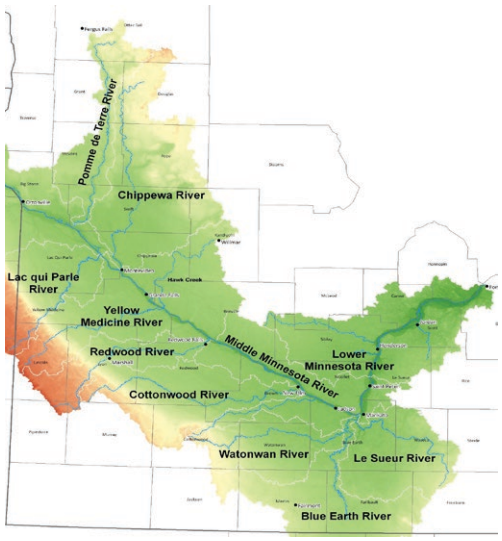
Total Maximum Daily Load report summary

Minnesota River- Greater Blue Earth River Basin TMDL for TSS

Why is it important?

Among major rivers in the United States, perhaps even the world, the Minnesota River stands apart in its formation and current challenges. Once a massive, pre-historic river, today its remnant strains under pressure from its geography, surrounding land use, and changing climate. The Minnesota River Basin provides fishing and other recreation for much of southern Minnesota. But it is also the biggest contributor of sediment and nutrient pollution to the Mississippi River in Minnesota.



The Minnesota River begins near the Minnesota-South Dakota border, flowing for 335 miles before joining the Mississippi River near St. Paul. The basin includes all or parts of 37 counties, draining a 17,000-square-mile area. The Greater Blue Earth River Basin is one of the largest sources of sediment in the Minnesota River Basin. When the Minnesota River reaches the Mississippi River, it accounts for approximately 34% of the drainage area to the South Metro Mississippi River, but contributes an average of 74% of the sediment load to the Mississippi.

Key issues

Streams in the Minnesota River and Greater Blue Earth River Basin suffer from high turbidity: Soil and other particles muddy the water so that it often fails to meet water quality standards that protect fish, insects, and other aquatic life. Sediment and other suspended materials (referred to as total suspended solids or TSS) in water can affect fauna by reducing visibility, clogging gills, and smothering habitat. Sediment buildup also affects navigation in the Minnesota River near the Twin Cities and threatens the long-term future of Lake Pepin.

A Total Maximum Daily Load (TMDL) determines the maximum amount of pollutant a receiving water body can assimilate while still achieving water quality standards, and allocates pollutant load reductions to pollution sources. This TMDL project area for TSS covers the nine major watersheds from the outlet of Lac qui Parle Lake to the mouth of the Minnesota River.

Several regional TMDL efforts are relevant to the TSS TMDLs addressed in this report. The *South Metro Mississippi River TSS TMDL* (MPCA 2015a) addresses the turbidity impairment on the Mississippi River from Fort Snelling in St. Paul to upper Lake Pepin downstream of Red Wing, in addition to the accelerated in filling of Lake Pepin with sediment. TMDLs also address nutrient impairments in Lake Pepin, and bacteria impairments in the Minnesota River Basin.

Because the Minnesota River outlets to the Mississippi River at Fort Snelling and because phosphorus often moves through a watershed attached to sediment particles, progress made towards achieving the Minnesota River TSS TMDLs will represent progress towards achieving the South Metro Mississippi River TSS TMDL (MPCA 2015a) and the Minnesota River and Lake Pepin excess nutrients TMDLs.

Highlights of report

This TMDL study covers 61 TSS impairments along the Minnesota River and its tributaries, including all of the TSS-impaired streams in the Greater Blue Earth River Basin (Blue Earth River, Le Sueur River, and Watonwan River Watersheds).

The primary sources of sediment in the project area include near-channel processes (e.g., bluff, ravine, and streambank erosion) and watershed runoff. Within each major watershed, near-channel sources account for between 63% and 83% of the TSS load.

Much of the annual sediment load in the basin occurs in the spring as a result of snowmelt and spring storms in March through June. The highest sediment concentrations occur during high and very high flow conditions. Subsurface tile drainage likely exacerbates sediment erosion in near-channel areas.

Land use in the watershed is dominated by agriculture, consisting of primarily corn and soybean rotations. To facilitate crop production in otherwise poorly drained soils and historic wetlands, thousands of miles of ditches and subsurface tile have drastically altered the basin hydrology. Following large rain and snowmelt events, rapid peaks in flow volume and velocity dislodge tons of sediment far more quickly than would be the case under natural conditions.

Recommendations

The goals, timelines, and strategies for sediment load reductions in the impaired waters addressed in this TMDL report are set in a greater context of basin-wide work to reduce sediment from both point and nonpoint sources. The Minnesota Pollution Control Agency (MPCA) has developed the *Sediment Reduction Strategy for the Minnesota River Basin and South Metro Mississippi River* (MPCA 2015b) to establish a foundation for local water planning to reach sediment reduction goals developed as part of TMDLs.

The Sediment Reduction Strategy outlines a milestone goal of reducing sediment in the Minnesota River by 25% by 2020 and by 50% by 2030, with a goal of meeting TMDL sediment reduction requirements by 2040 (MPCA 2015b). In addition to the sediment reduction goals, the Sediment Reduction Strategy also provides peak flow reduction goals to further address sediment reduction:

- Reduce 2-year annual peak flow rates by 25% by 2030.
- Decrease the number of days the 2-year peak flow is exceeded by 25% by 2030.

The MPCA expects that a combination of reduction strategies, simultaneously addressing reduction from upland and near-channel sources, will be most successful. Regardless of the main cause or causes, many of the solutions are the same. They can range from traditional conservation practices that reduce soil erosion on cropland, to innovative practices and programs that increase water storage on the land.

Recommendations (cont.)

A wide range of Best Management Practices have been developed to reduce sediment erosion and transport from upland areas:

- Grassed waterways
- Rebuilding soil health
- Water and sediment basins
- Conservation cover easements
- Residue management through conservation or reduced tillage
- Forage and biomass planting
- Cover crops
- Contour cropping
- Strip cropping
- Open tile inlet controls – riser pipes or french drains
- Vegetated buffers on field edges and riparian areas

Practices and actions for reducing near-channel sources of sediment include direct and indirect controls. Direct controls include such practices as limiting ravine erosion with a drop structure or energy dissipater, or controlling streambank or bluff erosion through stream channel restoration. Indirect controls will typically involve land management practices and structural practices designed to temporarily store water or shift runoff patterns by increasing evapotranspiration at critical times of the year.

About this study

TMDLs that address sediment in the Minnesota River Basin and downstream have been in development for many years. The draft TSS TMDLs were developed for the turbidity-impaired waters before the TSS standards were proposed; the TSS targets were based on relationships between TSS and turbidity in the impaired waters.

MPCA established TSS numeric criteria for class 2 waters. In the South River Nutrient Region, where the Minnesota River Basin is located, TSS may not exceed 65 mg/L in more than 10% of samples collected in the months of April through September.

An extensive stakeholder involvement effort included a series of meetings with a stakeholder advisory committee, formation of a sediment research colloquium, and activities designed to build capability and capacity among stakeholders.

Full report

To view the full report, go to http://www.pca.state.mn.us/water/minnesota-river-and-greater-blue-earth-river-basin-tmdl-tss, or search for "Minnesota River-Greater Blue Earth River Basin TMDL for TSS" on the MPCA website.

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