UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 13 2018

REPLY TO THE ATTENTION OF:

WW-16J

Glenn Skuta, Watershed Division Director
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194
Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the Total Maximum Daily Loads (TMDL) for the Lake Superior North Watershed- Flute Reed River, located in Cook County, Minnesota. The TMDLs are calculated for total suspended solids and address the turbidity related impairments to the Aquatic Life designated use of the Flute Reed River.

EPA has determined that these TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, EPA hereby approves Minnesota's two TMDLs for the Lake Superior North Watershed- Flute Reed River. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's effort in submitting these TMDLs, and look forward to future submissions by the State of Minnesota. If you have any questions, please contact Mr. Peter Swenson, Chief of the Watersheds and Wetlands Branch, at 312-886-0236.

Sincerely,

Linda Holst

Linda Holst
Acting Director,
Water Division

Enclosure

cc: Celine Lyrnan, MPCA
Karen Evens, MPCA

wq-iw10-13g

Lake Superior North Watershed TMDL

EPA Final Review

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 C.F.R. Part 130 describe the statutory and regulatory requirements for approvable TMDLs. Additional information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation. Use of the term "should" below denotes information that is generally necessary for EPA to determine if a submitted TMDL is approvable. These TMDL review guidelines are not themselves regulations. They are an attempt to summarize and provide guidance regarding currently effective statutory and regulatory requirements relating to TMDLs. Any differences between these guidelines and EPA's TMDL regulations should be resolved in favor of the regulations themselves.

This document is a final review of the MN TMDL document titled:

> Lake Superior North Watershed Total Maximum Daily Load - Flute Reed River
> Minnesota Pollution Control Agency, August 2018, wq-iw10-13e

Each section begins with an introductory summary of what is expected in the TMDL based on EPA guidance.

A brief summary of what supporting information was found and where in the Final TMDL document it can be located is included. Specific language excerpted from the document reviewed may be quoted as well.

General Review Comments:

Overall the document was well written and reflects the extensive amount of time and effort that has gone into gaining an understanding of the nature of the watershed, the sources of sediment leading to exceedances of the water quality standard, and the actions needed to reduce pollutant loads to a level that will no longer contribute to an impairment of the aquatic life designated use.

Section 1. Identification of Waterbody, Pollutant of Concern, Pollutant Sources, and Priority Ranking

The TMDL submittal should identify the waterbody as it appears on the State's/Tribe's 303(d) list. The waterbody should be identified/georeferenced using the National Hydrography Dataset (NHD), and the TMDL should clearly identify the pollutant for which the TMDL is being established. In addition, the TMDL should identify the priority ranking of the waterbody and specify the link between the pollutant of concern and the water quality standard (see section 2 below).

The TMDL submittal should include an identification of the point and nonpoint sources of the pollutant of concern, including location of the source(s) and the quantity of the loading, e.g., lbs/per day. The TMDL should provide the identification numbers of the NPDES permits within the waterbody. Where it is possible to separate natural background from nonpoint sources, the TMDL should include a description of the natural background. This information is necessary for EPA's review of the load and wasteload allocations, which are required by regulation.

The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as:

(1) The spatial extent of the watershed in which the impaired waterbody is located;
(2) The assumed distribution of land use in the watershed (e.g., urban, forested, agriculture); (3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;
(4) Present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and
(5) An explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyll *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Section 1 Review Comments:

Waterbodies are identified as they appear on the MN Proposed 2016 Impaired Waters List.

A comparison of Table 1 from the TMDL document to Review Table 1 shows that the information in the TMDL document matches the information in the MN Proposed 2016 Impaired Waters List.

Table 1. Impaired waters

Reach Name	AUID (04010101-xxx)	Use Class	Location/Reach Description	Affected Designated Use Class	Listing Year	Target Start/Completion	Pollutant or Stressor
Flute Reed River	D31	2A	Headwaters (Moosehorn Lk 16-0015-00) to Unnamed cr	Aquatic Life	2016	2013/2018	Total Suspended Solids
	D32	2A	Unnamed cr to Lk Superior	Aquatic Life	2010	2011/2018	Turbidity

Excerpted from the TMDL document

Review Table 1 Impairments in 2016 Proposed MN 303d list							
Water body name	AUID	Water body description	Affected designated use	Year added to List	TMDL target start year	TMDL target completion year	Pollutant or stressor
Flute Reed River	04010101-D31	Headwaters (Moosehorn Lk 16-0015-00) to Unnamed cr	Aquatic Life	2016	2013	2018	Total suspended solids
Flute Reed River	04010101-D32	Unnamed cr to Lk Superior	Aquatic Life	2010	2011	2018	Turbidity

Excerpted from the MN Proposed 2016 Impaired Waters List
https://www.pca.state.mn.us/water/2016-impaired-waters-list

The TMDL identifies the priority ranking of the waterbody

The priority ranking of the Flute Reed River is addressed in section 1.3 of the TMDL document and is reflected in the TMDL target completion year in the MN Proposed 2016 Impaired Waters List as indicated in Review Table 1 and Table 1 of the TMDL document. Further discussion is also provided in the TMDL document.

