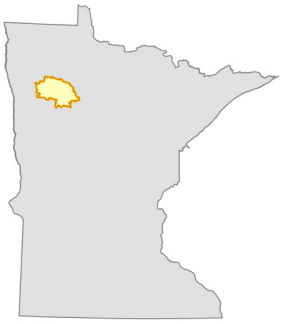
WRAPS report summary
Watershed Restoration and Protection Strategy

Clearwater River Watershed



Watershed approach

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 cycle repeated on a regular basis:

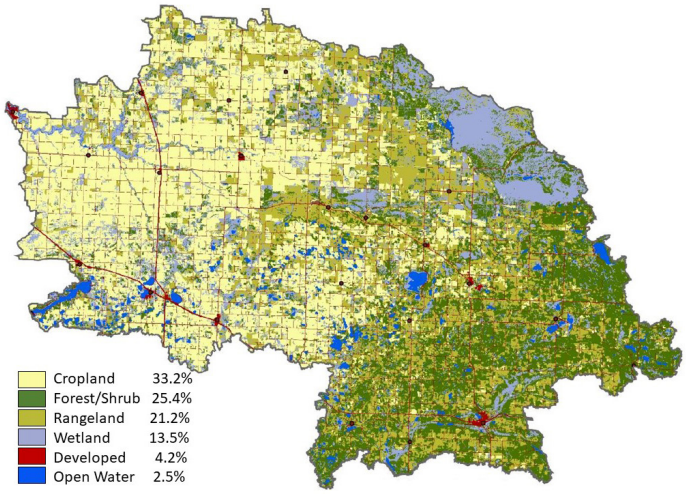
1. Monitoring water bodies and collecting data over two years on water chemistry and biology. (2014-2015)
2. Assessing the data to determine which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters. (2016-2017)
3. Developing strategies to restore and protect water bodies, and report them in a document called Watershed Restoration and Protection Strategies (WRAPS). (2020)
4. Coordinating with local One Watershed-One Plan efforts for implementation of restoration and protection projects.

The Minnesota Pollution Control Agency (MPCA) leads the technical work and coordinates and supports strategy development with local and state partners. Watershed partners are leaders in implementing strategies to restore and protect water resources. Their past and current work provides promising opportunities for watershed improvement and will continue to be a critical component to overall water quality. The main purpose of the WRAPS report is to summarize all the technical information so that local partners can use it for planning and implementing the best strategies in prioritized locations.

Watershed characteristics

- Size: 1,384 square miles.
- Water: Clearwater, Lost, Hill, and Poplar Rivers; Lower Badger, Silver and Bau Gerlot Creeks, Ruffy Brook; Clearwater, Pine, and Maple Lakes; Kiwosay Pool; numerous wetlands.
- Counties: Red Lake, Beltrami, Clearwater, Mahnomen, Pennington, Polk.
- Land cover: 33% cropland; 25% forest/shrubs; 21% rangeland; 13% wetlands; 4% developed.
- The 8-digit HUC for the watershed is 09020303.

Land use – Clearwater River Watershed



The upper reaches of the Clearwater are lined with wetlands and fed by clear, cold ancient springs naturally low in dissolved oxygen. In the area where the river leaves Clearwater Lake, water quality and habitat are very good but then decline in a region where the Clearwater and other streams have been heavily channelized/altered.

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 volumes to determine if lakes and streams are meeting water quality standards. Waters that fail to meet standards and do not support aqautic life, aquatic recreation, or consumption are deemed "impaired."

The Clearwater River Watershed Total Maximum Daily Load (TMDL) report addresses 44 impairments of aquatic life and/or recreation that were found within 27 stream reaches and 3 lakes within the watershed (The goal of a TMDL study is to quantify pollutant reductions needed to meet state water quality standards.).

A total of five total suspended solids (TSS) impairments were found along the Clearwater River and Nassett Creek. Aquatic life impairments due to low dissolved oxygen (DO) have been identified in 10 reaches of Clearwater River tributaries. Five DO-impaired reaches have been requested for reclassification and may not require TMDLs.

Low index of biological integrity scores[1] (IBI) have resulted in macroinvertebrate (aquatic insect) impairments for 3 reaches and fish impairments for 7 stream reaches. A river eutrophication impairment was identified in one reach of the Clearwater River. Impairments of recreational safety due to chronically high concentrations of *E. coli* were found along 15 reaches of the Clearwater River and its tributaries. Aquatic recreation was impaired by eutrophication (excess nutrients) in 3 lakes.

