Long Prairie 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

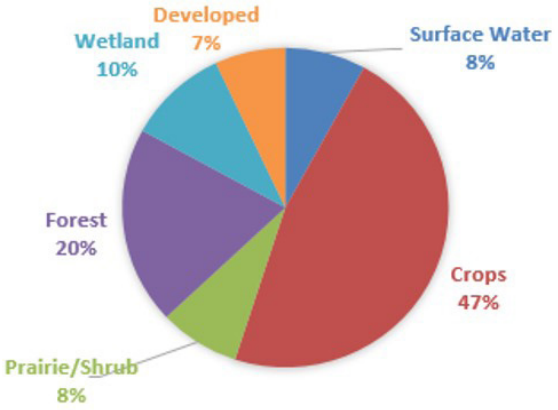
Long Prairie River, west of Long Prairie. Photo from Shannon Wettstein

The Long Prairie River watershed process began in 2011. It was the first time 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: 883 square miles or 565,078 acres.
- Water: ~220 lakes greater than 10 acres, and 965 perennial river miles.
- Counties: Douglas, Morrison, Otter Tail, Todd and Wadena.
- Ecoregions: Northern Lakes and Forests and North Central Hardwood Forests.
- Land use: Predominantly agriculture.
- 2010 Census finds 41,867 people reside in the watershed. The largest population centers are located in the towns of Alexandria and Long Prairie.
- The 8-digit hydrologic unit code or HUC for the Long Prairie River Watershed is 07010108.

Land Use in the Long Prairie River watershed

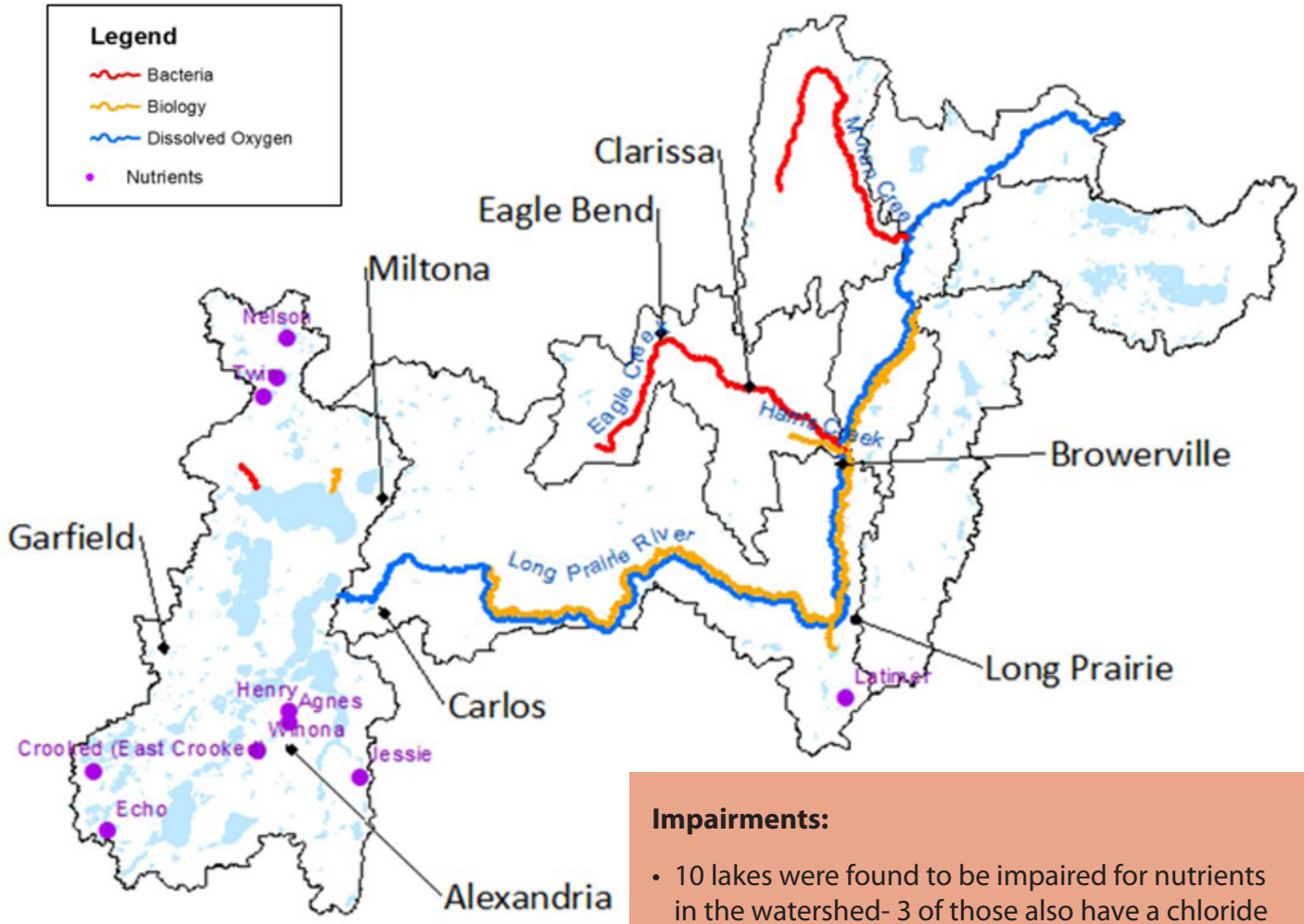


Assessments: Are waters meeting standards and providing beneficial uses?

