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Subject: Comments regarding Draft South Metro Mississippi River Total Suspended Solids Total Maximum Daily Load Report

Mr. Finley,

The undersigned stakeholders offer the following comments, outlining a series of questions, concerns and recommendations, some of which are directly related to this TMDL project specifically and some of which are related to the impaired waters process generally. The South Metro project, having involved a large number of diverse stakeholders covering a large geographic area in a near decade-long process, provides an excellent case study and an opportunity to evaluate this application of the Clean Water Act.

#### Section 2.0 Waterbody Description

According to the draft report, the construction of locks and dams “drastically altered the meanders and backwater wetlands of the Mississippi River and permanently inundated the floodplain behind each lock and dam.” This is stated as if it is a negative, but as stated in the MPCA’s TSS SAV Site-Specific Standard South Metro Mississippi report, “most rivers in the state do not have the potential to grow extensive SAV. The impounded reaches of the Mississippi River in Minnesota are generally conducive for desirable SAV growth.” In other words, the drastic altering of the Mississippi River corridor provides the habitat suitable for SAV growth. Picking and choosing amongst the perceived positive and negative effects of a management change, without recognizing the tradeoffs that usually occur, is divisive, especially when the TMDL author refuses to acknowledge all stakeholder perspectives. Did the construction of these locks and dams change sediment movement through the river system? If so, how? We would also suggest deletion of the inflammatory adjective “drastically”.

The draft report states that TSS levels change very little at monitoring sites downstream of river mile 844, an area where the river moves through a deep, narrow channel with limited access to slack water areas where settling of finer particles could occur. We would also note that the MPCA Total Suspended Solids- Submersed Aquatic Vegetation Site-Specific Standard report states that this reach of the river would be unlikely to achieve submersed aquatic vegetation goals due to “irreversible cultural changes”, and that as a result, the submersed aquatic vegetation targets should apply below these “major urban

influences.” What impact have these “major urban influences” had on sediment movement through the river system? On what basis does MPCA determine that cultural changes are irreversible? On what basis does MPCA choose to not apply a standard to a river reach?

The draft report states that habitat restoration opportunities are limited through the highly urbanized portion of the river channel, but that downstream of river mile 832, such opportunities exist in the shallower areas of the main channel, side channels and backwaters. Would these opportunities exist without the presence of the lock and dam system?

How does the maintenance of the shipping channel affect sediment movement through the river system?

Historical accounts are interesting, but the obvious use of selected anecdotes is not helpful. These references should be deleted. Alternatively the addition of other perspectives, like that of G. W. Featherstonhaugh, who in 1847 described the Blue Earth River as “loaded with mud of a blueish colour, evidently the cause of the St. Peters (Minnesota River) being so turbid.” Or the reference to a traveler who in 1856 described the Minnesota River as a “dirty little creek,” as related in Evan Jones’ *The Minnesota: the Forgotten River*.

The discussion of urban and rural development and population growth in the region is interesting, but leads to additional questions. According to the report, by 1926, untreated sewage had created a public health nuisance and very poor fish habitat in the Mississippi River, conditions that led to construction of the Metropolitan Wastewater Treatment Plant in 1938. The report also states that in the late 1920s, aquatic life appeared to remain healthy upstream of Lake Pepin despite increasing sedimentation rates. How does MPCA reconcile these contrasting observations? The return of mayflies in the late 1980s and early 1990s is a good indicator of advances in sewage treatment, but a clearer picture could be obtained by the inclusion of sewage discharge data. Could MPCA provide discharge data from 1938 to present to help readers understand key points in time when new technology allowed removal of increasing levels of phosphorus, nitrogen and other pollutants? How has sewage discharge volume changed over time? How have phosphorus, ammonia and nitrate-nitrogen concentrations of treated sewage discharge changed over time? Separation of combined sanitary sewers and storm sewers began in the 1980s. When will the separation be complete? How much progress has been made?

