



# Chippewa River Un-ionized Ammonia TMDL Project

Regional  
Environmental  
Management  
  
TMDL Program

Water Quality/Basins #3.09, July 2004

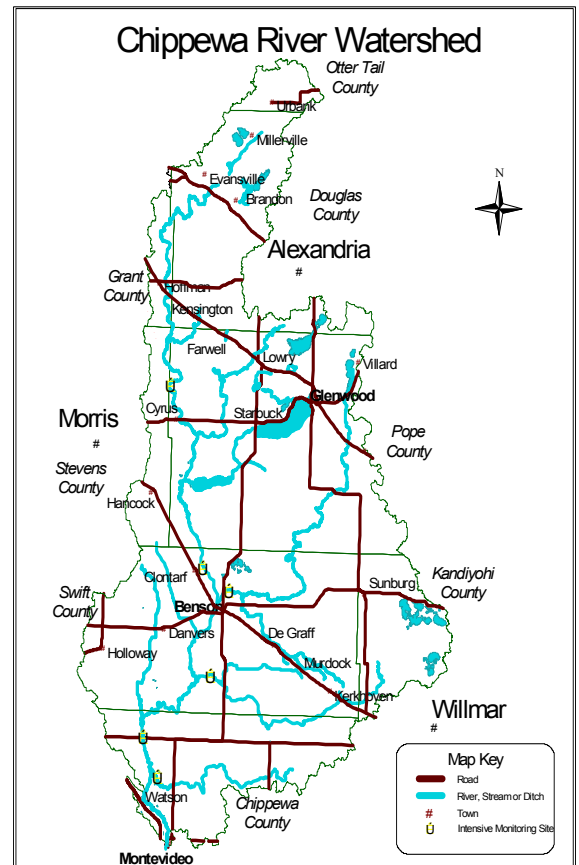
The lower 11.2-mile segment of the Chippewa River, from Dry Weather Creek to its confluence with the Minnesota River near Montevideo, has been listed by the state as an impaired water due to elevated concentrations of un-ionized ammonia. A draft report prepared for the U.S. Environmental Protection Agency and Minnesota Pollution Control Agency (MPCA) describes the impairment, its causes, and possible solutions.

## TMDL background

The report is part of a nationwide effort under the federal Clean Water Act to identify and clean up pollution in streams, rivers and lakes. Every two years states are required to submit a list of impaired waters to the U.S. Environmental Protection Agency (EPA). States and local organizations must determine the total maximum daily load of pollutants that an impaired water body can carry and still meet water quality standards. Citizen participation is an important component of the Total Maximum Daily Load (TMDL) process.

## Water quality standard

Ammonia is a natural by-product of biological activity that dissolves easily in water and is found in two forms, NH<sub>3</sub> (un-ionized) and NH<sub>4</sub><sup>+</sup> (ionized). The combined amount of these two is total ammonia nitrogen, referred to as ammonia. The un-ionized form is toxic to fish and other aquatic life, while the ionized form is not. The amount of ammonia in the un-ionized form is determined by the water temperature and pH, with greater



concentrations at higher pHs and temperatures. The MPCA has established a water quality standard of 0.04 milligrams per liter (mg/L) or less of un-ionized ammonia to protect aquatic life.

## Description of water body

The Chippewa River starts in northeast Douglas County and flows about 130 miles southwest to Montevideo where it joins the Minnesota River. One of the largest watersheds in Minnesota, it covers a 2,085-square-mile area including parts of Chippewa, Kandiyohi, Swift, Stearns, Pope, Stevens, Douglas, Grant and Otter Tail

## MPCA Area Offices

**Brainerd:**  
218/828-2492  
**Detroit Lakes:**  
218/847-1519  
**Duluth:**  
218/723-4660  
**Mankato:**  
507/389-5977  
**Marshall:**  
507/537-7146  
**Rochester:**  
507/285-7343  
**St. Paul:**  
651/296-6300  
800/657-3864  
**Willmar:**  
320/214-3786



counties. The southernmost 11.2-mile segment from Dry Weather Creek to the Minnesota River was first placed on the state's impaired waters list in 1994. It straddles three eco-regions: North Central Hardwood Forest, Northern Glaciated Plains, and Western Corn Belt Plains. A U.S. Army Corps of Engineers flood control project completed in 1951 provides a flow diversion into the Lac qui Parle Reservoir. During low-flow conditions the Corps sometimes releases more water through the dam to maintain flow needs in the Chippewa.