> *The MPCA's schedule for TMDL completions, as indicated on the 303(d) impaired waters list, reflects Minnesota's priority ranking of this TMDL. The MPCA has aligned TMDL priorities with the watershed approach and WRAPS cycle. The schedule for TMDL completion corresponds to the WRAPS report completion on the 10-year cycle. The MPCA developed a state plan, Minnesota's TMDL Priority Framework Report, to meet the needs of the EPA's national measure (WQ-27) under EPA's Long-Term Vision for Assessment, Restoration and Protection under the Clean Water Act Section 303(d) Program. As part of these efforts, the MPCA identified water quality impaired segments which will be addressed by TMDLs by 2022. The waters addressed by this TMDL are part of the MPCA prioritization plan to help meet EPA's national TMDL progress measure.*
> *Excerpted from the TMDL document*

The TMDL clearly identifies the pollutant(s) for which the TMDL is being established.

Table 8 of the TMDL document identifies the pollutant of concern for both impaired reaches as Total Suspended Solids.

Table 8. TMDL pollutants

Reach Name	AUID (04010101-xxx)	Location/Reach Description	Affected Designated Use Class	Pollutant or Stressor	TMDL Pollutant(s) [a]
Flute Reed River	D31	Headwaters (Moosehorn Lk 16-0015-00) to Unnamed cr	Aquatic Life	Total Suspended Solids	Total Suspended Solids
	D32	Unnamed cr to Lk Superior	Aquatic Life	Turbidity	Total Suspended Solids

a. In addition to high levels of turbidity and TSS, the *Lake Superior North Watershed Stressor Identification Report* (MPCA 2017b) also identifies the following stressors to aquatic life in the stream: elevated water temperature, physical habitat degradation, and aquatic organism passage barriers.

Excerpted from the TMDL document

The link between the aquatic life use impairment and the exceedance of the total suspended solids water quality criterion is discussed and supported in Section 2.2 of the TMDL document.

> *Aquatic life use is considered impaired when the numeric water quality criteria are exceeded, according to MPCA assessment procedures. The MPCA also makes a determination of aquatic life use support directly with calculated Index of Biological Integrity (IBI) scores, determined by using fish and macroinvertebrate data collected in streams and rivers. …*
>
> *A complete discussion of the biological basis for the TSS standard is contained in the TSS technical report Aquatic Life Water Quality Standards Draft Technical Support Document for Total Suspended Solids (Turbidity) (MPCA 2011).*
> *As discussed above, exceedances of the TSS criteria indicate that a waterbody does not meet the aquatic life designated use. The Flute Reed River was identified as impaired for aquatic life uses due to exceedances of the TSS water quality standard in 2010 and 2016. Subsequent biological monitoring in 2013-2015 and analysis of the fish and macroinvertebrate assemblages indicated the IBI scores met the thresholds for aquatic life. This presents a somewhat unique combination of water quality assessments that appear to say different things. An independent review of all data and scores by a professional judgment team upheld the designation of the aquatic life use impairment due to TSS.*
> *Although the IBIs are above the impairment thresholds, there is evidence of stress on the condition of the biota. The Lake Superior North Watershed Monitoring and Assessment Report (MPCA 2017a) indicates the headwaters show less TSS impact. The biological communities there are described as in good-to-excellent condition. In the lower reaches, more TSS stress may be impacting the community from the more elevated levels of suspended sediment. Macroinvertebrate IBI scores decline from upstream to downstream, but still meet the general*

use biocriteria.
Excerpted from the TMDL document

Waters within Indian Country, (as defined in 18 U.S.C. Section 1151) are identified and discussed.

Section 1.1 of the TMDL document indicates that no tribal owned lands are present within the project area.

