

Otter Tail 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 waterbodies and collecting data over two years on water chemistry and biology (2016-2017).
2. Assessing the data to determine which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters (2017-2019).
3. Developing strategies to restore and protect the watershed’s waterbodies, and report them in a document called Watershed Restoration and Protection Strategies (WRAPS) (2019-2021).
4. Coordinating with local One Watershed, One Plan (1W1P) efforts for implementation of restoration and protection projects (2021-beyond).

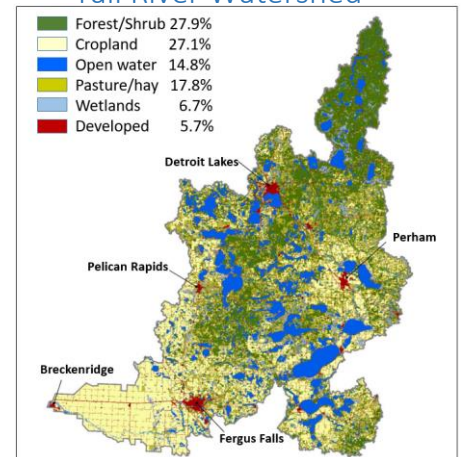


The Minnesota Pollution Control Agency (MPCA) leads the technical work and coordinates and supports strategy development with local, state and federal partners. Watershed partners are leaders in implementing strategies to restore and protect waters. Their past and current work provides opportunities 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 such as soil and water conservation districts can use it for planning and implement the best strategies in prioritized locations.

Watershed characteristics

- Size: 1,952 square miles
- Counties: Otter Tail, Becker, Wilkin, Clearwater, Clay, and Mahnomen
- Ecoregions: Mainly North Central Hardwood Forests, but also Northern Lakes and Forests, and the Lake Agassiz Plain
- Major tributaries: Otter Tail River, Pelican River
- Towns: Fergus Falls, Detroit Lakes, Pelican Rapids, Perham, Breckenridge
- Land cover: forests 27.9%, cropland 27.1%, pasture/hay 17.8%, open water (lakes) 14.8%, wetlands 6.7%, developed land 5.7%. There are more than 1,300 lakes (the most in any Red River Basin Watershed) and many are larger than 1,000 acres that are highly valued for recreation
- The 8-digit hydrologic unit code (HUC): 09020103

Land use in the Otter Tail River Watershed



Assessments: Are waters meeting standards and providing beneficial uses?

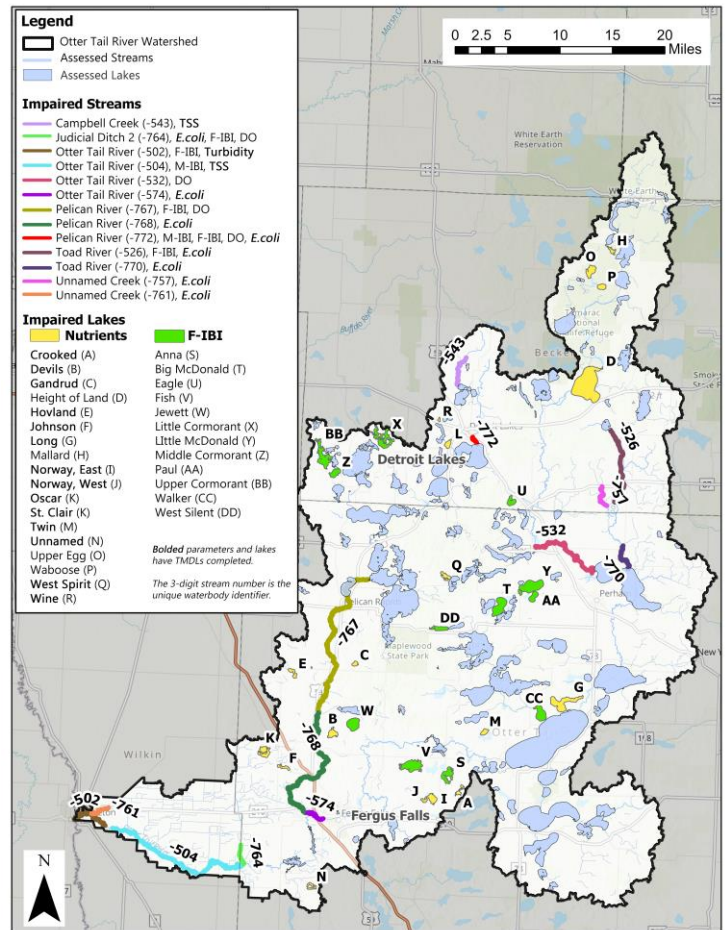
During the first phase of the watershed approach – intensive watershed monitoring (IWM) – the MPCA and partners collected data about biology such as fish populations, chemistry such as pollutant levels, and flow to determine if lakes and streams were meeting water quality standards. Waters are “impaired”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

