WRAPS report summary
Water Restoration and Protection Strategy

Red Lake River 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

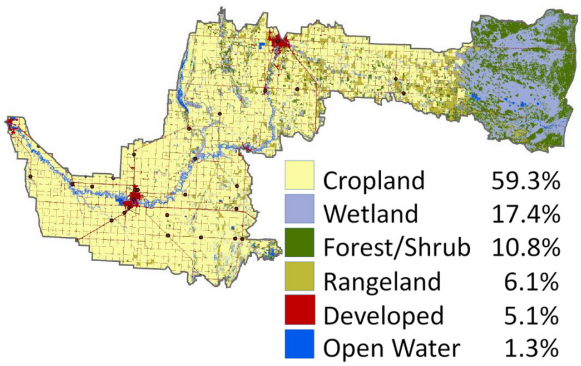
The Red Lake River Watershed process began in 2012 with monitoring and an assessment that looked at biology (fish and macroinvertebrates [aquatic insects]) along with the traditional chemistry and flow for a comprehensive watershed health assessment. Based on the assessment and a stressor identification study, the Red Lake Watershed District in tandem with other local partners developed a report containing strategies for restoring and protecting waters in the watershed (WRAPS Report). This is a summary of that report.

Watershed characteristics

- Size: 1,420 square miles.
- Waters include: The Red Lake, Gentilly, Black and Little Black rivers; Burnham, Kripple and Cyr creeks; numerous ditches.
- Counties: Beltrami, Clearwater, Marshall, Pennington, Polk, and Red Lake, and the Red Lake Tribal Nation.
- Land use: Predominantly cultivated crops including spring wheat, soybeans and sugar beets.
- The 8 digit HUC for the Red Lake River Watershed is 09020303.

Cultivated crops are the dominant land use and cover roughly 60% of the watershed. The next largest land use is wetlands with 17.4%. More than 70% of streams have been ditched to promote drainage and the region is prone to severe and frequent flooding. In more recent years, installation of agricultural drain tiles has become a common practice to further alter

Land use - Red Lake River Watershed



drainage systems. Although these projects accomplish their initial goal of draining water from the upstream land more quickly, many of the streams in the watershed have become more unstable and thus prone to bank failure.

The far eastern portion of the watershed, the headwaters area (the Red Lake River begins at the outlet of Lower Red Lake), is owned by the Red Lake Band of Chippewa (Red Lake Nation). The largely undeveloped land of the Red Lake Reservation is comprised of wetlands and forests and makes up approximately 18% of the watershed.

