WRAPS report summary
Water Restoration and Protection Strategy

Lower Minnesota River Watershed

Watershed approach

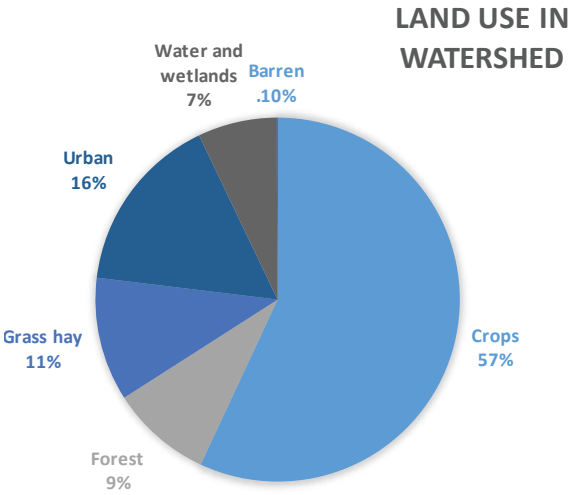
Minnesota has adopted a watershed approach to restoring and protecting rivers, lakes, and wetlands in its 80 major watersheds. This approach looks at the condition of the drainage area as a whole instead of focusing on individual bodies of water. The Minnesota Pollution Control Agency (MPCA) evaluates eight watersheds each year in a 10-year cycle. The process includes:

1. Monitoring waterbodies and collecting data on water chemistry and biology over two years.
2. 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 waterbodies and creating the Watershed Restoration and Protection Strategies (WRAPS) report.
4. Local implemention of restoration and protection projects.

The Lower Minnesota River Watershed process began in 2014. The MPCA lead the technical work and coordinates and supports strategy development with local partners. The WRAPS report summarizes all the technical information. Local partners, such as soil and water conservation districts, use it for planning and implementing the best restoration and protection strategies in prioritized locations.

Watershed characteristics

- Size: 1,835 square miles
- Counties: Carver, Dakota, Hennepin, Le Sueur, McLeod, Nicollet, Ramsey, Renville, Rice, Scott, and Sibley
- Water: 133 lakes greater than 10 acres, the Minnesota River, and 2,482 miles of tributaries, such as Rush River, Credit River, and Nine Mile Creek
- Ecoregion(s): The western two-fifths of the watershed is in the Western Cornbelt Plains. The rest is in the North Central Hardwood Forest ecoregion.
- Land use ranges from almost exclusively row-crop agriculture in the west to residential suburbs and urban industry in the northeast
- Eight-digit hydrologic unit code (HUC): 07020012



