



Upper/Lower Red Lake Watershed

Watershed approach

Minnesota has adopted a watershed approach to address the state’s 80 major watersheds. This 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:

- Monitoring water bodies and collecting data over two years on water chemistry and biology (2014-2015).
- Assessing the data to determine which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters (2016-2018).
- Developing strategies to restore/protect the watershed’s water bodies, and report them in a document called Watershed Restoration and Protection Strategies (WRAPS) (2018-2021).
- Coordinating with local watershed activities for implementation of restoration and protection projects.

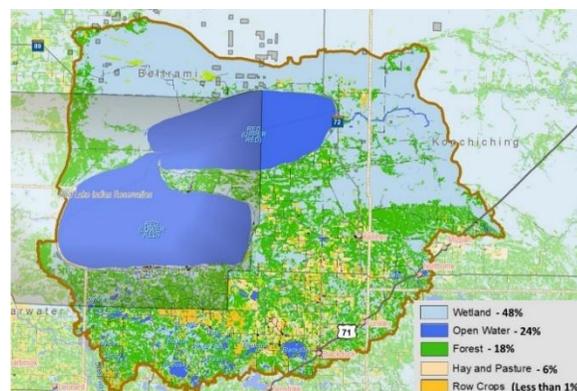


The Minnesota Pollution Control Agency (MPCA) leads the technical work, and coordinates and supports strategy development with local and state partners. Watershed partners, including the Red Lake Nation Department of Natural Resources (RL DNR), the Red Lake Watershed District, and Beltrami and Koochiching SWCDs, are leaders in implementing strategies to restore and protect waters. Their past and current work provides 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 implement the best strategies in prioritized locations.

Watershed characteristics

- Size: 1,940 square miles
- Counties: Primarily Beltrami (small portions in Koochiching, Clearwater, Itasca)
- Much of the watershed is within the Red Lake Indian Reservation
- Ecoregion: Primarily Northern Minnesota Wetlands
- Towns: Kelliher, Northome, Funkley, Blackduck, Waskish, and Red Lake Nation towns of Little Rock, Ponemah, Redby, and Red Lake
- Most land cover is wetlands and open water (214 lakes)
- Major tributaries: Sandy River, Blackduck River, North and South Cormorant Rivers, Battle River (and N. and S. branches). Most streams have periods of low flow, with many flowing through large wetland complexes
- The 8-digit hydrologic unit code (HUC): 09020302

UPPER/LOWER RED LAKE WATERSHED LAND USE



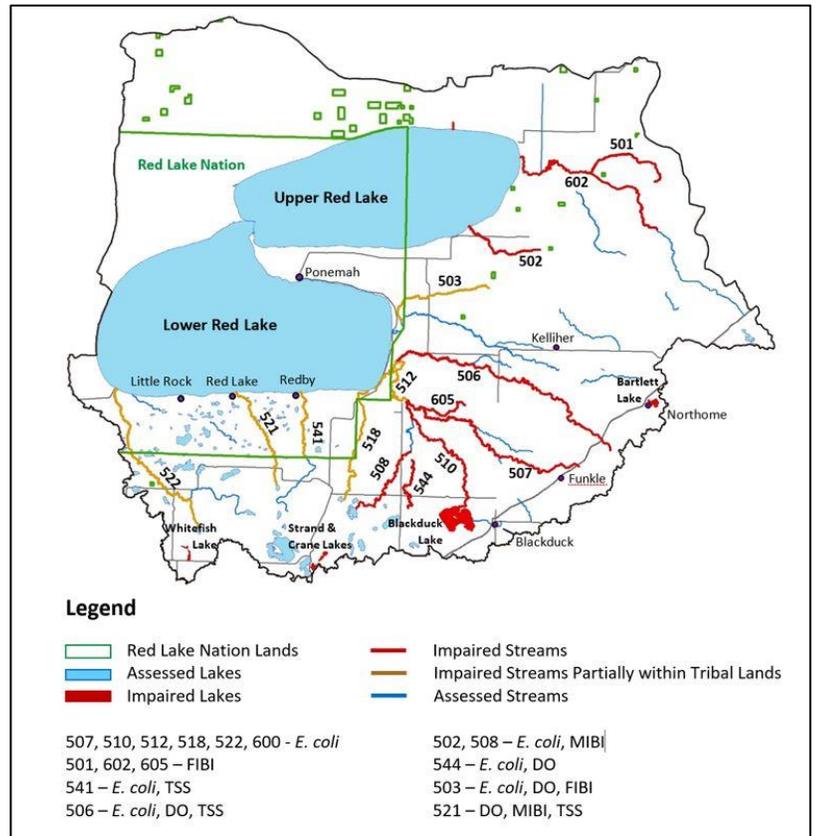
Assessments: Are waters meeting standards and providing beneficial uses?