The draft report states that the amount of sediment flowing into the South Metro Mississippi more than doubled from the 1930s to 1960s, then states that this “sedimentation rate” has stabilized in recent decades. Is “sedimentation rate” the same as “the amount of sediment flowing into” Lake Pepin? The report then states that “sediment loads” have increased over the past 500 years. The inconsistency of terms and dramatic changes in time scale severely limit the reader’s ability to draw meaningful conclusions.

The use of sediment cores at a limited number of sites in modern day Lake Pepin to estimate sediment loads to the South Metro Mississippi is of little value without a discussion of the myriad other factors

affecting sediment transport and storage upstream. In addition, figure 2 suggests that for hundreds of years sedimentation was relatively constant, only to become variable in the last 150 years. Given the dynamic nature of this complex system, this seems highly unlikely. If the scaling of the data cannot be presented more clearly, this information should be removed. Related to the sediment cores, has MPCA evaluated sediment cores between modern Lake Pepin and St. Paul to evaluate sediment transport and deposition while this area, once part of Lake Pepin, was being filled in? Has MPCA evaluated cores from other floodplain areas, particularly those along the Minnesota River between Mankato and Fort Snelling?

The draft report includes a summary of land-use changes due to agriculture, but includes no mention of urbanization, roads, bridges, levies, dams (wing, low-head or hydro-electric) or the lock and dam system. These other forms of development likely affected sediment supplied and moved by our rivers. According to the US EPA, up to 150 tons of soil per acre can be lost due to stormwater runoff from construction sites. On what basis did MPCA see fit to omit discussion of these other impacts?

The draft report discusses a shift in sediment loading from “farm fields”, which according to the report accounted for 65% of the sediment entering the South Metro Mississippi in 1940, but now represent 35%. If the numbers are simply multiplied and compared, which one must do with extreme caution given the uncertainty involved, sediment from “farm fields” was 195 tons in 1940, and 245 tons in 2010. Sediment supplied by ravines, bluffs and streambanks increased, according to the same formula, from 105 tons in 1940 to 455 tons in 2010. If these numbers are derived from cores taken within Lake Pepin, do they account for the sediment trapping efficiency of such structures as the Rapidan dam? A January 2010 MN DNR report (Reconnecting Rivers: Natural Channel Design in Dam Removals and Fish Passage) credits the Rapidan dam with trapping more than 11 million yards of sediment since it was constructed in 1910. The same DNR report states that Lake Byllesby was “flushed” in 1985, releasing sediment-laden water downstream—to the South Metro Mississippi and Lake Pepin. Nowhere does the draft TMDL report attempt to incorporate this information. Lake Pepin clearly does not provide a complete sediment history of the watershed, especially in this case, where only a few points within Lake Pepin are relied on so heavily.

The draft report states that increased precipitation is unlikely to be a main driver of increased sediment accumulation rates over the past 180 years. This appears to be based on a comparison of average statewide precipitation. In order to make a useful comparison, could MPCA provide sediment accumulation data over the same space (Minnesota) rather than the few points used to create figure 2? Also, the draft report states that precipitation during the period 1895-2005 was “roughly similar” to the decade 1990-2000. Looking at the data from the climatology office at the link provided in the report, precipitation values for the listed periods are:

1895-21.09	1990-31.78
1896-31.54	1991-35.76
1897-28.94	1992-25.28
1898-23.11	1993-35.34
1899-30.11	1994-28.62

1900-25.87	1995-30.84
1901-23.74	1996-26.89
1902-26.82	1997-27.09
1903-31.72	1998-30.06
1904-25.19	1999-28.42
1905-34.47	2000-25.39
Ave. - 27.51	ave.-29.59

We would not describe a 2” difference in annual precipitation averaged over a decade as “roughly similar”. Further, based on the typical relationship between runoff and precipitation, one would expect that this 7% additional rainfall would result in an even greater runoff volume, as rainfall falling on already saturated soil is unable to infiltrate. We would suggest that MPCA utilize available data on stream flow, sediment loads and precipitation to help identify relationships between sediment transport and supply drivers over similar time and space. The use of estimates lumping together many decades, as is done in figure 2, is extremely misleading, suggesting that sediment loading was constant prior to 1830 without data to show actual fluctuations that likely occurred.