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 on the next page shows the impairments for streams in the Long Prairie 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. There are 8 impaired lakes and 9 impaired stream segments in the Long Prairie River Watershed with completed TMDL studies.

Impairments in the Long Prairie River Watershed



Impairments:

- 10 lakes were found to be impaired for nutrients in the watershed- 3 of those also have a chloride impairment.
- 13 stream or river sections have impairments- 3 for bacteria, 4 for biology, and 6 previous for DO.

Stream Impairments

- Bacteria: E.coli and/or fecal coliform can indicate sewage or manure in water and makes the water unsafe for swimming.
- Biology: (fish and/or macroinvertebrates): The number and type of fish and bugs are indicators of water's health.
- Dissolved Oxygen (DO): Low or highly fluctuating concentrations of DO can have detrimental effects on many fish and bug species. DO concentrations change seasonally and daily in response to shifts in ambient air and water temperature, along with various chemical, physical, and biological processes within the water column. Many species of fish avoid areas where DO concentrations are below 5 mg/L.

Lake Impairments

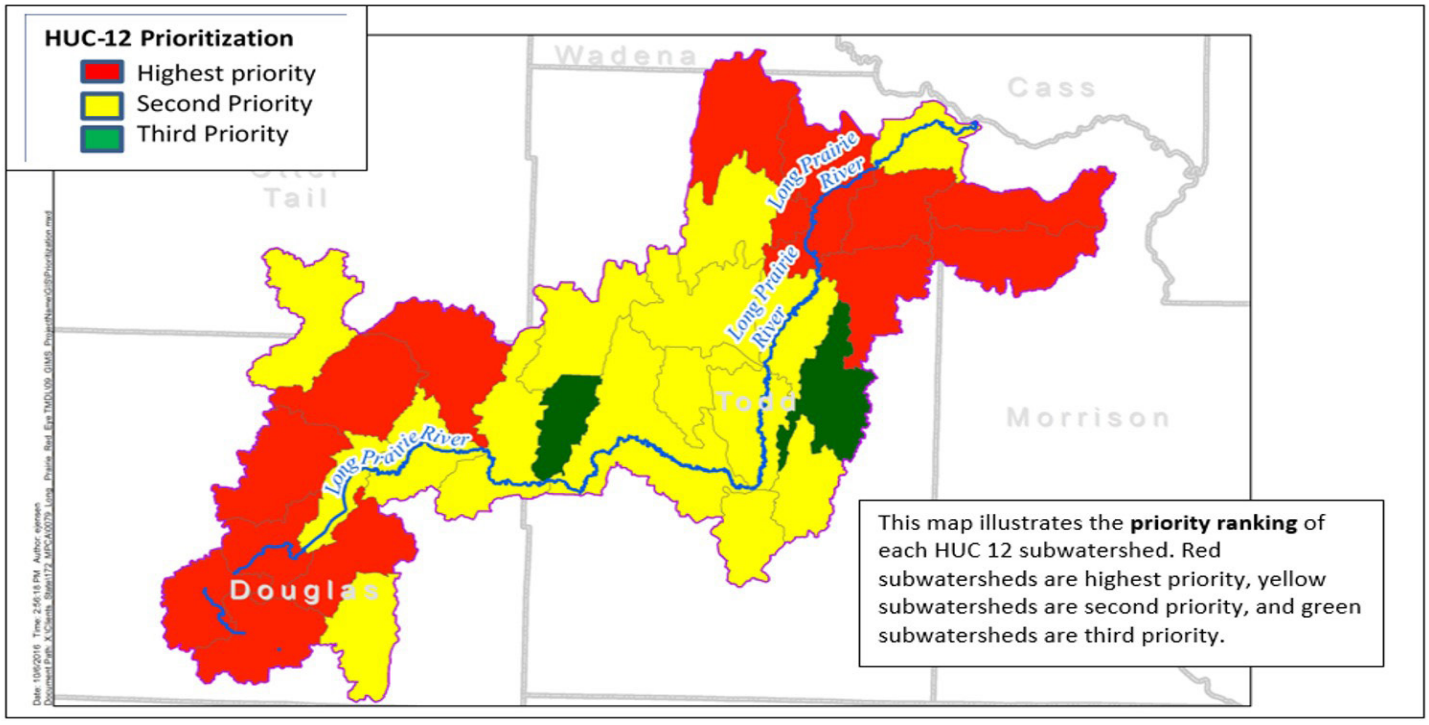
- Nutrients: Phosphorus is a common element in agricultural fertilizers, manure, and organic wastes in sewage and industrial discharges. Excess phosphorus in lakes, rivers, and streams causes algae to grow. Algae-covered water is less attractive for fishing and swimming —uses that are protected under the federal Clean Water Act. In addition, phosphorus can fuel toxic blue-green algal blooms, which are harmful to people and pets.
- Chloride: Can harm fish and plant life at high concentrations. Road salt contains chloride. When the snow and ice melts off of treated surfaces, the chloride runs into waterways. One teaspoon of road salt can permanently pollute five gallons of water.

