



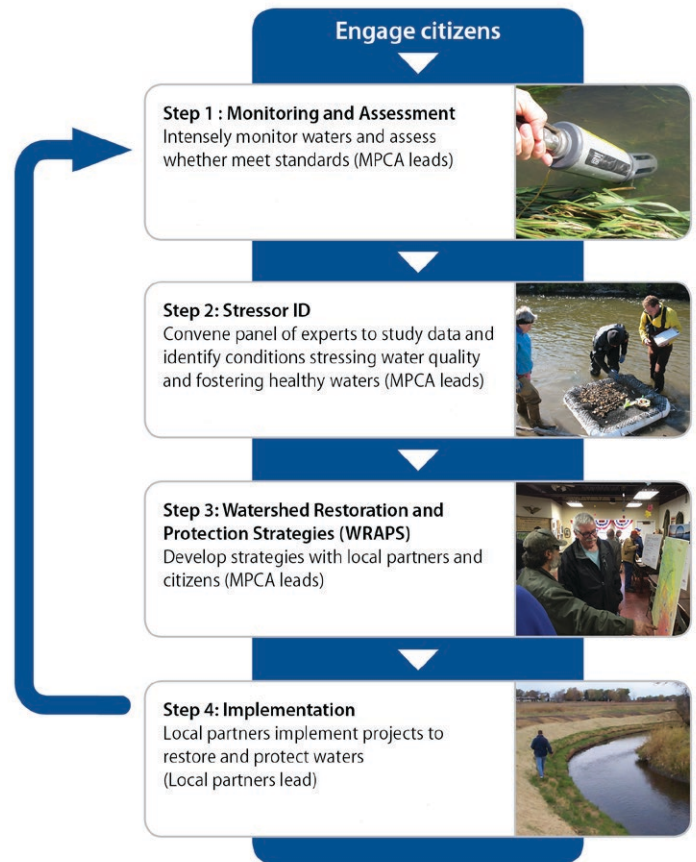
Grand Marais Creek Watershed

Watershed approach

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
- Public participation
- Planning
- Implementation
- Measurement of results

The Grand Marais Creek Watershed process began in 2012. The 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.



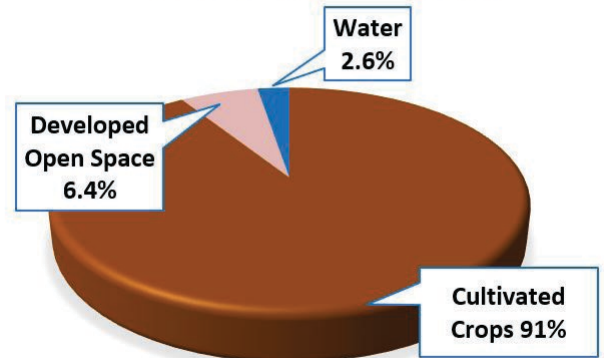
Watershed characteristics

- Size: 592 square miles.
- Water: One lake >25 acres and 69 perennial river miles.
- Counties: Polk, Pennington and Marshall.
- Land use: Predominantly cultivated crops including spring wheat, soybeans and sugar beets.
- The 8-digit HUC for the Grand Marais Creek Watershed is 09020306.

Cultivated crops are the dominant land use and cover more than 91% of the watershed. The next largest land use is developed open space with 6.4% of the watershed area. Spring wheat, soybeans, corn, and sugar beets are the main crops grown in the watershed.

Some of the larger pools in the watershed are artificial impoundments including the Euclid, Parnell, and Brandt impoundments which provide

LAND USE - GRAND MARAIS CREEK WATERSHED



flood mitigation for downstream agricultural land. Several large wetland complexes exist that are important resources as they provide wildlife habitat, flood storage, and water quality protection.