The draft report include comparison of May-June precipitation, noting that these are the months when most of the sediment load is produced in the Minnesota River, concluding that in the long term, climate change does not explain the 10-fold increase in sediment load from the Minnesota River. This summary raises two key questions. First, given the long term variability and complex nature of sediment movement, on what basis is the May-June comparison thought to be helpful? We would refer you to a recent paper by Heinz Stefan and Todd Vandegrift on annual stream runoff and climate, which found that seasonal time scale analysis yielded only some useful results and that precipitation was not a good predictor of runoff in any month. Stefan and Vandegrift also reported that multi-year running averages improve correlation strengths between precipitation and runoff significantly. The examination of May-June precipitation patterns for the past half century is irrelevant and was not brought before the stakeholders working on this TMDL project for their discussion. No reference is provided for this information.

We also have concerns with the methods used to arrive at the conclusion that there has been a 10-fold increase in sediment load from the Minnesota Rive. Over what time frame was this conclusion drawn? What data led MPCA to this conclusion?

The draft report includes numerous mentions of in-filling of Lake Pepin, which is a serious issue but not directly the subject of this TMDL report. However, we are especially concerned that MPCA would elevate the concerns of local residents, river scientists and environmental groups above the concerns of other stakeholders. This is a dangerous precedent and such language should be removed.

The draft report states that the disappearance of Lake Pepin as a sediment basin would adversely affect the Mississippi River downstream. Does this suggest that the formation and disappearance of riverine

lakes as sediment basins is or is not a natural process? We would suggest that MPCA include in the final report some discussion of riverine lakes, to help educate stakeholders.

The Tributary Basins and Watersheds section states that the Minnesota River basin “is also the dominant source every year because total loads vary in response to short-term precipitation patterns and other factors.” Perhaps it would be more accurate to state that the basin is the dominant source every year “even though” total sediment loads vary. In other words, the variation does not cause the Minnesota River basin to be a dominant source.

The discussion on contributing areas acknowledges the natural settling provided by riverine lakes, stating that the Minnesota River upstream of Lac Qui Parle contributes “very little” suspended sediment. We would suggest that “very little” be quantified, especially given that the MPCA has worked with watershed groups upstream of Lac Qui Parle on turbidity TMDLs.

The draft report states that the Upper Mississippi River north of Brainerd appears to contribute no suspended solids, then notes that gradually increasing agricultural and urban land uses in the watershed generate runoff of nutrients and sediment from tributaries. This long-standing approach of focusing first on land use, with no apparent willingness to acknowledge the basic geological differences due to soil type, depth of topsoil and slope, is a basic flaw in the MPCA’s approach to explaining sediment supply and movement to the public. Many stakeholders understand that agricultural areas are so because of the soils present, and that sediment from these areas would be greater than that from those areas where agriculture is not present simply due to landform. Land use is worthy of discussion as an additional factor, but simply labeling those areas contributing higher levels of sediment as high contributing solely because of agricultural activity is incomplete at best, intentionally misleading at worst.

The report continues this misleading approach when referring to the St. Croix basin as providing a “meager contribution of sediment to the Mississippi” due to a combination of favorable land cover and riverine lakes that act as settling basins. Again no mention of soil type or land form.

The discussion on the Cannon River Watershed includes no mention of the effect of Lake Byllesby, or its flushing in 1985, on long term TSS concentration at the mouth of the river.

The small direct tributary discussion correctly observes that tributaries from Wisconsin generally appear to run clearer than those from the Minnesota side of the Mississippi. While data would be more fulfilling than a general observation, the observation is logical to those who have studied soils in the region—again, land form is important.

