drainage sizes flowing to Lake Superior. Small watersheds may be less resilient to changes. The overall health of these streams influences the near shore and long-term health of Lake Superior.

The primary issues of concern include:

- Erosion along streambanks, lakeshores and roadsides
- Expanding demands on, and use of, surface and groundwater
- Forest management harvest targets and sustained healthy forests in an uncertain future of climate change
- Shoreline/wetland management in current and emerging development corridors

Maps and tables that depict the location and type of pollutants and watershed health stressors can be found in the WRAPS report along with stressor or pollutant impact maps; these tools provide a basis for more detailed and thoughtful discussion for watershed-improvement efforts. Data, maps and evaluative tools, such as the Hydrologic Simulation Program Fortran model for watershed analysis were combined to identify and eventually select the targeted sub-watersheds and needed practices to maintain or improve water quality and habitats.

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## Restoration and protection strategies

The WRAPS report strategies will be the basis for developing local resource implementation plans such as the One Watershed, One Plan effort. In this report, priority areas include the Flute Reed River (restoration and protection) and the Poplar River (protection). Other high-quality areas targeted for protection include Lake Superior's near shore area and the Devil Track River and Baptism River watersheds. Four lakes with continuous declining Secchi transparency targeted for further investigation are Poplar, Deer Yard, Devil Track and Tom.

Among the strategies identified as important continued and future work in various areas of Lake Superior - North are:

- Culvert inventories and replacement
- Septic system assessments, replacement, and improved management
- Streambank and lakeshore buffer improvements
- Natural stream channel restoration, where appropriate
- Improved forestry management
- Improved stormwater management
- Ordinance reviews and revisions
- Conservation easements, where appropriate
- Low impact development design to maintain natural hydrology



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## Key conclusions of first cycle

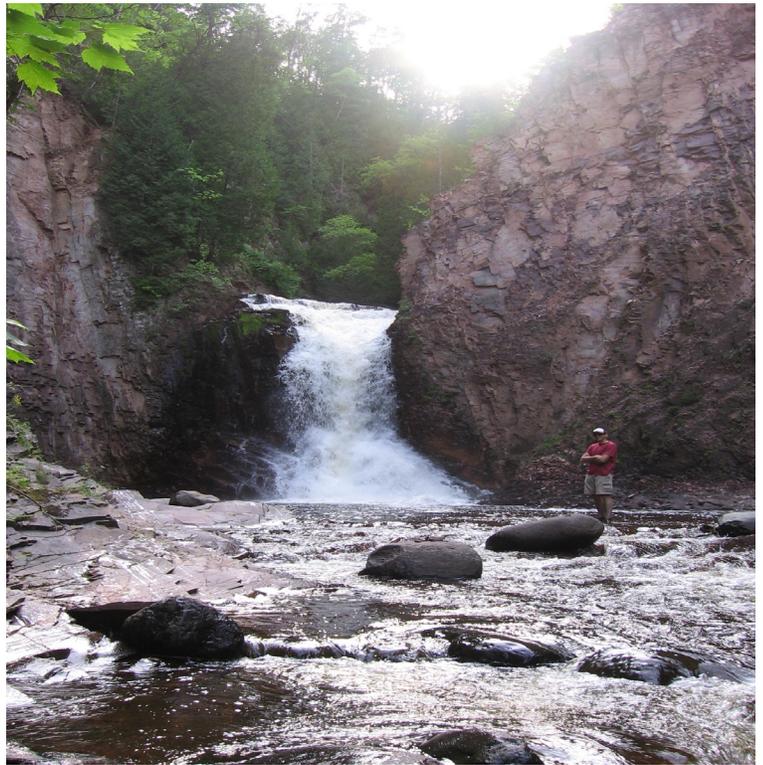
- Protection and restoration strategies are dictated largely by the sensitive geology, a healthy forest component and careful consideration of landuse practices that affect stream channel integrity and sediment delivery.
- Lakes in the watershed are high value recreation resources and meet all conventional water quality standards. They should be protected to ensure clean water in the future. Mercury reductions are still needed for many lakes. Unique among these lakes are lake and stream trout fisheries.
- Streams are prized recreation destinations, support healthy trout populations and scored so well in evaluations that they are considered reference streams for their category. They are also home to unique and rare species.
- Trout streams are in good condition. Ensuring a base flow of cold water is an important protection strategy.

- Impacts to streams are sediment and stream channel instability from slumping and eroding banks. This affects the health of fish populations and the stream-dwelling insects they thrive on. Stream channel instability is also a concern for transportation infrastructure.
- Improvements to the Lake Superior streams will reflect a healthier near shore habitat in Lake Superior and protect Lake Superior.

## Next steps and measuring future results

The WRAPS report lays out goals, milestones and responsible entities to address protection and restoration priorities in the watershed. The targets provide guidance and “measuring milestones” of the watershed’s health and the eventual success of actions taken.

In addition, local issues of concern and social readiness were factored into the evaluation. In many locations of the watershed, citizen groups are engaged and ready to commit to projects that will improve or sustain the Lake Superior - North’s water resources. An important goal is to grow these citizen interests and efforts. A local water management plan, the One Watershed, One Plan for Lake Superior - North has been completed and identifies specific projects in targeted locations.



## Full report

To view the full report, go to [www.pca.state.mn.us/sites/default/files/wq-ws3-09020309b.pdf](http://www.pca.state.mn.us/sites/default/files/wq-ws3-09020309b.pdf) or search for “watershed Lake Superior - North” on the MPCA website.

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