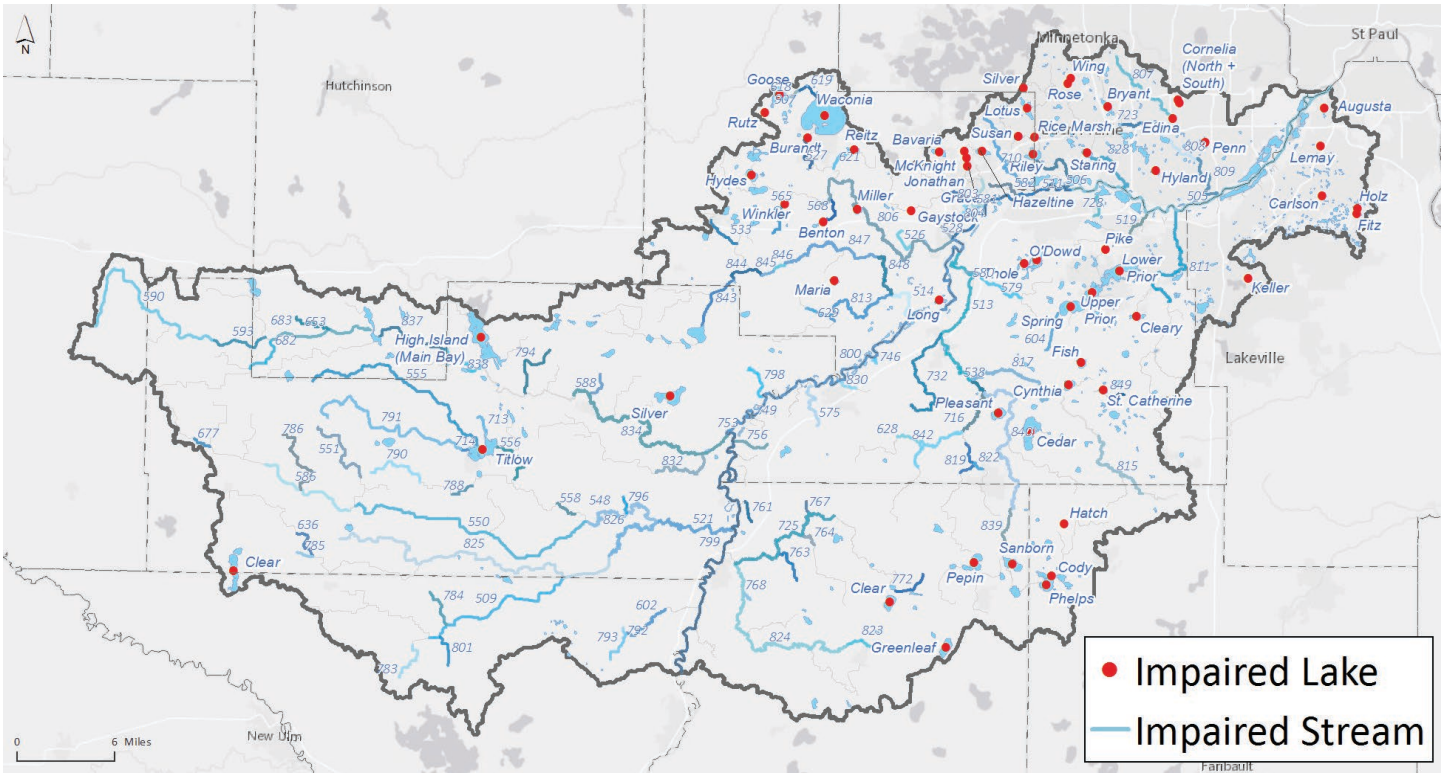
During the first phase of the watershed approach – intensive watershed monitoring – the MPCA collected data about the watershed's biological health (e.g., the health of bugs and fish and habitat quality) and analyzed water chemistry and flow. Agency staff used this data to see if lakes and streams were meeting water quality standards, which are designed to ensure that waters are safe for fishing, swimming, and other uses. Waters are considered "impaired" if they fail to meet standards (though impaired waters are not always unfit for recreation like swimming).

Water quality impairments

The second phase of the watershed approach – assessment – determines which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters. In the Lower Minnesota Watershed, 117 sections of streams and 103 lakes in the watershed showed elevated levels of nitrogen and phosphorus and persistent problems with excess sediment, bacteria, and other contaminants.

- 84% of streams did not meet standards for supporting fish and other aquatic life
- 95% of streams had bacterial contamination above health-based limits
- 55% of lakes had nutrient levels that exceeded standards

Which waters are not meeting standards?



Conditions stressing water quality

Sediment, phosphorus, and bacteria are the main pollutants affecting water quality in the watershed. They can harm lakes and streams in several ways:

- Excessive sediment can cloud the water which reduces light penetration for beneficial plants and favors undesirable algae species.
- Excessive sediment can also interfere with proper gill functioning of fish and macroinvertebrates (bugs).
- Bacteria levels in streams indicate sewage or manure in the water, which may make it unsafe for swimming.

- High phosphorus levels can cause excessive algae growth, leading to high pH and low dissolved oxygen, which can be harmful to aquatic life.
- The stress on fish and macroinvertebrates leads to less diversity of species.
- Algae blooms can also degrade aesthetics and recreational use of lakes and streams.

