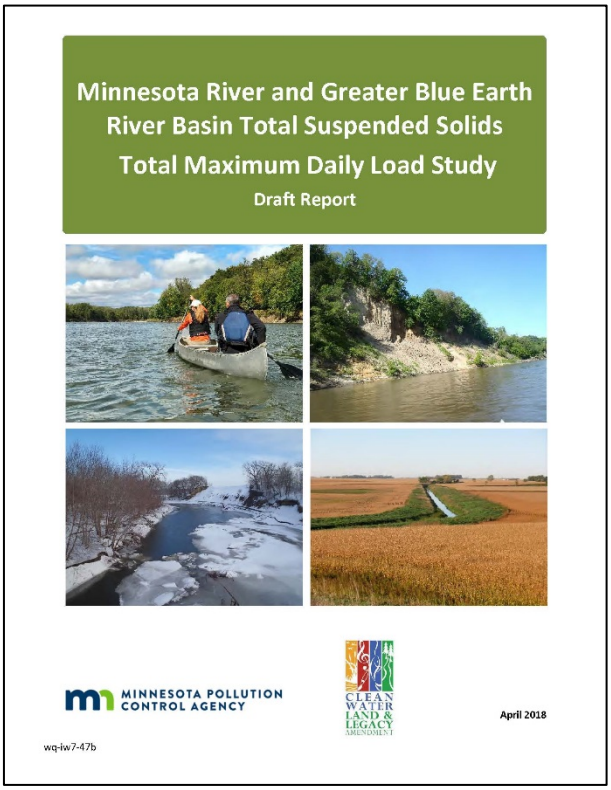
Minnesota River and Greater Blue Earth River Total Maximum Daily Load Study for Total Suspended Solids

Highlighting differences between the current and previous drafts

In 2012, the Minnesota Pollution Control Agency (MPCA) prepared draft Total Maximum Daily Load (TMDL) studies for turbidity (see #1 below) in the Minnesota River and Greater Blue Earth River. During their public notice periods both generated significant comments and requests for contested case hearings.

After prolonged negotiations and responses to the comments and requests for hearings, in 2014 the state adopted new water quality standards for Total Suspended Solids (TSS) that replaced the turbidity standard. This required a recalculation of allocations for the turbidity impairments in the draft TMDLs.

The MPCA decided the best course was to withdraw the 2012 drafts from the U.S. Environmental Protection Agency (EPA) consideration under Section 303 (d) of the Clean Water Act, and re-develop the two TMDLs as one combined study using the TSS standard. Following are highlights of significant differences between the 2012 Minnesota River and Greater Blue Earth turbidity TMDLs and the 2019 draft TSS TMDL.



1. Change to Total Suspended Solids water quality standard

The water quality standard in effect during the development of the 2012 drafts of the Minnesota River and Greater Blue Earth Turbidity TMDLs for Class 2Bd and 2B waters was a turbidity standard of 25 nephelometric units (NTUs), which measures the amount of light penetration of water. According to Minn. R. ch. 7050.0222, turbidity impairment listings occurred when greater than 10% of data points collected within the previous 10-year period exceeded the 25 NTU standard. Because turbidity is not a mass-based measurement, a surrogate was required to calculate TMDLs. TSS, which measures sediment and organic material, was used to set TMDLs for the impaired reaches addressed in the 2012 draft TMDLs. In order to determine the TSS numerical equivalent to 25 NTUs, simple linear regressions were used to establish surrogate TSS values. These surrogate values ranged from 50 mg/L TSS for some of the upper major watersheds to 100 mg/L TSS for the lower mainstem reaches of the Minnesota River.

In June 2014, the MPCA adopted a TSS water quality standard to replace the turbidity standard; it was approved by EPA in January 2015. The TSS standards are region-specific and based on a combination of both biotic sensitivity to TSS concentrations and reference or least impacted streams as supported by data.

The Minnesota River basin (including the Greater Blue Earth) is located in the Southern River Nutrient Region. It has a 65 mg/L TSS standard that may not be exceeded more than 10% of the time April through September over a number of years. The TSS concentration of 65 mg/L is being used to establish TMDL allocations for the impaired reaches addressed in the 2019 draft TSS TMDL. Historic turbidity listings prior to the 2016 303(d) impaired waters list will continue to be displayed as turbidity impairments. Subsequent impairments are listed as TSS. See Section 2 of the 2019 draft Minnesota River and Greater Blue Earth TSS TMDL for further information on the applicable water quality standard.