There are no tribal lands within the project area, however, the watershed is part of the of the La Pointe Treaty of 1854, which reserves hunting and fishing rights for the Ojibwa tribes of the Lake Superior region.
Excerpted from the TMDL document

Location and quantity of point and non-point sources are identified.

Section 3.4 of the TMDL document discusses the sources of suspended solids to the Flute Reed River. Sediment sources are separated into watershed sources and near-channel sources.

Figure 16 of the TMDL document shows the results of an HSPF model used to estimate the average annual sediment loads as well as the relative contributions of near channel sources and watershed sources from each of the subwatersheds within the basin.

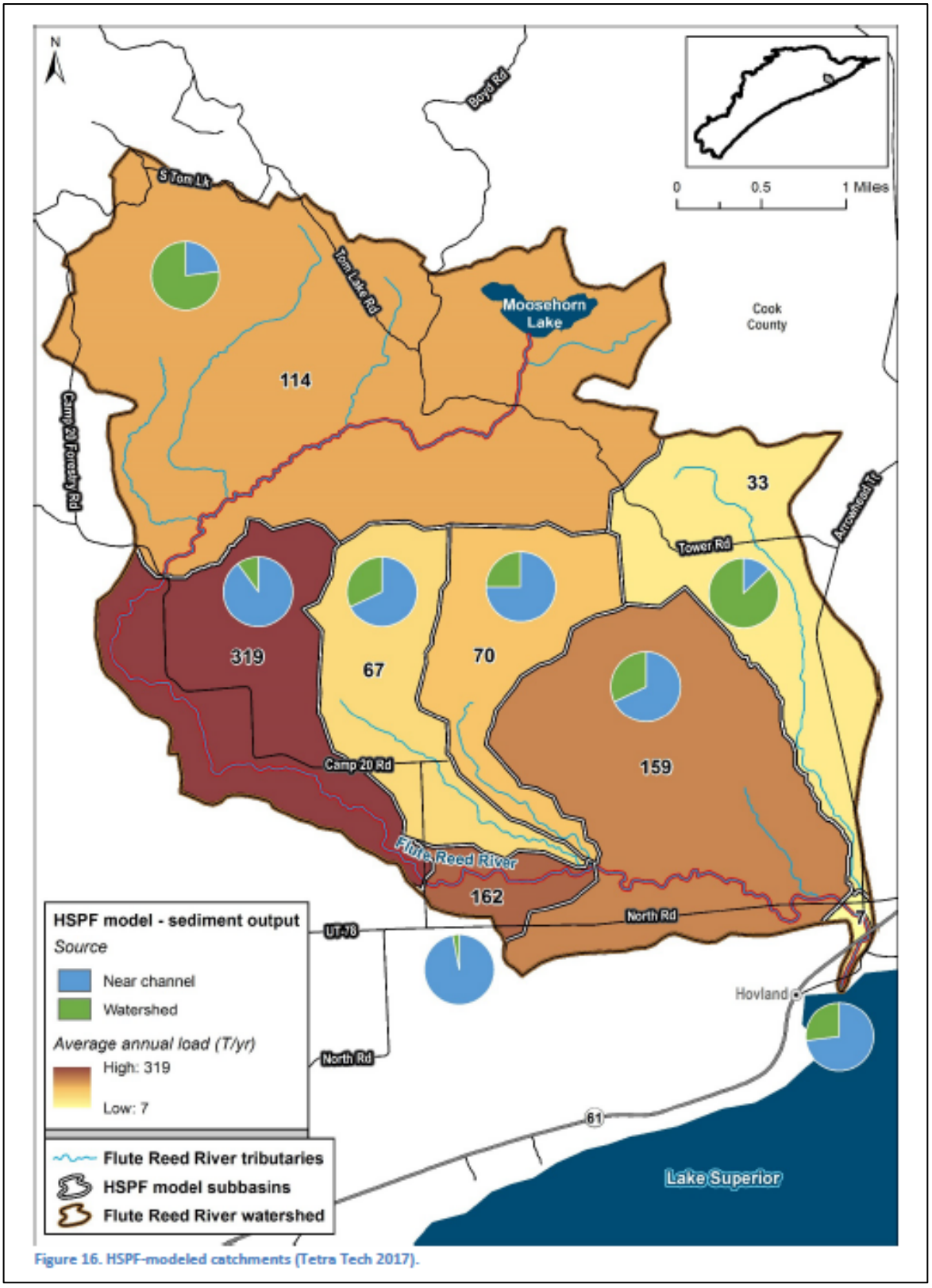

Figure 16. HSPF-modeled catchments (Tetra Tech 2017).

