

Nemadji 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 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:

- Water quality monitoring and assessment
- Watershed analysis
- Civic engagement
- Planning
- Implementation
- Measurement of results

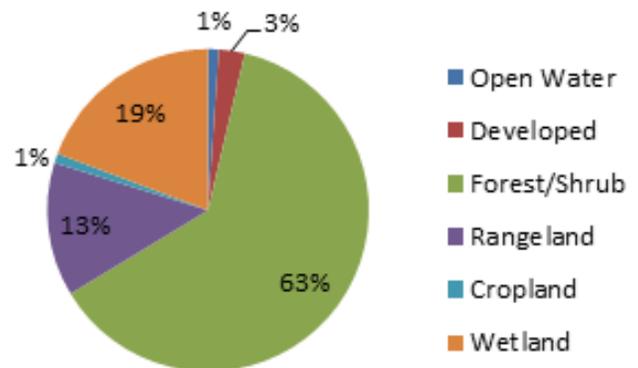


The Nemadji River in Carlton County

The Nemadji River Watershed process began in 2011. Watershed assessments incorporated biology (fish and macroinvertebrates) along with the traditional chemistry and flow for a comprehensive watershed health assessment. The watershed approach adds a protection component for water resources that currently meet standards rather than focusing entirely on restoration of impaired waters.

Watershed characteristics

- Size: 276 square miles or 176,640 acres in Minnesota
- Water: ~ 475 perennial river miles
- Counties: Carlton and Pine, Minnesota
- Ecoregions: Northern Lakes and Forests
- Land use: Predominantly forested, rural residential/recreational and rural small agriculture.
- Population: The watershed is sparsely populated with fewer than 10,000 people (2010 census) of townships. Towns include Wrenshall, Holyoke, Pleasant Valley and Duesler.
- The 8-digit HUC for the Nemadji River Watershed is 04010301.

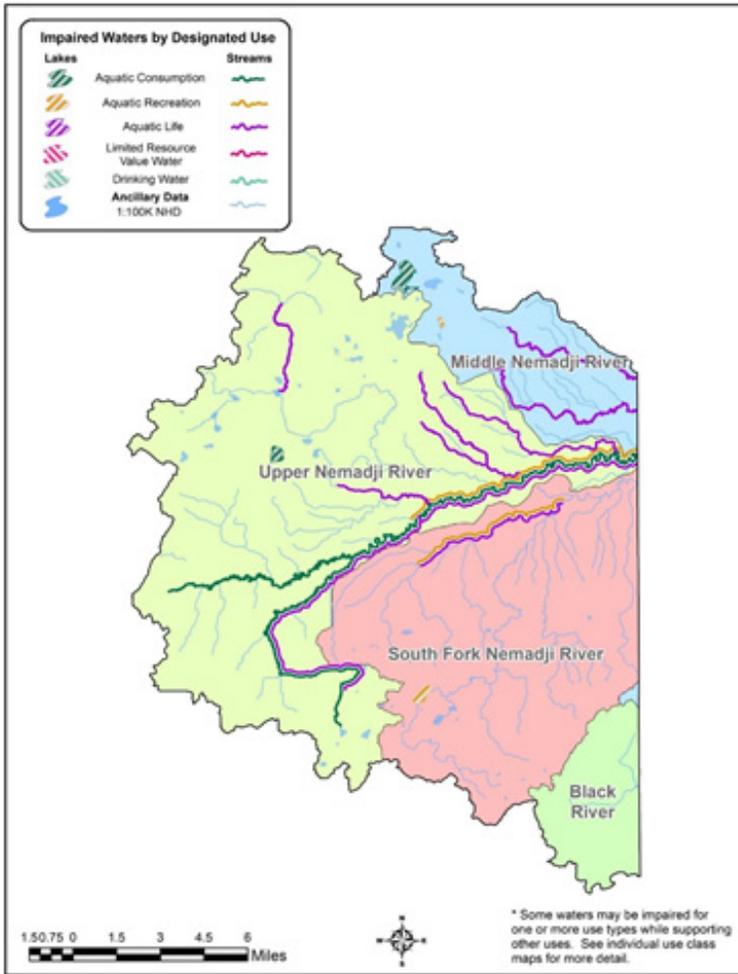


Assessments: Are waters meeting standards and providing beneficial uses?