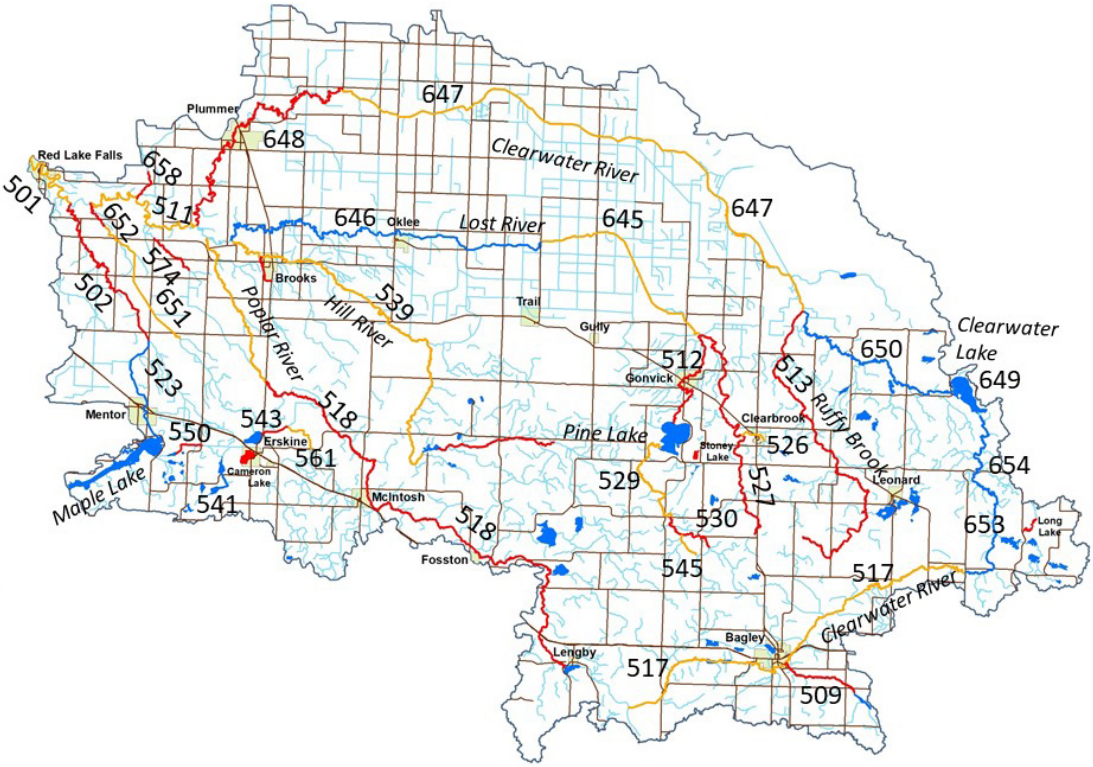
[1] Biological integrity is the ability of an aquatic ecosystem to support and maintain a balanced, adaptive community of organisms having a species composition, diversity, and function comparable to that of a natural habitat. A low IBI score indicates the species are significantly different or degraded compared with regional reference sites. A final determiniation of biological impairment is also based on habitat quality, available water chemistry data, and biological condition of nearby upstream and downstream segments, local land use information, and other watershed data. Narrative descriptions can be used to rate the integrity of a site as excellent, good, fair, poor, or very poor.

Map of Clearwater River Watershed impairments

Legend

502, 504, 512, 513, 530, 574, 578, 651 (*E. coli*)
509, 517, 543 (DO)
501, 511, 648 (TSS)
561, 658 (F-IBI)
526, 529, 550 (*E. coli*, DO)
545 (*E. coli*, DO, TSS)
647 (*E. coli*, TSS, Nutrients)
539 (*E. coli*, F-IBI)
527 (*E. coli*, M-IBI)
656, 645 (DO, F-IBI)
518 (DO, M-IBI, F-BI)
652 (M-IBI, F-IBI)
Lakes (Nutrients)

Reaches in dark blue represent waters that were assessed and meet standards.



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. This table summarizes the stressors affecting fish and/or aquatic insects (macroinvertebrates) identified in the assessed streams of the watershed.