Artificial and altered natural watercourses are common in the Grand Marais Creek Watershed. Overall, 70% of the streams in the watershed have been channelized, ditched, or impounded. Recent water resources projects in the Grand Marais Creek Watershed have made great progress toward restoring natural hydrology. The upstream end of Grand Marais Creek is now an oversized channel that resembles a wetland or an oxbow lake more than it resembles a stream. Grand Marais Creek begins near the town of Fisher and flows northwest for 44.6 miles to the Red River. The cut-channel that once diverted Grand Marais Creek, through a straight channel, west to the Red River of the North has been stabilized and now only carries local runoff and excess flow from the Grand Marais Creek watershed.

Assessments: Are waters meeting standards?

During the first phase of the watershed approach – intensive watershed monitoring – the Minnesota Pollution Control Agency (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. This map shows the impairments in the watershed.

Using data from these sampling efforts, it was determined that three stream reaches were impaired for recreation due to excessive levels of *E.coli* bacteria and required Total Maximum Daily Load (TMDL) studies.

TMDL studies identify sources of pollution in a watershed causing a particular impairment and then determine the reductions in those sources that are needed in order for the water body to meet state standards.



Impairments were also found for total suspended solids, fish and aquatic insect (macroinvertebrate) communities, low dissolved oxygen, and chloropyrifos (a pesticide). These impairments will be addressed at a later time.

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 in the indicated streams in the watershed.

AUID	Stream Name Description	Biological Impairment	Primary Stressor				
			Loss of Physical Connectivity	Lack of Base Flow	Lack of instream habitat	High Suspended Sediment	Low Dissolved Oxygen
09020306-515	County Ditch 2 CD66 to Grand Marais Creek	F-IBI	●	●	●		○
		M-IBI		●		○	○
09020306-517	County Ditch 43 Unnamed Ditch to County Ditch 7	F-IBI	●	●	●	○	○
		M-IBI		●		○	○
09020306-520	Judicial Ditch 75 CD 7 to Red River	Fish	●	●	●		○

● = Primary stressor; ○ = Secondary stressor; *Source: 2015 Grand Marais Creek Watershed Stressor ID Report*

Restoration and protection strategies

Based on output from modeling tools, One Watershed One Plan priority areas and input from the Grand Marais Creek WRAPS technical advisory committee, locations of watershed implementation efforts were prioritized as follows:

Priority 1 – Restoration of Grand Marais Creek and protection of the headwaters (approximately east of Highway 75).

Priority 2 – Restoration of Judicial Ditch 75 and County Ditch 2.

Priority 3 – Restoration of the lake plain ditch system, JD 1, and the direct drainage of the Red Lake River

The following implementation strategies will be used in the watershed to help restore and protect priority waterbodies:

- Restore stream and ditch connectivity to increase base flow, and remove/modify migration barriers such as beaver dams and flood control structures that are improperly sized or designed.
- Increase buffer widths adjacent to waterbodies. Promote/encourage more crop rotation.
- Restore the natural channel of Grand Marais Creek through habitat enrichment and erosion control projects.

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 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 some areas 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. For these reasons, it is much more cost-effective to protect clean waters while we can, such as those in the watershed.

Key conclusions of first cycle

- The watershed is dominated by agriculture, with nearly 92% of the land use in crop production. Approximately 72% of streams have been altered from their original course in an effort to increase drainage rates to better suit the current land use practices of the area. These alterations have resulted in heavy sedimentation and lowered levels of oxygen in many streams, reducing the abundance and diversity in both fish and aquatic insect (macroinvertebrate) communities.
- Widespread changes in land use practices will need to occur to bring about significant improvement in most indicators. Increased public understanding and interest in these conditions is also needed since the vast majority of land in the watershed is privately owned and improvements will require a change in agricultural practices that are largely voluntary.
- Though the watershed is largely impaired, there were a few sensitive aquatic insects collected such as mayflies. There are likely additional communities that would repopulate if suitable habitat conditions were re-established; for example, a recently completed project that re-established meanders in Grand Marais Creek for a distance of about six miles. Coarse substrates, woody debris, re-meandering, depth variability, and more permanent flows will be vital for recolonization in these systems.
- Practices such as increased buffers, crop rotation and stream restoration are recommended to protect and restore waterbodies.



Full report

To view the full report, go online and search for “MPCA Grand Marais Creek Watershed WRAPS report.”

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