Excerpted from the TMDL document

Watershed Sources

Section 3.4.1 of the TMDL document identifies watershed sources as those associated with runoff from snowmelt and large rainfall events.

Sources of sediment identified from watershed runoff include logging, land clearing and the creation of impervious sources such as roads, driveways, and trail networks, and erosion from ditch scour.

There are no wastewater treatment plants or MS4 regulated stormwater sources identified in the watershed.

Near Channel Sources

Section 3.4.2 of the TMDL document discusses near-channel sources of sediment as those resulting from increased erosion of the stream channel and stream banks resulting from changes in hydrology of the watershed due to historic and current land alterations.

Increased erosion from banks, bluffs, and channel scour are due in part to evolution of the river channel resulting from altered hydrology brought about by changes in land use including logging and land clearing for development.

A geomorphic assessment was completed by MPCA in 2016 based on the Bank Assessment for Nonpoint source Consequences of Sediment (BANCS) model. The model indicated that on average 1,429 tons of sediment are lost annually from stream banks.

> *The BANCS model combines Bank Erosion Hazard Index (BEHI) and Near Bank Stress (NBS) measurements to estimate an erosion rate. Measurements are completed at an individual bank scale and extrapolated to a reach scale. In the MPCA assessment, 2 to 38 banks were assessed per reach depending on the length and reach complexity. At each assessment bank, characteristics such as plant root depth and density, bank height and bank angle were used to calculate a BEHI score and the location of dominant channel flow relative to the bank or depositional properties and other channel characteristics were used to calculate a NBS score. [Excerpted from the TMDL document]*

Figure 19 of the TMDL document shows the estimated annual tons of sediment associated with bank erosion for each of the reaches assessed.

> *Near-channel sources (banks, bluff, and channel scour) are highest in the middle reaches and correspond to the highest average annual sediment loading.*
> *[Excerpted from the TMDL document]*