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 whether lakes and streams are meeting water quality standards.

Waters are “impaired” if they fail to meet standards. The map on the next page shows the watershed’s impairments for streams and lakes in the Nemadji River Watershed. Under federal and state laws, impaired waters must have total maximum daily load (TMDL) studies to determine reductions of pollutants needed to again meet water quality standards. In this first WRAPS cycle, the MPCA and local partners completed TMDL studies for 10 stream sections and two lakes.

Impairments in the Nemadji River Watershed



Impairments:

- Two lakes do not meet water quality standards.
- Twelve stream sections do not meet water quality standards.
- Lac La Belle, Net Lake, and Deer, Elim, Mud and Skunk Creeks are examples of waterbodies listed as “impaired,” or polluted by high levels of phosphorus, sediment or bacteria.
- The remaining assessed water bodies meet all water quality standards.
- More information is available in the water quality monitoring and assessment report.

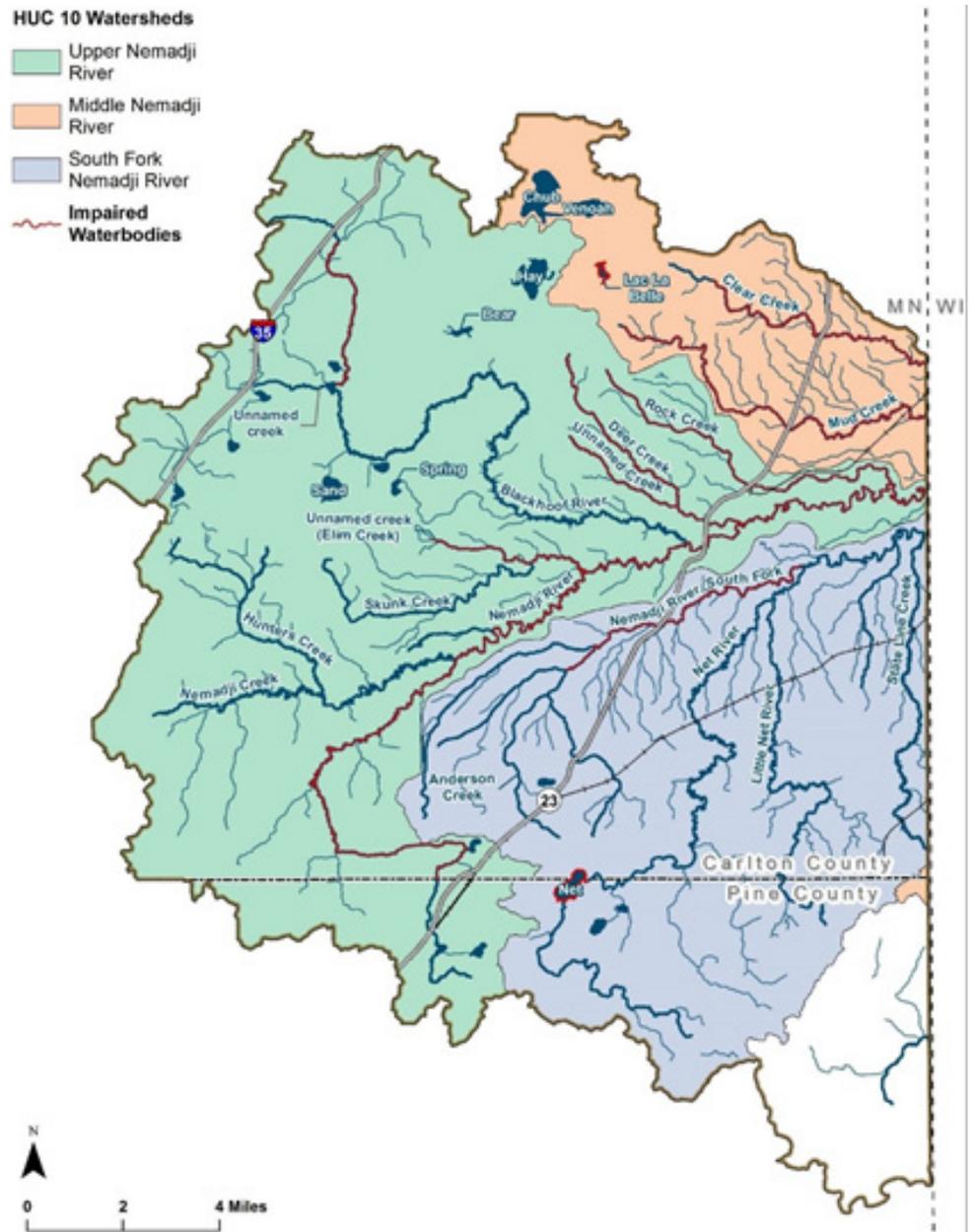
Stressors: What factors are affecting fish and bugs?