The Otter Tail River Watershed (OTRW) TMDL Report was completed in conjunction with the WRAPS report and addresses 23 impairments in 10 stream reaches and 13 lakes. Of these 23 impairments, 8 are caused by *Escherichia coli* bacteria (*E. coli*) and 2 by total suspended solids (TSS) or turbidity in streams, and 13 by excessive nutrients in lakes (excessive phosphorus that causes nuisance algae blooms).

TMDLs are not being done for a number of impairments for a variety of reasons. Some are being deferred due to insufficient information at this time, while some are being deferred due to the planned Rice Lake wetland restoration project upstream, which is expected to improve water quality and aquatic habitat in downstream reaches of the Pelican River and Detroit Lake.

More information about impairments not addressed in the TMDL report (including those addressed in already completed TMDLs) can be found in the WRAPS report and in Section 1.2 and Appendix 3 of the TMDL report.

Map of impairments in the OTRW (aquatic life, recreation uses)



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

Based on IWM and stressor identification work, impaired waters are scattered throughout the watershed. Generally, impairments include the following:

- Excess nutrients (phosphorus) in some lakes is fueling algae blooms, reducing clarity and affecting recreation.
- Fish and aquatic insect communities are impacted in some impaired streams by degraded habitat, loss of connectivity due to barriers such as dams or insufficient culverts, high levels of suspended sediment, low dissolved oxygen (DO), and flow instability (periods of high flows during spring runoff and summer rain events followed by extended periods of little to no flow).
- Fish communities in some impaired lakes are impacted due to eutrophication (excess nutrients), physical habitat alteration such as lakeshore development and aquatic vegetation removal, temperature changes, and decreased DO.

Conditions stressing fish, aquatic insects in streams

Reach name (AUID suffix)	Biological impairment(s)	Stressors				
		Loss of longitudinal connectivity	Flow regime instability	Insufficient physical habitat	High suspended sediment	Low dissolved oxygen
Toad River (526)	F-IBI	•		•	•	
Pelican River (772)	F-IBI/M-IBI		•	•	•	•
Pelican River (767)	F-IBI	•		•		•
Judicial Ditch 2 (764)	F-IBI	•	•	•	•	•
Otter Tail River (504)	M-IBI				•	
Otter Tail River (502)	F-IBI			•	•	

- Eight stream reaches in the watershed have impaired aquatic recreation due to elevated levels of *E. coli* bacteria. Microbial source tracking was conducted on a limited basis in the watershed in 2019 to try to determine specific sources of *E. coli* or fecal contamination in impaired stream reaches. The limited results suggest that birds, humans, cattle, and wildlife such as beavers may be considered potential sources of *E. coli* within the drainage areas of the impaired stream reaches. Further study may be needed support these findings.

Restoration and protection strategies

The WRAPS process includes a means to categorize waterbodies for restoration and varied levels of protection. Numerous restoration and protection strategies, or best management practices (BMPs), have been identified through collaboration with local partners in the OTRW.