### Monitoring data

A U.S. Geological Survey stream gauge has monitored river flow at State Highway 40 east of Milan since 1937. Water quality monitoring data for un-ionized ammonia are available primarily from a MPCA stations on State Highway 7 in Montevideo between 1971 and 1994. The data that caused the Chippewa River to be listed as an impaired water were collected between October 1984 and September 1993. Out of a total of 54 measurements, five exceeded the 0.04 mg/L water quality standard. The MPCA issued an NPDES permit for the Montevideo waste water treatment plant in April 1993 that authorized an upgrade and assigned ammonia limits for the first time. The limits were calculated to meet the water quality standard. Monitoring at the Highway 7 site ceased in 1994. However, additional MPCA monitoring in 2001 revealed continuing exceedances (two out of six samples exceeded the water quality standard).

### Water quality goals

The assigned use classifications for this segment include aquatic life and recreation, industrial consumption, agriculture and wildlife, aesthetic enjoyment and navigation. The aquatic life standard for un-ionized ammonia of 0.04 mg/L is established to protect aquatic life from toxicological effects. The Total Maximum Daily Load is expressed as the total seasonal ammonia concentrations allowable to achieve the standard under critical low flow conditions. The standard is no more than one exceedance in three years.

### Source assessment

The ammonia comes from point and non-point sources in the watershed. A model was used to assess the relative impact of point and non-point source loads. The model

indicates that the Montevideo waste water treatment plant is the major point source contributor of ammonia in the TMDL reach during low flow. Non-point and point sources above the Montevideo WWTP contribute a small amount of ammonia to the TMDL reach. Non-point sources include individual sewage treatment systems (ISTS), stormwater runoff and feedlots.

### TMDL Allocation

The Total Maximum Daily Load equals the sum of the waste load allocation (point sources), load allocation (non-point sources), and a margin of safety. To achieve the water quality standard for un-ionized ammonia, it will be necessary to manage the waste load allocation of the major contributor, the Montevideo waste water treatment plant. No single other source contributes a significant fraction of the load. While no reduction in load allocation (non-point source) is currently proposed, any major changes in land use that could significantly increase ammonia would require additional analysis. The margin of safety can be incorporated by conservative modeling standards. This TMDL does not include a specific allocation for future growth. That will be addressed through the National Pollutant Discharge Elimination System permitting process, or revisiting the allocations.

### Citizen participation

A public meeting hosted by the Chippewa River Watershed Project is scheduled for 7-9 p.m., Thursday, July 22, 2004 at the Montevideo Community Center. The CRWP, headquartered in Montevideo, includes representatives from local government, agencies, and landowners. It has been very active in monitoring, analysis, and implementation.

### For more information

For more information on the Chippewa River un-ionized ammonia TMDL project, contact Muriel Runholt, MPCA-Marshall, 507-537-7137; or Kylene Olson, Chippewa River Watershed Project, 320-269-2139 ext. 116. General information on TMDLs can be found on the Web at the following sites:

#### Minnesota Pollution Control Agency

[www.pca.state.mn.us/water/tmdl/](http://www.pca.state.mn.us/water/tmdl/)

[www.pca.state.mn.us/water/basins/mnriver/index/](http://www.pca.state.mn.us/water/basins/mnriver/index/)

#### U.S. Environmental Protection Agency

[www.epa.gov/owow/tmdl/](http://www.epa.gov/owow/tmdl/)