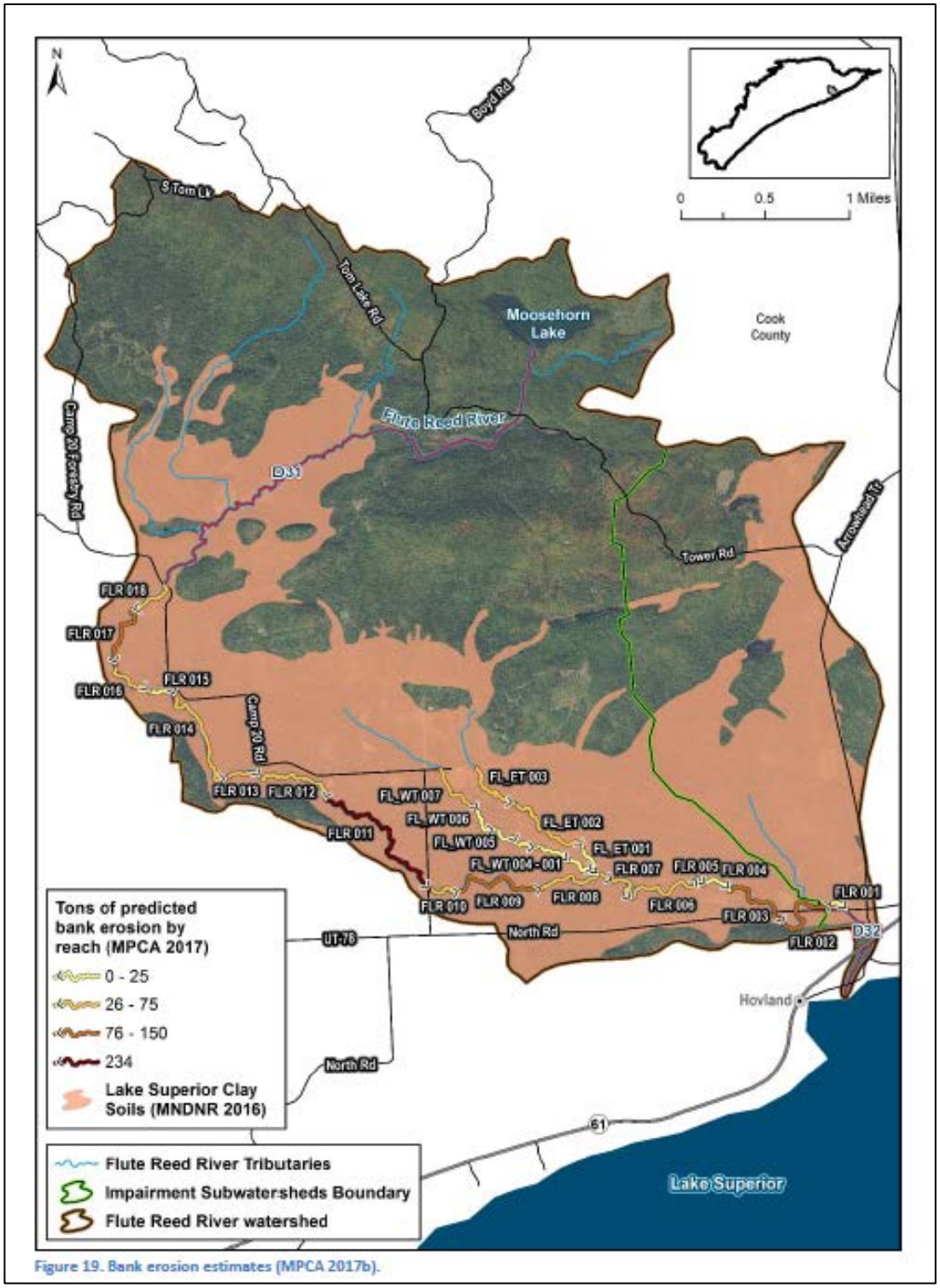

Figure 19. Bank erosion estimates (MPCA 2017b).

Excerpted from the TMDL document

Impacts associated with beaver dams are also identified as a potential contributing factor to near-channel sediment loadings, however, the study was not able to quantify the proportion of sediment due to this source. Figure 18 of the TMDL document shows the location of the numerous beaver dams throughout the Flute Reed River watershed.