During the first phase of the watershed approach – intensive watershed monitoring – the MPCA and partners collected data about biology such as fish populations, chemistry such as pollutant levels, and flow to determine if lakes and streams were meeting water quality standards. Waters are “impaired” if they fail to meet standards. Impaired waters require a study called a Total Maximum Daily Load (TMDL), a Clean Water Act requirement. The goal of a TMDL study is to quantify pollutant reductions needed to meet state water quality standards.

Thanks to the fact that there is little development in the watershed and much of it is covered by surface water and forest, most lakes and streams have good water quality; however, impairments do exist.

The Upper/Lower Red Lake Watershed TMDL Report addresses 31 total impairments in 5 lakes and 16 stream reaches that are on Minnesota’s 2018 303(d) list of impaired waters (see graphic).

Map of impaired waters in the watershed



Individual TMDLs were calculated for bacteria in the form of *Escherichia coli* (*E. coli*) for impairments in nine stream reaches, one TMDL for total suspended solids (TSS) impairments in one stream reach, and five individual TMDLs for total phosphorus (TP) for nutrient impairments in five lakes.

The WRAPS and TMDL reports for this watershed were developed through a partnership between the MPCA and the RL DNR. The RL DNR accompanied the MPCA staff during biological sampling in tribal waters, assisted with water quality sampling, participated in assessment activities, conducted public participation events within the reservation and in other areas of the watershed outside their jurisdiction, provided a wealth of local knowledge of the watershed, and wrote significant sections of the TMDL report. Even though the MPCA doesn’t have jurisdiction over reservation lands, information from these reports will be used by the RL DNR for management of the Red Lake Nation’s water resources.

Blackduck Lake is the only impaired lake impacted by significant development, and the WRAPS report lists best management practices (BMPs) to lessen these impacts. Bartlett Lake impairments are mainly due to past phosphorus inputs that no longer persist, and water quality trends have been improving.

The Strand, Whitefish, and Crane Lake impairments are not due to development; however, they are shallow lakes that are subject to bottom sediment/phosphorus re-suspension due to wind and wave action.

Three *E. coli* impairments are due only to bird and beaver activity, not human activity, and TMDLs were not completed for those impairments. Other *E. coli* impairments are in areas of livestock production. (Pasture management and cattle exclusion from streams are strategies for improvement). Inadequate or failing septic systems are also a minor cause (bringing inadequate septic systems up to code is a strategy included in the WRAPS).

Stressors and pollutants: What factors are affecting fishing and swimming?

Based on intensive water monitoring and stressor identification work, a relatively small number of impaired waters exist throughout the watershed. Generally, impairments include the following:

- Nutrients: Excess phosphorus in lakes is fueling algae blooms, reducing the clarity of water.
- Altered hydrology: Artificial drainage (channelized ditches) is driving many of the problems in the watershed.
- Biology (fish and/or macroinvertebrates): Many low dissolved oxygen (DO) and fish and bug impairments are due to altered hydrology, wetland influence (low DO in wetland fed streams), degraded habitat, and flashy flows or low flows.
- Bacteria: Some *E. coli* impairments are due to bird and beaver activity, not human activity. Other *E. coli* impairments are in areas of livestock production. Inadequate or failing septic systems are also a minor cause.

