Minnesota Pollution Control Agency

Pipestone Creek Fecal Coliform and Turbidity TMDL Project

Water Quality/Impaired Waters #7-07a • February 2008

It is estimated that the overall magnitude of reduction needed to meet water quality standards is approximately 77 percent and 26 percent for current fecal coliform bacteria and turbidity levels, respectively.

Monitoring will be done for a minimum of two seasons and will begin after substantial implementation has taken place, approximately five to seven years from now.

The list of impaired waters developed by the Minnesota Pollution Control Agency includes three reaches, or segments, of Pipestone Creek in southwestern Minnesota that fail to meet the standard for human contact due to excessive amounts of fecal coliform bacteria, and also the water quality standard for turbidity. Turbidity is a measure of cloudiness of water that affects aquatic life. The MPCA has prepared 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.

The water quality standard for fecal coliform bacteria is an average of 200 colony forming units (CFU) per 100 milliliters (ml) of water. Above this level there is greater risk of disease caused by bacteria. This causes the water to be less suitable for swimming.

Watershed Description

Pipestone Creek flows from Minnesota into South Dakota, and back into Minnesota before converging with Split Rock Creek. The Minnesota portion of the Pipestone Creek watershed is located in Pipestone County and encompasses 151 square miles (96,577 acres). The watershed is within the Northern Glaciated Plains ecoregion and is a subwatershed of the Big Sioux

River watershed of the Missouri River basin. Split Rock Creek converges with the Big Sioux River in southeastern South Dakota. Land use is dominated by agricultural cropping and animal production. Pastureland comprises much of the riparian area.

Pollution Sources

The primary contributing sources to fecal coliform bacteria are believed to be livestock on overgrazed riparian pasture, surface-applied manure on cropland and feedlots lacking adequate runoff controls. The primary contributing sources to the turbidity impairments appear to be soil erosion in the riparian zone from livestock, streambank erosion/slumping from livestock and increased flow related to land use, upland soil loss from row cropland and possibly nutrient additions leading to algae growth.

The study used a flow duration curve approach to determine the pollutant loading capacity of the impaired reaches under varying flow regimes. The report focuses on pollutant loading capacity and

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general allocations necessary to meet water quality standards at three individual impaired stream reaches, rather than on precise loading reductions that may be required from specific sources. However, it is estimated that the overall magnitude of reduction needed to meet water quality standards is approximately 77 percent and 26 percent for current fecal coliform bacteria and turbidity levels, respectively.

Monitoring and Assessment

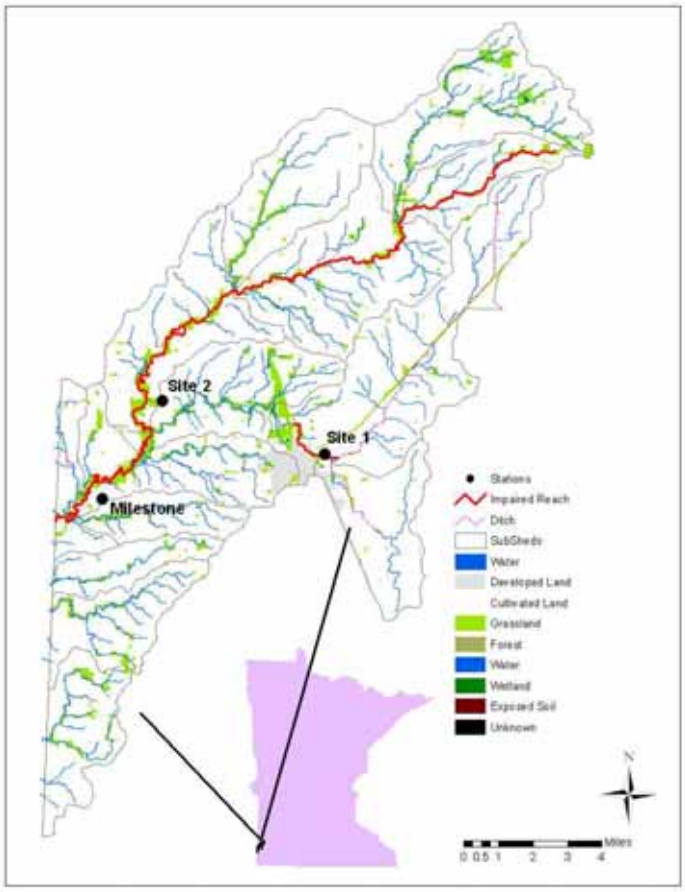
Monitoring of *E. coli* (assuming the proposed rule change shift from fecal coliform to *E. coli* occurs) will be done at the same sites that were monitored for assessment/study purposes. The Pipestone County Conservation and Zoning Office will do so five times per month from April 1 through October 31. A similar schedule will be done for turbidity. Monitoring will be done for a minimum of two seasons and will begin after substantial implementation has taken place, approximately five to seven years from now. The monitoring data will dictate the need for additional implementation and follow-up monitoring.

Best Management Practices

David Mulla of the Department of Soil, Water, and Climate at the University of Minnesota developed a range of agricultural best management practices (BMPs) addressing turbidity and which also have potential to reduce fecal coliform bacteria impacts. Mulla provides the following summary of appropriate BMPs for the range of agricultural-related water quality impacts that occur there:

> *Good animal and manure management practices include livestock exclusion from streams, improved pasture management, and limiting manure applications to frozen ground. Liquid manure waste holding facilities should be properly sited and designed to minimize seepage and overflow. The Manure Application Planner is recommended for nutrient management. Conservation tillage and conservation crop rotations are recommended to reduce soil erosion. Protection of ground water quality from nitrate contamination is a high priority in this agroecoregion. Nitrogen fertilizer applications should be based on realistic crop yield goals, nitrogen credits from legumes and manure, and an N soil test.*

Specific to improved pasture management, using rotational grazing is an appropriate practice in this watershed. Additional actions to specifically address the fecal coliform impact include upgrading of noncompliant septic systems and correction of feedlots with runoff problems.



Streambank erosion was identified as an important contributing source to the turbidity problem. It is not clear to what extent streambank restoration will be pursued in this watershed. Due to potential high cost any streambank restoration projects should be prioritized based on magnitude of apparent contribution.

For more information

For more information on the Pipestone Creek fecal coliform bacteria and turbidity TMDL project, contact Chris Zadak, MPCA-St. Paul, 651-297-8613, or Kyle Krier, Pipestone County Conservation and Zoning Office, 507-825-6765. The draft TMDL report will be available on the Web at: www.pca.state.mn.us/water/tmdl/index.html#drafttmdl. General information on TMDLs can be found on the Web at: www.pca.state.mn.us/water/tmdl/ and www.epa.gov/owow/tmdl/