Lack of longitudinal connectivity refers to barriers to fish passage. These can include dams, improperly installed/sized culverts, and beaver dams.

More information can be found in the Clearwater River Watershed Stressor Identification Report.

Name (AUID suffix)	Biological impairment(s)	Candidate causes				
		Low dissolved oxygen	Flow alteration	Lack of physical habitat	Elevated nutrients	Lack of longitudinal connectivity
County Ditch 23 (658)	F-IBI		X	X		X
Beau Gerlot Creek (652)	F-IBI/M-IBI		X	X		X
Poplar River (518)	F-IBI/M-IBI	X	X	X		X
Hill River (539)	F-IBI	X		X		X
Hill River (656)	F-IBI	X		X		X
Tributary to Poplar River Diversion Ditch (561)	F-IBI	X	X	X		X
Lost River (645)	F-IBI	X	X	X	X	X
Silver Creek (527)	M-IBI	X	X		X	

Restoration, protection strategies

The WRAPS process includes a means to categorize and prioritize water bodies for restoration and varied levels of protection.

Numerous restoration and protection strategies, or best management practices (BMPs), have been developed through collaboration with local and state partners in the Clearwater Watershed. These include:

- Soil and Water Conservation Districts provide cost-share programs for landowners to help with the costs of installing side water inlets (SWIs), windbreaks, shelter belts, filter strips, buffers, critical area planting, streambank protection, shoreline protection, no-till cropping practices, and sediment basins
- Many wild rice farmers are implementing a new approach to wild rice paddy drainage, moving from surface drainage to main-line tile drainage to reduce sediment in the drainage after harvesting and improve/protect water quality
- Various stream bank and grade stabilization projects along the Clearwater River and its tributaries
- Restoring meanders and installing rock riffle structures
- Cattle exclusion projects and grazing management plans
- Public education (River Watch)
- Install adequately sized culverts, modify private stream crossings and remove earthern dams to eliminate fish barriers
- Shoreline restoration and protection along the shores of Pine Lake and Clearwater Lake
- Protection strategies for a trout stream reach of the upper Clearwater River include repairing damaged riparan areas to keep the stream healthy. Trout streams are not common in the Red River Basin and this reach is at risk for becoming impaired by *E. coli*.

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 establishes goals and milestones 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 against the state’s water quality standards.

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 could negatively impact water quality. The perpetual challenge is to make improvements and try to prevent 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 more cost-effective to protect clean waters while we can by implementing protection strategies.

Key conclusions of first cycle

- Lakes and streams with sufficient data to make an assessment were assessed for aquatic life, aquatic recreation, and aquatic consumption use support. During this process, 32 stream segments were assessed for aquatic life (fish and aquatic insects) and 28 segments were assessed for aquatic recreation (such as swimming). Thirty-two lakes were assessed for aquatic recreation and nine lakes were assessed for aquatic life.
- Twelve stream segments fully supported aquatic life. The remaining 20 segments were determined to be impaired. Eight aquatic life impairments were the result of poor fish and/or macroinvertebrate (insect) communities.
- Fifteen of the segments assessed for aquatic recreation were found to be impaired due to elevated levels of *E. coli*. Aquatic recreation was impaired by excess nutrients (which cause excessive aglae growth) in three lakes.
- Most biological impairments were attributed to poor habitat caused by unstable stream channels and widely varying flow regimes (high flows during spring runoff and summer rain events, low-flow conditions for much of the rest of the year). The unstable stream channels had poor channel development and contained excess fine sediment which can cover coarse material on stream bottoms that provide good habitat for fish and insects.
- Insufficient base flows was the most common stressor for aquatic biology within impaired Clearwater River tributaries and it exacerbated the effects of other stressors like low DO. Barriers to fish passage, such as improperly installed/sized culverts and beaver dams, were also a cause of biological impairments within the watershed.
- Strategies have been recommended for reducing nonpoint contributions of TSS and *E. coli* using various erosion control strategies and best management practices, such as grazing management and excluding cattle from streams.
- Other strategies are described for improving DO levels, aquatic habitat, fish passage, and other projects to improve conditions for aquatic life.

Filamentous algae growth on 6/25/2015. Continuous DO data from this site recorded excessive DO flux, likely caused by extensive algae growth during the day followed by decomposition at night, which uses up available oxygen.

Full report

To view the full report, go online and search for "MPCA Clearwater Watershed WRAPS Report."

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