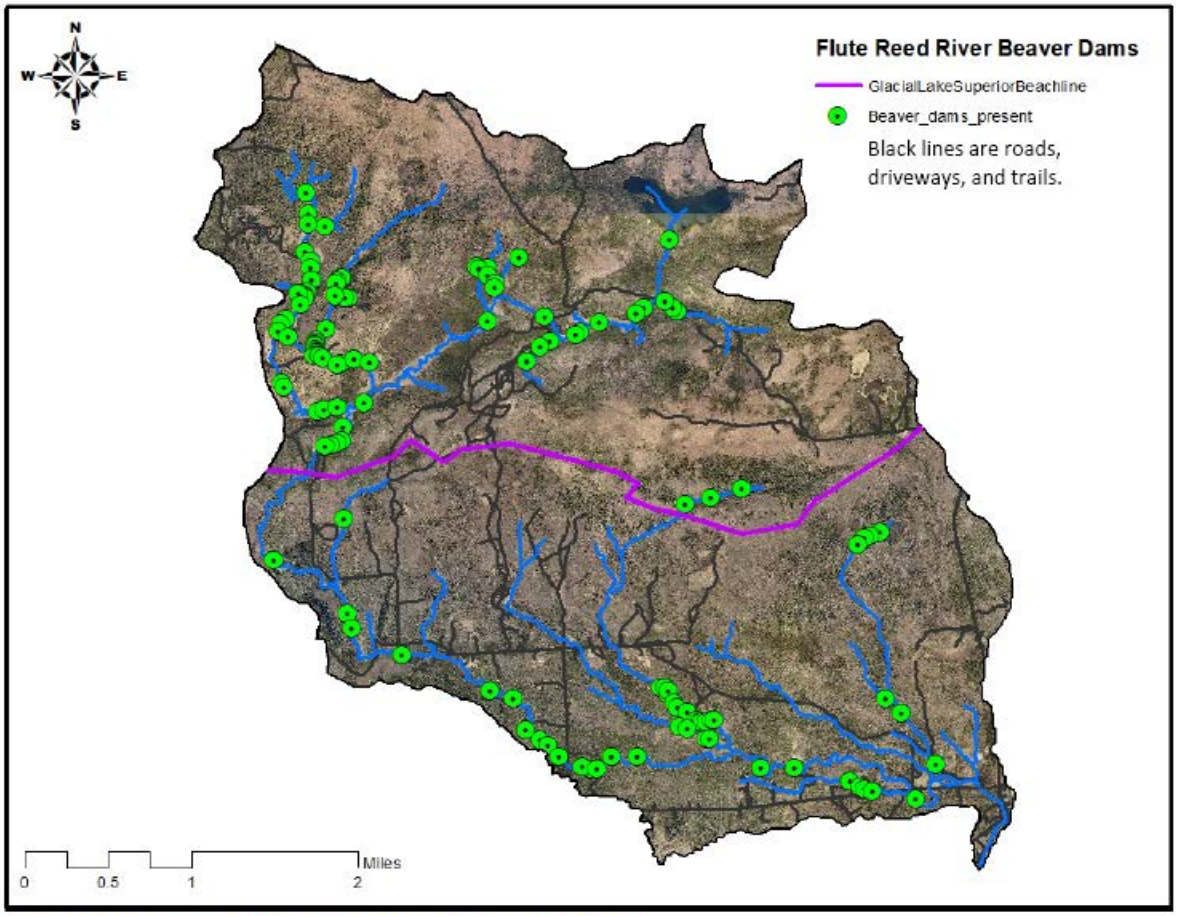

Figure 18. Beaver dams and infrastructure (map provided by MPCA).

Excerpted from the TMDL document

Natural background sources of sediment are discussed in section 4.1 of the TMDL document. Although natural background sources were not specifically quantified, a discussion is included to explain why the State does not believe natural background sources of sediment are a major contributing factor to the current impairments.

> *Natural background conditions were evaluated, where possible, within the source assessment portion of this study. The source assessment indicates natural background inputs (i.e., forest and wetlands) are generally low compared to near-channel sources and developed land covers. The impact of beaver activity, a natural source, has been documented as contributing to sediment loading in the stream; however, it is not possible at this time to distinguish the proportion of near-channel loading attributed to beaver activity.*
> *Other streams exist within the larger HUC 8 that have similar geologic and hydrologic*

conditions. It is important to note that, of the Lake Superior North streams assessed to date, the Flute Reed River is the only sediment-impaired stream. The lack of other impairments among this group of assessed streams provides evidence that additional factors are contributing to the Flute Reed River impairments, including a higher amount of development and a more extensive road network. …
Based on the MPCA's waterbody assessment process and the TMDL source assessment, there is no evidence at this time to suggest that natural background sources are a major driver of the impairment and/or affect the waterbody's ability to meet state water quality standards. Natural background sources are implicitly included in the LA portion of the TMDL and reductions should focus on the major anthropogenic sources including roads, developed land uses, and logging operations.
[Excerpted from the TMDL document]

Tributaries, though a contributor of suspended sediment to the Flute Reed River, are not expected by MPCA to be making a significant contribution to the impairment of the stream.

Limited tributary monitoring data collected in the spring of 2016 indicate that tributaries are likely contributing to impairment, but are not a major source.
[Excerpted from the TMDL document]

Both construction and industrial site stormwater runoff are considered to be insignificant sources of sediment and are not specifically addressed in the source assessment section of the TMDL document. However, waste load allocations for these sources are included later in the document.

The EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the first criterion.

Section 2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. (40 C.F.R. §130.7(c)(1)). EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

The TMDL submittal must identify a numeric water quality target(s) – a quantitative value used to measure whether or not the applicable water quality standard is attained. Generally, the pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical (e.g., chromium) contained in the water quality standard.

The TMDL expresses the relationship between any necessary reduction of the pollutant of concern and the attainment of the numeric water quality target. Occasionally, the pollutant of concern is different from the pollutant that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorus and the numeric water quality target is expressed as Dissolved Oxygen (DO) criteria). In such cases, the TMDL submittal should explain the linkage between the pollutant of concern and the chosen numeric water quality target.

Section 2 Review Comments:

Applicable WQS are identified and described, and a numerical water quality target is included.

Section 2 of the TMDL document addresses the applicable water quality standards and the pollutant of concern. The TMDL numerical endpoint is <10 mg/L TSS, exceeded no more than 10% of the time from April 1 through September 30.

2.1 Designated Uses
Use classifications are defined in Minn. R. 7050.0140, and water use classifications for individual water bodies are provided in Minn. R. 7050.0470, 7050.0425, and 7050.0430. This TMDL report addresses two Flute Reed River reaches that do not meet the standards for Class 2A waters. Class 2A waters are protected for the propagation and maintenance of a healthy community of cold water sport or commercial fish, and associated aquatic life and their habitats, and are also protected for aquatic recreation activities including bathing. [Excerpted from the TMDL document]