The primary source of suspended sediment in the watershed is streambank erosion, but runoff from cropland also contributes. Excess phosphorus is coming from cropland, altered wetlands, urban stormwater, and internal loading in lakes — when phosphorus is released from sediment on the lake bottom by fish activity or wave action, or from certain lake plants as they die off. Livestock manure from feedlots and fertilized fields is also a likely source of phosphorus, in addition to a primary source of bacteria. Failing septic systems and urban stormwater also appear to add bacteria.

In addition, water quality in the watershed is stressed by insufficient or degraded habitat and altered hydrology, such as streams that have been straightened or stream connectivity that has been interrupted.

Restoration and protection strategies

The third phase in the watershed approach is developing strategies to restore and protect the bodies of water in the watershed (and address water quality issues downstream). The required reductions in pollutant loads — particularly phosphorus and sediment — to impaired bodies in the watershed will be a significant challenge.

A key part of developing restoration and protection strategies is meaningful civic engagement and public participation to help shape local plans and projects, collect data, and encourage landowners to take action. Participants in the process identified several specific impaired lakes and streams in the watershed as priorities for action. Civic engagement also helped pinpoint strategies that would help improve water quality in the watershed:

- Reducing ditch cleanouts to decrease erosion and increase nutrient uptake
- Restoring healthy vegetative areas to increase habitat and buffer the effects of pollutants
- Using best practices for applying commercial fertilizer and manure, to reduce nutrient runoff
- Using conservation tillage on croplands with a greater than 2% slope, to improve soil health and reduce runoff
- Planting cover crops with corn and soybeans, to improve soil health and reduce runoff

Many of the pollutant reduction strategies are focused on agriculture because it's the dominant land use in the watershed. The WRAPS recommendations are aggressive because improving water quality in the watershed will require large reductions in sediment and phosphorus pollution.

Key conclusions of first cycle

Some waters in the Lower Minnesota River watershed are in good condition and need protection, but many more are impaired and need restoration.

Overall biological health in the watershed's streams is poor:

- 95% of streams failed to meet standards designed to protect swimming, fishing, and other recreational uses.
- 84% of streams evaluated for the health of fish and other aquatic life failed to meet standards.

More than 50% of streams have sediment or phosphorus contamination that exceeds standards. 24% have excess chloride.

Seventy-six percent of the streams miles in the watershed have been altered (e.g., rerouted or modified), which is one of largest contributing factors to water quality impairments.

Four lakes in the watershed — Crystal, McMahon, Mitchell, and Bryant — are now meeting water quality standards that they failed to meet previously. The improvements are the result of successful restoration efforts by state and local entities.

Fifty-five percent of lakes failed to meet water standards that protect for recreational uses.

Fifty-seven percent of lakes evaluated for the health of fish and other aquatic life failed to meet standards.

In two-thirds of the lakes studied, internal loading is a larger source of phosphorus contamination than runoff.

The strategies recommended for water restoration and protection vary depending on the pollutants and stressors. But increased living cover, such as cover crops or perennial crops, is a key strategy that could remedy multiple impairments in rural areas by reducing phosphorus, sediment, and nitrogen loading and improving hydrology and soil health.

The relatively high pollution reductions needed for many of the waterbodies represents a significant challenge. Water quality restoration will be a long-term undertaking requiring prioritization of efforts, significant financial resources, and a continued emphasis on civic engagement to encourage landowners and others to take action.

Watershed stakeholders identified protecting drinking water and groundwater in Ottawa, Sharon, and Tyrone townships in Le Sueur County as a priority.

The straightened stream bed of High Island Creek is characteristic of the altered hydrology prevalent in the watershed.

Several high quality waters, or those with special significance in the watershed, may warrant priority protection efforts. The bluffs of the Minnesota River valley give rise to many springs including Boiling Springs in Savage, a sacred site to the Mdewakanton Sioux Tribe, and Fredrick-Miller Spring, an artesian well in Eden Prairie. Assumption Creek, Eagle Creek, and Black Dog Creek are designated trout streams. The watershed's calcareous fens, including Savage and Seminary Fen, are given special protection because they are rare and provide habitat for numerous rare plant species.

Full report

See the full report at https://www.pca.state.mn.us/sites/default/files/wq-ws3-07020012b.pdf

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