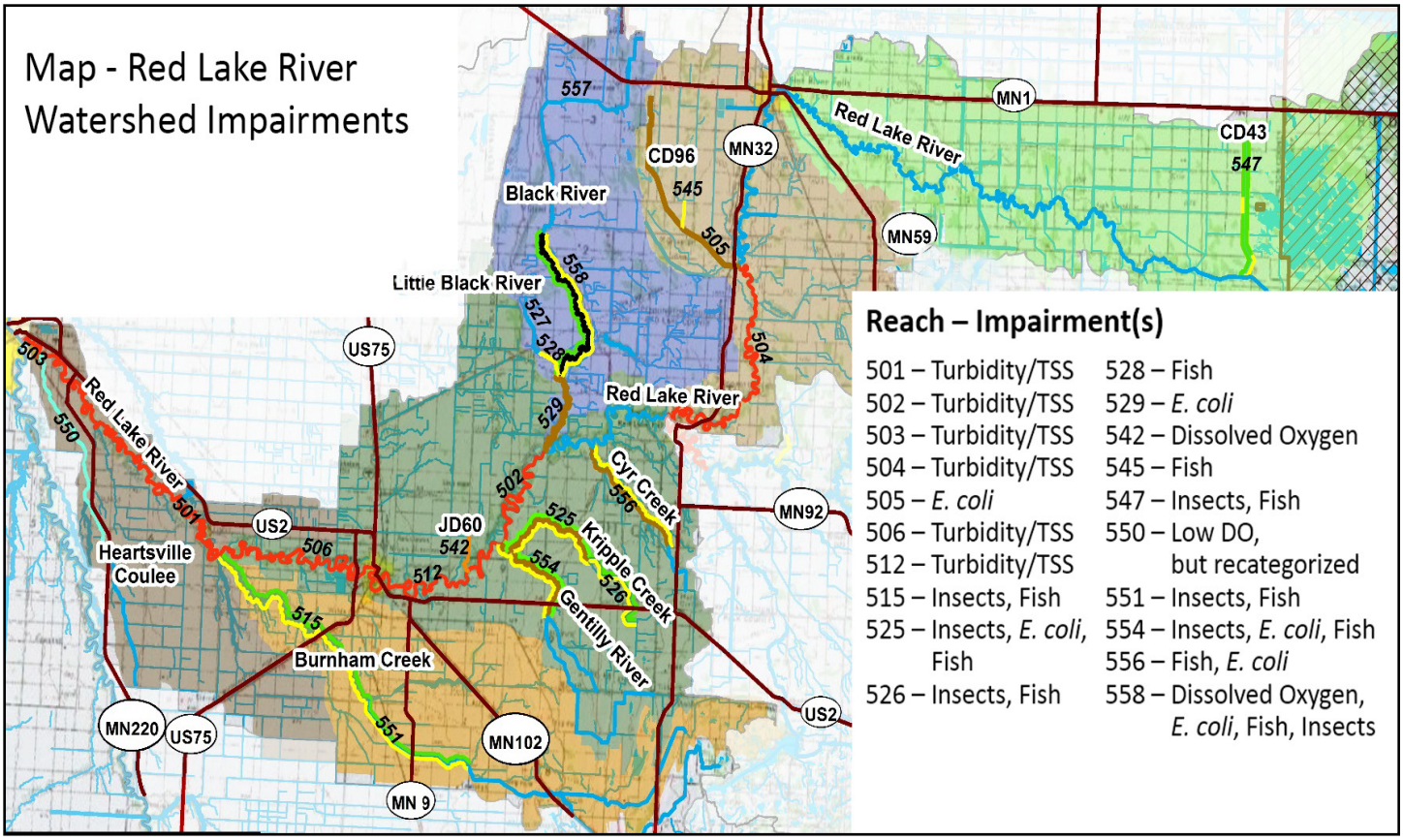
There are 12 dams in the watershed. Many are used to manage water levels to increase waterfowl habitat, and a few are used for hydroelectric power. The removal of two large dams (in 2005 and 2006) along the Red Lake River increased public safety and recreational opportunities to kayakers and anglers, and has provided fish habitat and the ability to access critical upstream spawning areas. Remaining dams in some cases can be barriers to fish movement, negatively impacting their populations.

The Red Lake River is especially popular for recreation in the Red Lake Falls area. As the Red Lake River moves south and west into the Red River Valley Ecoregion, it becomes cloudier with increased turbidity.

Assessments: Are waters meeting standards?

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 below shows the impairments in the watershed. The studies found 31 impairments of aquatic life (fish and macroinvertebrates [aquatic insects]) and recreation in 19 reaches of the Red Lake River and its tributaries. TMDL studies were done on six of the reaches impaired for recreation due to excessive *E. coli* bacteria levels and six reaches impaired for aquatic life due to excessive levels of total suspended solids (TSS). 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.
Additional analysis was done to identity likely sources of the *E. coli* . The tests showed *E. coli* contamination from livestock (likely from manure from feedlots and cattle in streams), humans (likely from faulty septic systems), and birds (including waterfowl and swallows nesting under bridges).



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.

Lack of base flows is a stressor in all biologically impaired tributaries. Many have extended periods of low or no flow, especially in late summer.

Reaches are also subject to periods of low dissolved oxygen (DO), which appear to coincide with low flow conditions. Several reaches have a lack of instream habitat (clean, coarse sand/gravel in the stream bed).

High suspended sediment is contributing to nearly all of the aquatic insect impairments.

A loss of physical connectivity (barriers to fish such as dams, etc.) is a stressor for fish in the Little Black and Black Rivers (reaches 528 and 558).

