Lac qui Parle-Yellow Bank Total Maximum Daily Load for Turbidity, Bacteria, Dissolved Oxygen

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Minnesota Pollution Control Agency

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The list of impaired waters developed by the Minnesota Pollution Control Agency (MPCA) includes 11 sections of the Laq qui Parle and Yellow Bank Rivers in western Minnesota, which fail to meet one or more of the water quality standards for fecal coliform bacteria, turbidity, and low dissolved oxygen. The Lac qui Parle-Yellow Bank Watershed District is the local sponsor preparing a Total Maximum Daily Load (TMDL) report documenting the impairments.

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.

Sources of turbidity include erosion from fields or construction sites, urban runoff from precipitation, eroding streambanks, bottom feeders such as carp and excessive algal growth.

After final approval of the report by the U.S. Environmental Protection Agency, a TMDL implementation plan will be developed

The Lac qui Parle-Yellow Bank watershed drains about 1,712 square miles in western Minnesota (976 square miles) and eastern South Dakota (736 square miles). The Lac qui Parle starts at Lake Hendricks in Lincoln County and flows north through Yellow Medicine and Lac qui Parle Counties. Coming off the Coteau, there is a 1,070-foot drop in elevation in the first 60 river miles. The Yellow Bank River is located in the northern portion of Lac qui Parle County.

Lac qui Parle River

Water quality impairments

Turbidity is a measure of water clarity. A decrease in water clarity is caused by suspended and dissolved matter such as clay, silt, organic matter, algae and color. Sources in the watershed may include stormwater runoff, streambank instability, and straight-pipe individual sewage connections. Turbidity is recognized as an indicator of water quality. Increased turbidity levels limit light penetration and inhibit healthy plant growth. High turbidity can make it difficult for aquatic organisms to find food, affect gill functions and cause spawning habitat to become covered.

Fecal coliform bacteria are found in the feces of all warm-blooded animals. The bacteria itself is usually not harmful, but high concentrations can indicate the presence of other harmful bacteria, viruses and/or parasites. Examples include the pathogenic strain of *E. coli* that is often linked to food borne illnesses, as well as

gardia and cryptosporidium. Recreational contact, especially swimming, is not recommended when high concentrations of fecal coliform bacteria are present.

The water quality standard for fecal coliform bacteria is an average of 200 colony- forming units (CFU) per 100 milliliters (ml) of water. Data for all stations show exceedances across all flow conditions. This suggests sources such as septic systems, overgrazed pastures with direct access to streams, and/or wildlife, and rain runoff events as probable sources.

Dissolved oxygen – oxygen molecules dissolved in water – is a major indicator of water quality. Like the air we breathe, the survival of aquatic life depends on a sufficient level of oxygen dissolved in water. When it drops below levels necessary for sustaining aquatic life, it becomes a significant water quality impairment, often referred to as low dissolved oxygen (DO). The minimum standard is 5 mg/l, and the section listed falls below that in low flow conditions.

Pollution sources

Fecal coliform bacteria pollution in rivers is caused by a combination of many sources, including cattle that are allowed access to streams, improper application of manure to agricultural land, runoff from feedlots, illegally discharging septic systems and wildlife.

Sources of increased turbidity levels include erosion from fields or construction sites, urban runoff from precipitation, eroding streambanks, bottom feeders such as carp and excessive algal growth.

Agriculture is likely a primary source of sediment in the watershed. Over 94 percent of the land use in the Lac qui Parle River watershed is agricultural, and much of that is in row crop agriculture, primarily corn and soybeans. Soil loss is due in part to these areas being left without much vegetative cover for portions of the year between crop harvest and the emergence of the following year's crop.

Low dissolved oxygen (DO) primarily results from excessive algae growth caused by phosphorus. Nitrogen is another nutrient that can contribute to algae growth. As the algae die and decompose, the process consumes dissolved oxygen. This can result in insufficient amounts of dissolved oxygen available for fish and other aquatic life. Die-off and decomposition of submerged plants also contributes to low dissolved oxygen.

Project partners, process

On November 24, 2009, public meetings to introduce the TMDL project were held in Canby and Madison. Representatives from the watershed district, MPCA, and Wenck Associates described the project and answered questions. The report includes data gathered from previous monitoring efforts by the Lac qui Parle-Yellow Bank Clean Water Partnership and citizen monitoring network, which began in 2001.

After final approval of the report by the U.S. Environmental Protection Agency, a TMDL implementation plan will be developed. The plan will provide a strategy for implementation of practical management measures needed to meet the water quality standards. Citizen involvement, education and outreach, and pollution prevention are key components of all TMDL implementation plans.

More information

For more information about the Lac qui Parle-Yellow Bank Rivers multiple impairments TMDL project, contact:

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The draft TMDL report will be available on the Web at: www.pca.state.mn.us/ (Navigate to Water>Impaired Waters and TMDLs>TMDL projects>Minnesota River Basin>Lac qui Parle River). www.pca.state.mn.us/water/tmdl/.

General information on TMDLs can be found on the Web at: www.epa.gov/owow/tmdl/.