Conditions stressing fish, aquatic insects in streams

Stream	Reach description	Biological impairment	Primary stressor						
			Dissolved oxygen	Phosphorus	Sediment/TSS	Connectivity	Altered Hydrology	Channel Alteration	Habitat
Tamarac River	Headwaters to Upper Red Lake	Fish	•				♦		
Shotley Brook	Headwaters to Upper Red Lake	Macro-Invertebrates			•		♦	•	•
North Branch Battle River	Headwaters (Unnamed ditch) to S Br Battle R	Fish	•			•	◊		
Darrigans Creek	Whitefish Lk 04-0137-00) to O'Brien Cr	Macro-Invertebrates			•			♦	
Lost River	Unnamed cr to Tamarac R	Fish	•		?			?	?
Perry Creek	Unnamed cr to Cormorant R	Fish				○	○		
North Cormorant R	Headwaters to Blackduck R	Fish and Macro-Invertebrates			•		♦	•	•

♦ A "root cause" stressor, which causes other consequences that become the direct stressors.
 ◊ Possible contributing root cause.
 • Determined to be a direct stressor.
 ○ A stressor, but anthropogenic contribution, if any, not quantified. Includes beaver dams as a natural stressor.
 ? Inconclusive

Restoration and 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 have been developed through collaboration with local, state, and tribal partners in the Upper/Lower Red Lake Watershed.

- TSS and biological impairments on Pike Creek are expected to improve due to the replacement of an undersized culvert with an appropriately sized culvert that will reduce flow velocities and erosion in the stream.
- Wild rice farming occurs in the northeast and western portions of the watershed. Modifying discharge practices in the paddies should reduce sediment and nutrient runoff during harvest times.
- *E. coli* reductions are expected to occur through pasture management and cattle exclusion from streams, as well as bringing inadequate septic systems up to code.
- Significant investigative work has been done on Bartlett Lake to provide options for lake management. Currently, the Red Lake Watershed District, as well as interested local citizens, the city of Northome, Koochiching County, Koochiching Soil and Water Conservation District (SWCD), Minnesota Department of Natural Resources (DNR), MPCA, and Board of Water and Soil Resources (BWSR) are involved in developing a Lake Management Plan for Bartlett Lake.
- Several lakes and streams in the watershed with very high water quality are targeted for protection efforts.
- Other WRAPS restoration strategies include wetland and stream restoration, installation of stream riffles to decrease erosion, and establishing/maintaining riparian vegetation.

Key conclusions of first cycle

- In general, most of the lakes and streams in the watershed are in good condition due in large part to the vast expanses of wetland and forest combined with light development, which promote good water quality.
- Overall, biological communities (fish and aquatic insects) are in good condition. Many of the headwater streams have excellent habitat. Many of the aquatic life use impairments were the result of either a lack of connectivity (beaver dams blocking fish passage) or low DO from natural wetland influence and altered hydrology (extensive ditching). A few aquatic life use impairments were due to elevated TSS.
- Observed fish [index of biotic integrity](#) (FIBI) scores exceeded the exceptional use criteria on segments of the following streams: Mud River, Blackduck River, South Cormorant River, Spring Creek, and Meadow Creek. These areas are identified as high priority for protection efforts.
- Bacteria (*E. coli*) concentrations are a concern, as 12 stream reaches had concentrations that exceeded the aquatic recreation standards. However, microbial source tracking data indicated that three of these impairments are due only to natural background wildlife sources and could not be directly linked to human activity.
- The watershed has approximately 214 lakes, and the majority have good water quality. There are five lakes wholly within the Red Lake Nation that are managed for trout. These exhibited excellent water quality and are identified as high priority for protection efforts.
- The Upper and Lower Red Lakes are relatively shallow in comparison with their vast surface areas. As a result, nutrients in the lake bottom sediments are subject to becoming re-suspended via wind and wave action, which leads to nuisance algae blooms. Upper and Lower Red Lakes did not meet current state water quality standards for eutrophication; however, results of a paleolimnological (lake sediment core) study indicated that conditions are natural and match historical records. The MPCA, the Science Museum of Minnesota's St. Croix Watershed Research Station, and RL DNR are working cooperatively to develop site specific standards for the Upper and Lower Red Lakes. This process is currently under development and the lakes are not listed as impaired.

Next steps

The Upper/Lower Red Lake Watershed approach began in 2014, and publication of the WRAPS report occurred in 2021. The restoration and protection strategies listed in the WRAPS report will be the basis for developing comprehensive local water management plans that include implementation efforts to restore and protect water resources. The WRAPS 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.

Full report To view the full WRAPS report, search “Upper/Lower Red Lake Watershed” on the MPCA website at www.pca.state.mn.us.

Contact MPCA Project Manager Denise Oakes, denise.oakes@state.mn.us, 218-206-8119
RL DNR Biologist Kayla Bowe, kayla.bowe@redlakenation.org, 218-679-1607