AUID Suffix	Reach Name	Biological Impairment(s)	Stressors				
			Loss of Physical Connectivity	Lack of Base Flow	Lack of Instream Habitat	High Suspended Sediment	Low Dissolved Oxygen
515	Burnham Creek	F-IBI/M-IBI		•	•	•	•
525	Kripple Creek	F-IBI/M-IBI		•	•	•	•
526	Kripple Creek	F-IBI/M-IBI		•	•	•	•
528	Little Black River	F-IBI	•	•	•	•	•
545	County Ditch 96	F-IBI		•			•
547	County Ditch 43	F-IBI/M-IBI		•	•		•
551	Burnham Creek	F-IBI/M-IBI		•	•	•	•
554	Gentilly River	F-IBI/M-IBI		•	•	•	•
556	Cyr Creek	F-IBI		•			•
558	Black River	F-IBI/M-IBI	•	•	•	•	•

Restoration and protection strategies

Members of the Red Lake River WRAPS Technical Advisory Committee (representing local and state agencies) have created a list of strategies to restore impaired waters and provide protection were water quality is good. An extensive list appears in section 3.3 of the Red Lake River Watershed WRAPS Report. Here are a few key examples from the list:

- Reduce overland and stream bank erosion
- Stabilize ditch outlets and improve agricultural drainage management
- Reduce pollutants in stormwater runoff within cities
- Improve in-stream habitat, base flows, and stream connectivity for fish passage
- Improve septic system compliance and grazing management, and limit cattle access to streams
- Improve the quality of vegetative buffers and protect wetlands
- Prioritize and target cost-effective projects and practices to achieve measurable improvements.

Next steps and measuring results

Restoration and protection strategies listed in the WRAPS report were incorporated into the Red Lake River One Water One Plan. The WRAPS report lays out goals, milestones and responsible entities to address protection and restoration priorities in the watershed. Priority is given to streams closest to being restored and those closest to being impaired. Highlighted in the report are target areas most in need of projects/practices that reduce pollution and improve habitat. The report also provides 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. Making improvements while keeping up with new problems is a perpetual challenge. 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 that have been identified as being at risk for becoming impaired.

Key conclusions of first cycle

- The watershed is dominated by agriculture, with nearly 60% of the land use in crop production. Approximately 70% 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.
- Ten streams were assessed as fully supporting aquatic recreation (swimming, etc.) while seven do not due to elevated bacteria levels. For aquatic life use (fish/aquatic insect communities), 15 streams were found to be fully supporting and 13 stream reaches were non-supporting. No lakes were assessed within the watershed.
- Studies found 31 impairments of aquatic life (fish and aquatic insects) and recreation in 19 reaches of the Red Lake River and its tributaries. TMDL studies were done for six tributary reaches impaired for recreation due to excessive *E. coli* bacteria levels and six reaches impaired for aquatic life due to excessive total suspended solids. Additional analysis done to identify sources of the *E. coli* using DNA showed contamination from livestock (likely from feedlots and cattle in streams), humans (likely from faulty septic systems), and birds (including waterfowl and swallows nesting under bridges).
- Aquatic biology is generally in good condition on the Red Lake River main-stem channel. However, both fish and macroinvertebrate (aquatic insect) communities are in poor condition on a majority of the tributaries. Insufficient base flow (the streams dry up at times) is the most common and impactful stressor for aquatic biology and dissolved oxygen within impaired Red Lake River tributaries. There were no pollutant-based causes of low DO or biological impairments found.
- Landowners, farmers and water managers in the watershed have implemented many projects and practices to improve water quality; however, additional 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 some changes in agricultural practices that are largely voluntary.

In 2005, a project involving a number of state and local watershed partners removed an old dam in Crookston (left) and replaced it with a series of rapids formed from boulders (pictured from opposite side of river). This project, along with a dam project upstream of town, restored fish passage from the Red River in East Grand Forks to Thief River Falls, a distance of 125 river miles. Fish now have access to better spawning habitat.

Full report

To view the full report, go online and search for https://www.pca.state.mn.us/water/watersheds/red-lake-river "MPCA Red Lake River Watershed WRAPS report."

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CLEAN WATER LAND & LEGACY AMENDMENT