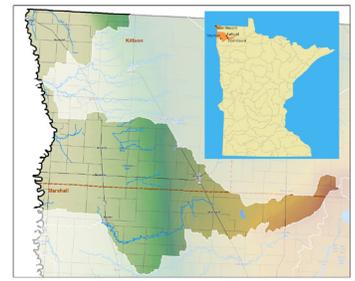


Summary - Lower Red River Watershed Restoration and Protection Strategies (WRAPS) Report



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:

- Water quality monitoring and assessment
- Watershed analysis
- Public participation
- Planning and implementation
- Measuring results



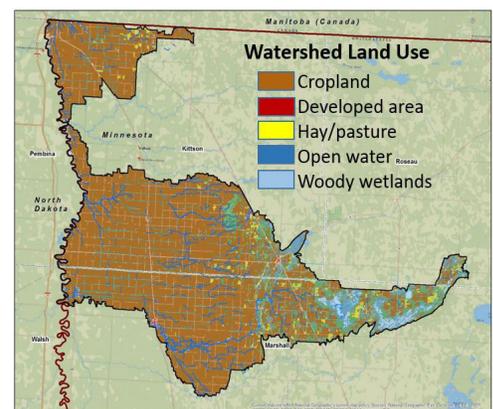
Photos showing the effects of “flashy” flows in the watershed. Rivers swell quickly after spring runoff and summer rains but have low flows at other times.

The Minnesota Pollution Control Agency (MPCA) leads the monitoring and assessment of the waters and works with local partners to develop restoration and protection strategies. Local partners lead efforts to implement the strategies to restore and protect water resources, and also engage citizens throughout the process. Local partners whose administrative boundaries overlap partially or completely with the area of the watershed include the Kittson, Marshall, and Roseau Soil and Water Conservation Districts, and the Two Rivers, Joe River, and Middle-Snake-Tamarac Rivers Watershed Districts.

The Lower Red River Watershed effort began in 2008 and produced a Watershed Restoration and Protection Strategies (WRAPS) Report that was published in April 2018. Summarized in this document are key findings and recommendations contained in the full report.

Watershed characteristics

- Size: 886 square miles or 567,036 acres
- Counties: Kittson, Marshall, and Roseau
- Ecoregion(s): Lake Agassiz Plain
- Municipalities: Donaldson, Halma, Humboldt, Karlstad, Kennedy, Saint Vincent, Stephen, and Strandquist
- Land cover: Cultivated Crops (80%), Wetlands (6%), Forest/shrub (5.5%), Developed (5%), Pasture/hay/grassland (2%), and open water (1.5%)
- Tributary to: Red River of the North
- The 8-digit hydrologic unit code or HUC for the Lower Red River Watershed is 09020311.



Assessments: Are waters meeting standards and providing beneficial uses?

During the first phase of the watershed approach – intensive watershed monitoring – the MPCA collected data about biology such as fish and aquatic insect populations, chemistry such as pollutant levels, and stream 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. The map on the next page shows impairments for streams in the Lower Red River of the North Watershed that are being addressed with TMDLs.

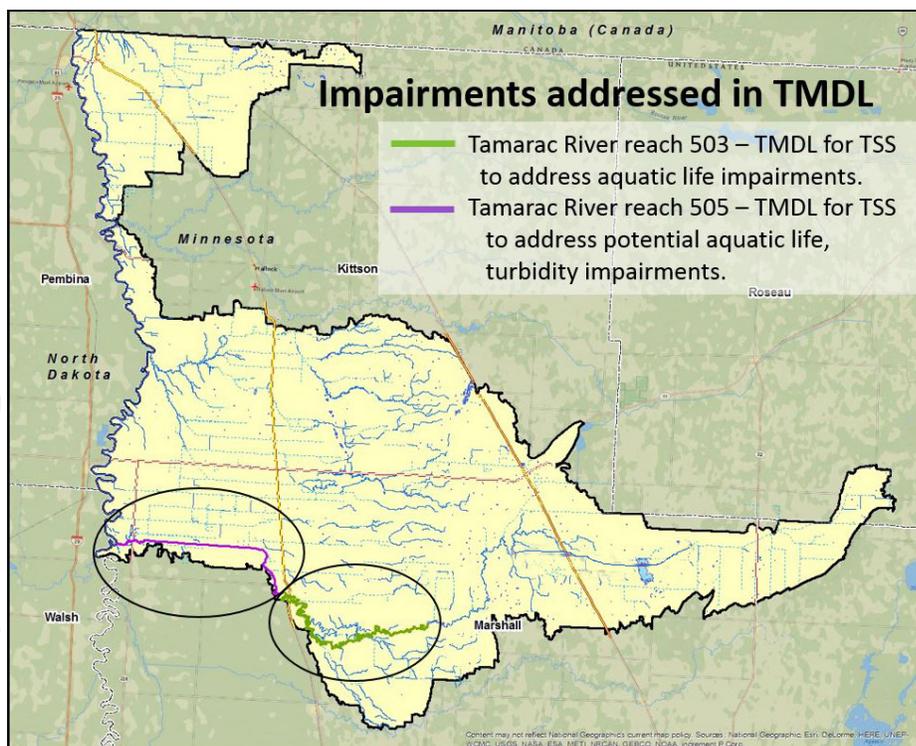
The watershed contains 52 stream reaches and 38 lakes as defined by the state of Minnesota (i.e., they have an assessment unit ID [AUID] and/or a DNR lake number). Of these, not all were monitored or assessed for impairment due to reasons including being part of the Red River of the North mainstem, extensive modification, channelization, insufficient flows, impoundments, no channel or waterbody present, and/or limited resource value waters.

