



# Chippewa River Total Maximum Daily Load Project for Turbidity

Nine segments of the Chippewa River in western Minnesota have been listed by the Minnesota Pollution Control Agency (MPCA) as being impaired for turbidity. A Total Maximum Daily Load (TMDL) report documenting the impairments is being developed, along with an implementation plan to begin work on reducing turbidity.



A TMDL study calculates the maximum amount of a pollutant a water body can receive, (known as the “loading capacity”), without violating water quality standards. The TMDL process identifies all sources of pollutants causing impairments and allocates reductions necessary to meet the water quality standard.

## Watershed description

The Chippewa River Watershed is located in the upper Minnesota River Basin. It originates near Fish Lake in southeastern Otter Tail County, flow approximately 130 miles south and discharges into the Minnesota River at Montevideo. It covers nearly 1,333,440 acres of land, or 2,080 square miles, and is the largest watershed in the Minnesota River Basin. It includes portions of eight counties: Chippewa, Kandiyohi, Swift, Pope, Douglas, Grant, Stevens and Otter Tail. It is divided into 127 minor watersheds with a total stream network of intermittent and perennial streams of more than 2,000 miles. The majority lies in the Northern Glaciated Plains ecoregion. The northeast corner lies in the North Central Hardwood Forest ecoregion, and the southeast corner in the Western Corn Belt ecoregion. It has a population of about 41,000. Agriculture accounts for about 73 percent of the land use.

## Turbidity description

Turbidity is caused by particles suspended or dissolved in water that scatter light making the water appear cloudy or murky. Particulate matter can include sediment – especially clay and silt, fine organic and inorganic matter, soluble colored organic compounds, algae, and other microscopic organisms.

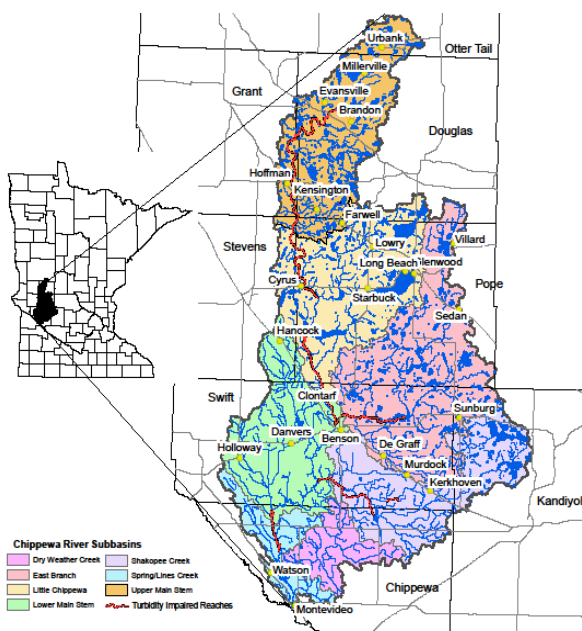
High turbidity can significantly reduce the aesthetic quality of lakes and streams, having a harmful impact on recreation and tourism. It can increase the cost of water treatment for drinking and food processing. It can harm fish and other aquatic life by reducing food supplies, degrading spawning beds, and affecting gill function.

Turbidity is measured using specialized optical equipment in a laboratory or in the field. A light is directed through a water sample, and the amount of light scattered is measured. The unit of measurement is called a Nephelometric Turbidity Unit (NTU). Sediment often tops the list of substances or pollutants causing turbidity. Algae that grow with nutrients entering the stream through leaf decomposition or other naturally occurring decomposition processes, or from manure and commercial fertilizers, can also be a source of turbidity. The state turbidity standard and water quality goal for the Chippewa River is 25 NTU or lower.

## Turbidity sources

Excessive turbidity can be caused by sediment, algae or other substances suspended in the water. The Chippewa River originates in an area dominated by lakes and wetlands with a gently rolling landscape. As the river flows south, the landscape becomes more ideal for row crop agriculture. Precipitation events deliver large amounts of sediment to the streams and rivers, through overland runoff and through the extensive tiling and drainage systems.

Streambank erosion and streambeds contribute additional sediments. Impervious surfaces (pavement and roofs) and agricultural drainage can cause higher flows that increase the erosive force of the river. There are also a number of point source contributors such as National Pollutant Discharge Elimination System (NPDES) permit holders (municipal wastewater treatment plants and industrial facilities) and additional non-point sources such as natural background, aggregate mining, unpaved roads, stormwater and construction activities.



## Turbidity solutions

Land use practices that reduce the amount of sediment and nutrients entering lakes and streams are necessary to reduce turbidity. Riparian (streambank, lakeshore) buffers, streambank stabilization, water storage, surface tile intake buffers or replacements, and crop residue management, all help reduce sediment transport. On farmland, conservation tillage and increased crop diversity including pasture can reduce sediment loss considerably. Crop nutrient management plans help keep nitrogen and phosphorus out of waters, as do improvements in private and public wastewater treatment systems. In cities and developing areas, stormwater management and construction erosion control help prevent sediment runoff.

The TMDL report and implementation plan were developed by the staff of the Chippewa River Watershed Project (CRWP) in conjunction with a stakeholder group of watershed residents, and a consultant that conducted the modeling, load allocations and reduction scenarios. The CRWP staff collected information, worked with the consultant and produced the TMDL report. CRWP staff will conduct educational and outreach activities pertaining to the turbidity TMDL with public meetings, website, and printed media. After the TMDL report is approved by the Environmental Protection Agency, the implementation plan drafted by the CRWP and stakeholder group will be reviewed and approved by the MPCA. Drafting the implementation plan involved holding public meetings to gather input from stakeholders in the watershed and developing a plan that will be used to guide restoration efforts. This project does not include the lowest reach of the Chippewa River (07020005-501) that is also impaired for turbidity, because it is included in the Minnesota River Basin turbidity TMDL.

## For more information

For more information, contact the MPCA-Marshall Office at 507-537-7146, or Kylene Olson, Chippewa River Watershed Project Coordinator, 320-269-2139 extension 116, [kylene@chippewariver.org](mailto:kylene@chippewariver.org). More information is available on the Web at: [www.chippewariver.com/](http://www.chippewariver.com/) and [www.pca.state.mn.us/water/tmdl/project-chippewariver-turbidity.html](http://www.pca.state.mn.us/water/tmdl/project-chippewariver-turbidity.html).