2.2 Water Quality Criteria
Water quality criteria for Class 2A waters are defined in Minn. R. 7050.0222. The criteria include numeric criteria for various chemical and physical constituents in water, along with biological threshold criteria. Aquatic life use is considered impaired when the numeric water quality criteria are exceeded, according to MPCA assessment procedures. The MPCA also makes a determination of aquatic life use support directly with calculated Index of Biological Integrity (IBI) scores, determined by using fish and macroinvertebrate data collected in streams and rivers.
As noted earlier in this document, TSS standards replaced the older turbidity standards during a 2015 rulemaking. The TMDL endpoint for Class 2A streams is <10 mg/L TSS, exceeded no more than 10% of the time from April 1 through September 30. The previous turbidity standard for Class 2A waters was 10 nephelometric turbidity units. For the development of the TSS water quality standards, the MPCA relied on field-collected aquatic community or biological data. Statistical tools were also employed in standards development for more accurate and precise measures of biological thresholds. A complete discussion of the biological basis for the TSS standard is contained in the TSS technical report Aquatic Life Water Quality Standards Draft Technical Support Document for Total Suspended Solids (Turbidity) (MPCA 2011).

Excerpted from the TMDL document

The TMDL expresses the relationship between any necessary reduction of the pollutant of concern and the attainment of the numeric water quality target.

Load duration curves are utilized to specify the amount of reduction of total suspended solids necessary to attain the numeric water quality target for each of the 5 flow regimes identified for the two impaired reaches. This information is presented in Figures 22 and 23 of the TMDL document, and summarized in Tables 9 and 10 of the TMDL document.

The EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the second criterion.

Section 3. Loading Capacity - Linking Water Quality and Pollutant Sources

A TMDL must identify the loading capacity of a waterbody for the applicable pollutant. EPA regulations define loading capacity as the greatest amount of a pollutant that a water can receive without violating water quality standards (40 C.F.R. §130.2(f)).

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). If the TMDL is additionally expressed in terms other than a daily load, e.g., an annual load, the submittal should explain why it is appropriate to express the TMDL in the unit of measurement chosen. The TMDL submittal should describe the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In many instances, this method will be a water quality model.

The TMDL submittal should contain documentation supporting the TMDL analysis, including the basis for any assumptions; a discussion of strengths and weaknesses in the analytical process; and results from any water quality modeling. EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

TMDLs must take into account *critical conditions* for steam flow, loading, and water quality parameters as part of the analysis of loading capacity. (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable *critical conditions* and describe their approach to estimating both point and nonpoint source loadings under such *critical conditions*. In particular, the TMDL should discuss

the approach used to compute and allocate nonpoint source loadings, e.g., meteorological conditions and land use distribution.

Section 3 Review Comments:

The loading capacity is presented for POC (including daily loads)

Figures 22 and 23 of the TMDL document present the loading capacity of the impaired reaches in the form of loadduration curves with the curves representing the total maximum loading capacity for all flow conditions for each of the two impaired segments.

> *The load duration curve method was used to develop the stream TMDLs. Because this method uses a long-term record of daily flow volumes, virtually the full spectrum of allowable loading capacities is represented by the resulting curve. In the TMDL equation tables, only five points on the entire loading capacity curve are depicted—the midpoints of the designated flow zones (e.g., for the high flow zone [0th to 10th percentile], the TMDL was calculated at the 5th percentile). However, the entire curve represents the TMDL and is what is ultimately approved by the EPA. Table 8 summarizes the TMDLs being developed.*
> *[Excerpted from the TMDL document]*