The following are the 2011 assessment highlights of the watershed:

- No lakes were assessed.
- Only two of 15 stream reaches with biological monitoring stations were assessed for aquatic life use. The remaining 13 were deferred due to extensive stream alteration and the special set of standards developed for such conditions (TALU) had not yet been adopted. One of the two reaches assessed was supportive of aquatic life, but the other (a reach of the Tamarac River) had an existing 2006 impairment caused by low fish numbers that was confirmed, and a new impairment caused by low aquatic insect numbers was identified and listed in 2012. Though not yet officially listed as impaired, one of the deferred stream reaches of the Tamarac River was determined to have excessively high total suspended solids (TSS) levels.
- There was sufficient data to assess four stream reaches for aquatic recreation use (swimming); three were supportive, but one (Judicial Ditch 19) was found to be impaired due to high bacteria levels and was listed in 2012.

Additionally, one stream reach had been previously listed in 2006 as having aquatic life use impairments due to pH and chloride while another reach was listed in 2014 as being impaired for aquatic life use due to high levels of an insecticide called chlorpyrifos.

Florian Park Reservoir was listed in 1998 as having an aquatic consumption use impairment due to mercury in fish tissue.



Stressors: What factors are affecting fish and bugs?

To develop strategies for restoring or protecting water bodies with biological impairments, agencies and local partners first identify the possible causes, or stressors, of the impairments. In the Lower Red River Watershed there are two impairments on the same reach of the Tamarac River. They are caused by poor fish and aquatic insect (macroinvertebrate) communities. This table summarizes the major stressors of these two biological communities.

HUC-10 Subwatershed	AUID (Last 3 digits)	Stream	Reach Description	Biological Impairment	Primary Stressor				
					Fish Passage (dams)	Altered Hydrology	Habitat	Suspended Sediment	Dissolved Oxygen
Lower Tamarac River (0902031102)	503	Tamarac River	Florian Park Reservoir to Stephen Dam	Fish	●	○	○	○	○
				Macroinvert.		○	○	○	○

● = high risk, ○ = medium risk, ○ = low risk

Total Maximum Daily Loads (TMDLs)

Under federal and state laws, impaired waters must have Total Maximum Daily Load (TMDL) studies to determine reductions of pollutants needed to meet water quality standards. In this first WRAPS cycle, the MPCA and local partners completed two TMDLs for two stream reaches to address three impairments:

- As TSS was identified as a stressor to the fish and aquatic insect communities in the impaired reach of the Tamarac River, a TSS TMDL was written to address these two aquatic life use impairments. The highest reduction needed is 13%.
- Though not yet officially listed as impaired, a TSS TMDL was written to address high TSS levels in another reach of the Tamarac River since levels are so high it will very likely be listed in the future. The highest reduction needed is 95%.

The only TMDL that's been written previously for a water body in this watershed was for a mercury in fish tissue impairment in Florian Park Reservoir which was part of the statewide mercury TMDL.

Restoration and Protection Strategies

Water quality restoration and protection strategies within the Lower Red River Watershed were identified through collaboration with local and state partners (i.e., soil and water conservation districts, watershed districts, MPCA, MN DNR, and Minnesota Board of Water and Soil Resources). Due to the homogenous nature of the watershed, most of the suggested strategies are applicable throughout the watershed.

TSS, dissolved oxygen, altered hydrology, poor habitat, and connectivity were cited as stressors to the impaired biological communities. Restoration and protection strategies were developed to prevent or mitigate activities that may further exacerbate these stressors. Restoration strategies were also developed for impairments caused by *E. coli*, chloride, and chlorpyrifos, a pesticide.

Also provided is an analysis of stream reaches that are nearly or barely impaired for water quality parameters.

A wind erosion prediction system model was developed to help quantify the magnitude of wind erosion in the watershed and to inform restoration and protection strategies.

The watershed districts and SWCDs have a long history of improving water quality. All have been actively seeking grants to improve local water quality before and since the passage of the Clean Water, Land and Legacy Amendment.

Next steps and measuring results

The restoration and protection strategies listed in the WRAPS report will be the basis for developing local implementation plans to restore and protect water resources. The report lays out goals, milestones, and responsible entities to address protection and restoration priorities in the Lower Red River Watershed. The targets are intended to provide guidance and "measuring sticks" to assess the watershed's health and success of actions taken.

Water quality in Minnesota has declined over many decades. While restoration activities continue, new problems develop, such as converting land to cultivated crops that negatively impact 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.

Key conclusions of first WRAPS cycle

- Excluding the Red River of the North main stem, there are currently seven impairments on five waterbodies within the watershed on the 2018 impaired waters list.
- 13 stream reaches were deferred for aquatic life assessment and will be assessed using tiered aquatic life standards in the future.
- Loss of longitudinal connectivity (caused by barriers to fish movement), flow regime alteration, lack of physical habitat, high suspended sediment, and low dissolved oxygen were identified as stressors to the biological communities on the impaired reach of the Tamarac River.
- As part of this first WRAPS cycle, two TMDLs were written for two stream reaches to address three impairments.
- Restoration strategies were developed for all five stressors listed above and for impairments caused by *E. coli*, chloride, and chlorpyrifos, a pesticide.



Photos of barriers to fish movement include the remnants of a private stream crossing taken in 2008 (upper left), the Florian Dam taken in 2015 (upper right), the Stephen Dam taken in 2014 (lower left), and the remnants of another private stream crossing downstream of 330th Ave. NW taken in 2013 (lower right, courtesy Google Earth).

Full report

For the full report, go online and search for "MPCA Lower Red River WRAPS report."

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