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 for the indicated streams in the Nemadji River Watershed.

Streams	Biological Impairment	Primary Stressor					
		Historic Flow Alteration	Recent Flow Alteration	Physical Habitat Alteration	Habitat Fragmentation	Water Temperature	Total Suspended Solids / Turbidity
Mud Creek	Fish	x					x
Clear Creek	Fish and macroinvertebrates	x					x
Unnamed creek (Elim Creek)	Fish				x		
Blackhoof River	Fish and macroinvertebrates				x		
Deer Creek	Fish	x		x			x
Rock Creek	Fish and macroinvertebrates	x	x			x	x

Restoration and protection strategies

- Three subwatersheds within the Upper Nemadji are prioritized for both restoration and protection work in the first 10 years of targeted implementation and water quality improvement work. They are the Deer Creek, Skunk Creek and BlackHoof River subwatersheds. Three lakes are the focus of targeted work, Lac La Belle, Net Lake and Chub Lake. Multiple sources of data, maps and evaluative tools including HSPF watershed analysis were combined to select the targeted subwatersheds.
- Social readiness was factored into the strategies. Prioritized watersheds have active citizen leaders or organizations that have been and are currently engaged in water improvement projects.
- Other maps of individual pollutants, such as phosphorus and nitrogen, can be found in the full report. Stressor or pollutant impact maps are also part of the report and provide more detail as to where projects may be best focused.



Next steps and measuring results

The WRAPS report's restoration and protection strategies will be the basis for developing local implementation plans. The report lays out goals, milestones and responsible entities to address these priorities. The targets are intended to provide guidance and "measuring sticks" to assess the watershed's health and success of actions taken. Among the strategies are: culvert inventories and replacement, septic system assessments and replacement, livestock/animal stream access improvements, streambank and lakeshore buffer improvements, natural stream channel restoration where appropriate, ravine, channel bank and stream headcut stabilization, improved forestry management, conservation easements where appropriate, and low impact development design to maintain natural hydrology.

Making improvements and keeping up with new problems is challenging. Impacts from other factors, such as climate change, are still not completely understood. Consequently, it may take decades to fully restore impaired waters.

Key conclusions of first cycle

- Protection and restoration strategies are dictated largely by the sensitive geology, a healthy forest component and careful consideration of land use practices that affect stream channel integrity.
- Most lakes in the watershed are high value recreation resources and meet water quality standards. They should be protected to ensure clean water in the future.
- Several Nemadji Watershed streams support healthy trout populations and are highly preferred recreation destinations. The Nemadji watershed forest supports unique and rare species of trees, birds and reptiles.
- Primary impairments to streams are sediment and stream channel instability from slumping and eroding banks. This affects the health of the trout population and the stream dwelling insects they thrive on. Stream channel instability is also a concern for transportation infrastructure.
- Improvements to the Nemadji system will reflect a healthier near shore habitat in Lake Superior.
- Stewardship/education programs and activities for restoration and protection efforts in the watershed should be continued.



Deer Creek at high flow.

Full report

Full report and supporting documents can be found at www.pca.state.mn.us and search for **Nemadji River**.

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