The draft report discussion of the Metroshed includes 433,819.8 developed acres as of 2001. This number is undoubtedly higher today due to massive urbanization into communities surrounding Minneapolis and St. Paul.

The draft report discussion of the Minnesota River Basin states that TSS concentrations often dip from St. Peter to Jordan—“likely the result of floodplain deposition, increased base flow from groundwater, or both”. Could MPCA provide data on the extent of these factors? Here again, it is likely that the developed footprint of 466,560.8 acres has grown since 2001.

The draft report discussion on urban land uses continues another troubling MPCA method—comparing disparate land uses. Agricultural and urban land uses are very different, are both important to society, and often exist intermingled within a watershed. We suggest that MPCA refrain from direct comparisons, instead offering data and descriptions of areas based on what is known. We also suggest inclusion of more information, such as the Minnesota River Basin TSS data from Minnesota State University, Mankato, showing TSS loads from agricultural basins as low as 27 pounds per acre. The information from southeast Minnesota is not complete. Further, monitoring by the Minneapolis Parks Board verifies that approximately 225 pounds per acre of sediment is delivered from the Minneapolis area, a number that integrates the runoff from both developed and undeveloped land in the Minneapolis area. Simple math suggests that the urban influence is more than “negligible” as 1,806,146 acres multiplies by 225 pounds per acre yields approximately 200,000 tons of material.

The application of a concentration based standard is a new approach to protecting aquatic life. The target of 32 mg/L TSS (30 mg/L TSS with margin of safety) as a long term average to be attained in at least 5 years in a period of 10 years, with a secondary target of no single season average exceeding 44 mg/L TSS is far less ambiguous than the previous application of turbidity standards. We commend MPCA for taking this new approach, and encourage its application more broadly in addressing sedimentation of rivers. We also want to state for the record that it is highly likely that within the next ten years, better science will emerge revealing a more productive means to measure and assess the effects of sediment on aquatic plants, and that the standard will likely require adjustment toward 40, possibly even 50 mg/L TSS.

We also want to state for the record our dissatisfaction with the “open” modeling process utilized “throughout” the project. As stakeholders from the beginning, we felt that our input was not valued, and that the project manager sought opportunities to skew research associated with the project toward his presuppositions. As a result, some stakeholders feel disenfranchised by the process. Taxpayer dollars were also squandered on research that proved to be of little value. While this is sometimes the case even with the best planned research, the project manager’s relationship with some of the funded projects is of concern.

And finally, the report states that MPCA made no attempt to divide the load allocation into subcomponents such as field, ravine, bluff and stream bank, as more research is needed to determine these components with accuracy. We would also suggest that natural background factors must be evaluated as well. In the meantime, we have one closing question for MPCA—given that the Blue Earth and LeSueur Rivers contribute a significant amount of sediment to the Minnesota, which is in turn the leading contributor of sediment to the South Metro Mississippi and Lake Pepin—and given that sediment fingerprinting shows that nearly 90% of the sediment from the Blue Earth and LeSueur is from

ravines, bluffs and streambanks, is it reasonable to expect that changes in agricultural land management, which constitute the majority of the implementation steps applicable to the Greater Blue Earth River Basin, will achieve MPCA's water quality objectives, and if so, at what cost?

In summary, as proponents of clean water and conservation in general, we support the MPCA in their efforts to implement the Clean Water Act and the Minnesota Clean Water Legacy Act. We ask MPCA to edit the draft South Metro Mississippi River TSS TMDL report by removing all conflicting and subjective extraneous references outlined in these comments. We also ask MPCA to rewrite passages outlining stakeholder views divergent from those of the author in a more respectful manner. And finally, we ask that MPCA explore new approaches to working more collaboratively with stakeholder groups in future water quality planning efforts.

Sincerely,

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