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 of the indicated streams in the Long Prairie River watershed.

Stressors to Biological Health of Streams	Water Chemistry			Geomorphology			
	Dissolved Oxygen	Elevated Nutrients	Total Suspended Solids	Deposited Sediment (Degrades habitat)	Physical connectivity	Lack of physical habitat	Altered Hydrology (Stream flow changed, runoff)
Unnamed Creek to Lake Miltona	Not a stressor	Not a stressor	Not a stressor	Main stressor	Main stressor	Not a stressor	Main stressor
Harris Creek	Main Stressor	Main Stressor				Lesser stressor	Lesser stressor
Spruce Creek	Not a stressor	Not a stressor				Main stressor	Main stressor
Venewitz Creek	Main Stressor					Not a stressor	Lesser stressor

Restoration and Protection Strategies



The MPCA created the strategy map above using HUC-12 subwatersheds – drainage areas within the larger HUC-8 Long Prairie River watershed – to help identify priority areas for targeting actions to improve water quality. Multiple sources of data, maps and analysis tools including HSPF, were combined to create this map. The colors on the map indicate:

- Red – Water quality is poor but improvement is feasible, or water quality is exceptional and there are water quality concerns to address with protection projects
- Yellow – Medium priority for restoration or protection efforts (water is Impaired)
- Green – Water quality is poor and improvement is not feasible, or water quality is exceptional and there are no major water quality concerns to address with protection projects

Local and other partners can use the priority-ranking map to help prioritize watershed and stream management efforts at the local level. Other maps of individual pollutants, such as phosphorus and nitrogen, can be found in the full report.

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 Long Prairie 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 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.

Key conclusions of first cycle

- Protection and restoration strategies are dictated largely by the agricultural land use in the watershed.
- The WRAPS report data and findings provide a base for developing County Water Plans
- Protection strategies for the watershed include riparian pasture management, shoreland development ordinances, Best Management Practice (BMP) adoption, nutrient management and stormwater management. Due to issues with channelization in the watershed, stream restoration projects are also an important strategy for both protection and restoration.
- Restoration strategies involve cropland nutrient reductions through agricultural BMPs, feedlot runoff reductions, riparian pasture management, shoreland protection through natural plantings, buffers and shoreland stabilization projects.

Horseshoe Lake. Photo from Shannon Wettstein

- The next WRAPS project cycle for the Long Prairie River Watershed is expected to begin in 2021.

Long Prairie River watershed partner accomplishments

Citizen monitoring in 1994 put the Long Prairie River Watershed at the top of the list of small watersheds to start a TMDL study when the river was placed on the 2002 impaired waters list, due to low dissolved oxygen. This put the watershed in an excellent position to apply for the first ever round of Clean Water Legacy grant dollars in Minnesota. The Todd, Morrison and Douglas SWCDs' long-standing partnerships with private citizens, county offices and state and federal agencies have resulted in the implementation of many successful projects within the watershed.

The Long Prairie Dissolved Oxygen TMDL and Implementation Plan were completed in 2005 and 2007, respectively. Since that time, Todd County, along with other partners have received over $845,000 in Section 319 Grants, and have matched with cash or in-kind another $1.3 million.

Flagship projects in this area included bank stabilizations using engineered streambarbs at locations along the river. Changes to vegetation, hydrology and natural channels have caused many segments of the river cut into banks at the loss of 10-20 feet per year. Streambarbs allow river current energy to be redirected and the barbs enable sediment deposition where banks have eroded.

This area of the state is also dominated by agriculture, and the sand and gravel which outlines the river valley is highly permeable. These higher infiltration rates make animal waste containment a top priority. Farmyard fixes are engineered to store dirty water and manure in place until they can be properly field applied. This keeps nutrients locked up and river life in balance where farm site water and river waters converge.

In the last ten years alone nearly 70 projects have been completed with the help of MPCA 319 funds. This funding source combined with private, public and landowner dollars has resulted in hundreds of conservation projects all along the river. These projects have resulted in significant reductions of many pollutants such as nitrogen, sediment and phosphorous.

Long Prairie River, showing eroded bank and completed streambarbs. Photo from Shannon Wettstein

Projects over the years as diverse as rotational grazing plans, livestock exclusion fencing projects, agricultural waste pond closures, alternative livestock watering sources, nutrient management plans, minimum tillage, riparian grass buffers, storm water control – rain gardens, reforestation and riparian tree planting projects and bank stabilization and shore land erosion control projects have helped restoration efforts on this unique river.

Full report

Full report as well as supporting documents can be found at www.pca.state.mn.us and search "Long Prairie River".

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