2. Consolidating sections and including sections approaching the Mississippi River

The 2012 draft of the Minnesota River Turbidity TMDL addressed nine mainstem impaired sections. These were not all contiguous due to data limitations and section length. The nature of suspended sediment and its ability to be easily transported downstream makes this patchwork of section impairments unlikely. Rather, the sections not listed as impaired were likely an artifact of incomplete data. The MPCA recently has consolidated some of the shorter sections of the Minnesota River resulting in fewer but longer mainstem sections.

Using additional data and professional judgment, the long sections resulting from consolidation of an impaired section and a non-listed section are listed as impaired for turbidity or TSS on the 2018 303(d) impaired waters list. As a result, all of the Minnesota River mainstem sections downstream of the Lac qui Parle dam will be listed as impaired for turbidity or TSS and are addressed in the 2019 draft TSS TMDL. This includes the mainstem sections between High Island Creek and the confluence with the Mississippi River that were not included in the 2012 draft Minnesota River Turbidity TMDL. See Table 1 and Appendix A in the 2019 draft TSS TMDL for more information on the impairment listings and section consolidations.

3. Hydrological Simulation Program – FORTRAN (HSPF) model update

Models for six of the Minnesota River's 12 watersheds (HUC8) were originally developed by MPCA and subsequently expanded and calibrated by Tetra Tech in 2002 to include the entire basin from Lac qui Parle to Jordan. In 2008, Tetra Tech refined the models for sediment simulation, and were used in the MPCA's 2012 Minnesota River and Greater Blue Earth Turbidity TMDLs. The basin model since has been refined by RESPEC (2014) and most recently by Tetra Tech (2016) to incorporate new data and increase resolution. The primary differences between the 2008 HSPF model application used in the previous draft TMDLs and the 2016 model used in the current project are:

- The 2008 model scale was at approximately the HUC10 scale; the 2016 model is at the HUC12 scale.
- The 2016 model was extended through 2012.
- The entire updated model was recalibrated based on newer observations and additional data on field-derived sediment sources in the remainder of the basin. The simulations were recalibrated to agree with external information on water balance components and sediment sources:
    - Sediment was apportioned among upland, ravine, bluff, and channel erosion based on sediment budget studies of the Le Sueur and Greater Blue Earth River basins.
    - Model parameter adjustments were made to ensure that per-acre upland sediment loading rates are consistent with expected rates based on local and regional monitoring data and modeling studies.

See Section 4.4.1 of the 2019 draft TSS TMDL for further information on the HSPF model.

4. Setting Waste Load Allocations for Municipal Separate Storm Sewer Systems

The method used for setting Municipal Separate Storm Sewer System (MS4) Waste Load Allocations (WLA) has been changed in the 2019 draft TSS TMDL. In the 2012 draft, MS4 WLAs were calculated by multiplying a sediment export coefficient times the regulated MS4 area. The regulated MS4 area was based on the total developed area within the regulated MS4 boundaries of the 2001 National Land Cover Database (NLCD) layer. In

the 2019 draft of the TMDL, MS4 WLAs are calculated using the same export coefficient as used in the downstream South Metro Mississippi TSS TMDL (154 lb/ac-yr). The area of each permitted MS4 is based on the developed land within MS4 jurisdictional boundaries as indicated in the 2011 NLCD layer. Source assessment

indicated developed areas within permitted MS4s contribute no more than 1% of existing TSS loads (with the exception of the Lower Minnesota watershed). Therefore, it was determined that no reductions to current TSS loading from MS4s are necessary. However, no increases to TSS loading are allowed. MS4s must follow the best management practices and reporting requirements as defined in their permits and Stormwater Pollution Prevention Program (SWPPP). For more information on source assessment and setting MS4 WLAs see Table 7 and Section 5.4.3 of the 2019 draft TMDL.

5. Analysis of conditions for high sediment loading

The HSPF model was used to investigate conditions of high sediment loading in the Minnesota River basin. This work was performed as part of a parallel effort to examine and potentially revise the Sediment Reduction Strategy (MPCA 2015). Seasonality, months of high sediment loads and loading from intense storms were analyzed. This analysis provides insight on critical conditions for sediment delivery in the Minnesota River basin. See Section 4.4.4 of the 2019 draft TSS TMDL for more information.

6. Reasonable assurance

The reasonable assurance section of the new TMDL has been expanded beyond the 2012 draft incorporating the framework for implementation developed for the Chesapeake Bay TMDL project (USEPA 2009). The revised reasonable assurance identifies multiple-scale efforts, from local best management practice implementation to watershed and basin scale plans and strategies. Numerous programs, laws and funding options also are identified as ways to provide reasonable assurance. Finally, the revised reasonable assurance section outlines how progress will be tracked through monitoring and reporting as well as contingency requirements if sediment reduction milestones are not met on schedule. For more information see Section 8 of the 2019 draft TSS TMDL.

References

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