- According to the MPCA’s [Healthier Watersheds webpage](#) and data from local partners, more than 3,500 BMP projects have been implemented in the OTRW between 2004 through 2019, including agricultural and cropland practices, stream bank and shoreline restorations, septic system improvements, urban stormwater control practices, and more. During that time, \$94 million has been spent on water quality issues through state and federally funded programs, which does not include all local government or private spending.
- For example, construction of the new Detroit Lakes wastewater treatment plant, completed in 2019, is expected to help reduce nutrient inputs to St. Clair Lake and lakes Sallie and Melissa, downstream.
- Phosphorus reductions in Detroit Lake and other improvements in downstream portions of the Pelican River are expected after completion of the Pelican River Watershed District’s Rice Lake wetland restoration project.
- The East Otter Tail SWCD, in cooperation with Becker SWCD and West Otter Tail SWCD and with assistance from federal and state partners, is working with farmers to improve irrigation management to maintain crop yields and reduce nitrate infiltration into groundwater.
- Low fish [index of biotic integrity](#) (F-IBI) and low macroinvertebrate (aquatic insect) (M-IBI) scores were found in six reaches of the OTRW. Removing barriers to restore connectivity, mitigating flows and hydrology of the watershed, reducing erosion, and maintaining buffers and riparian corridors may help restore fish and macroinvertebrate communities in impaired stream reaches and prevent impairments in other stream reaches.
- Low F-IBI scores were found in 12 biologically-impaired lakes. Seven lakes were identified as not impaired but vulnerable. Strategies to reduce nutrient inputs, shoreline degradation, and habitat alteration, as well as preventing aquatic invasive species, can help restore fish communities and prevent impairments in other lakes.
- To improve upstream mobility among aquatic communities, some existing dams and culverts can be modified to allow passage. A dam between Muskrat and Sallie lakes was among the first to be modified in the OTRW and serves as an example to what these projects can look like. Three other dam projects on Fish, Lizzie and Prairie lakes together reconnected 20 miles of the Pelican River. Other dams and culverts will likely be removed or replaced, including the dam located in Pelican Rapids. The existing park and well-known “World’s Largest Pelican,” Pelican Pete, will be preserved and enhanced.



Key conclusions of first cycle

- Water quality in the OTRW is generally good. A majority of streams and lakes support fish and aquatic insect communities, and recreation.
- Sixty-eight percent of the streams that were assessed fully support aquatic life (fish and aquatic insect communities) and have good water quality. The diverse fish and aquatic insect communities are likely due to good habitat and stable flow patterns. Many biological impairments in streams were attributed to poor habitat (see chart on Page 2). One impairment was the result of a barrier restricting fish migration within the Pelican River. Twenty-two dams are present on the Otter Tail River and there are at least six on the Pelican River. Many of these structures are barriers to fish migration.
- Of the remaining aquatic life impairments in streams, four are caused by low DO levels and three are caused by high TSS concentrations, which were evident in the lower reaches of the Otter Tail River and in Campbell Creek, a small headwater stream in the Upper Pelican River subwatershed.
- Excessive levels of *E. coli* bacteria were found in eight stream reaches in the watershed, which are considered impaired. These impairments may be attributed to both human and natural causes.
- Most lakes have good water quality supportive of maintaining quality fisheries and recreational opportunities. Eighty-five percent of the 80 lakes assessed for aquatic life met aquatic life use standards. Numerous lakes contained intolerant fish species (such as the blacknose shiner, blackchin shiner, Iowa darter and banded killifish) which is an indicator of excellent water quality and aquatic habitat.
- Ninety-one percent of lakes assessed for aquatic recreation met aquatic recreation use standards. Of the 9% found to be impaired, many are relatively shallow with elevated phosphorus concentrations, while three are located within the Tamarac National Wildlife Refuge; their impairment is likely the result of naturally occurring conditions (no human activities occur within their catchments).

Next steps

The Otter Tail River Watershed approach began in 2016 and will continue through local water planning and 1W1P efforts. 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 opportunities. 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 “Otter Tail River Watershed” on the MPCA website at <https://www.pca.state.mn.us>.

Contact

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