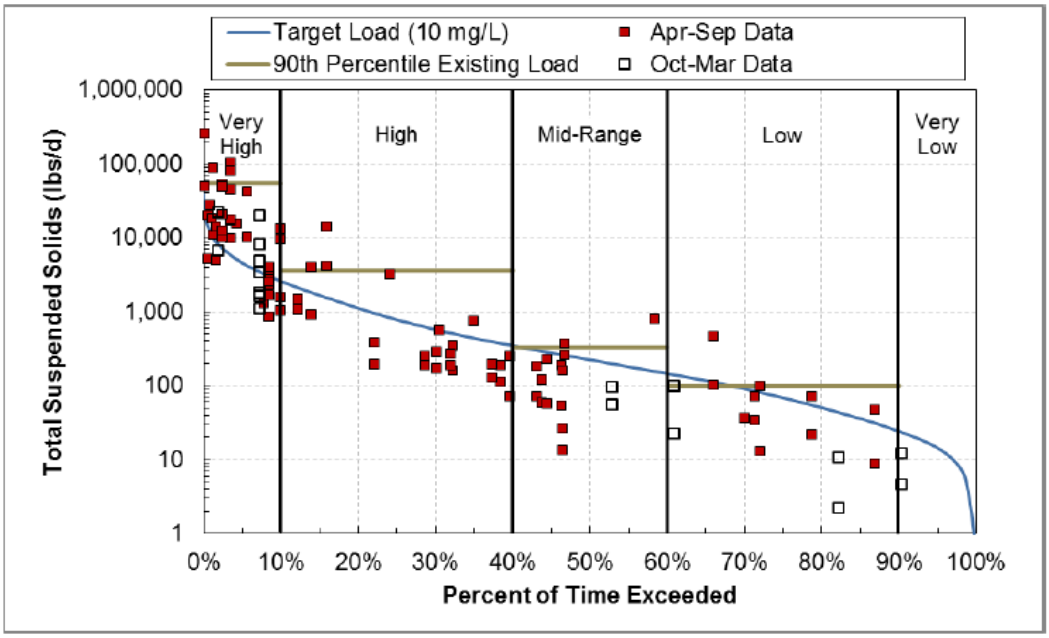

Figure 22. TSS load duration curve, Flute Reed River (04010101-D31).
Excerpted from the TMDL document

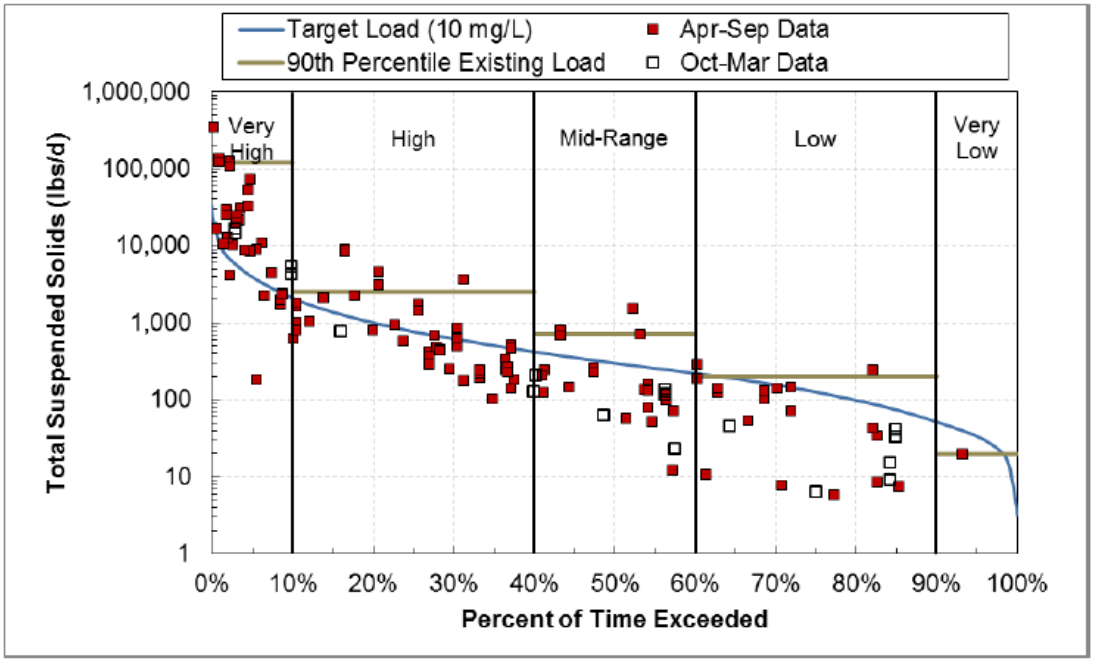

Figure 23. TSS load duration curve, Flute Reed River (04010101-D32).

Excerpted from the TMDL document

The TMDL summaries in Tables 9 and 10 of the TMDL document provide a breakdown of the pollutant loading capacity for each of the five flow regimes identified for the two impaired reaches. TSS loading capacity is presented in lbs/day.

Table 9. TSS TMDL Summary, Flute Reed River (04010101-D31)

Table 10. TSS TMDL Summary, Flute Reed River (04010101-D32)

All values except for construction and industrial stormwater WLAs are rounded to nearest whole number.

TMDL Parameter		Flow Regime				
		Very High	High	Mid-Range	Low	Very Low
		TSS Load (lbs/day)				
Wasteload Allocation	Construction Stormwater (MNR100001)	0.132	0.021	0.006	0.002	0.0004
	Industrial Stormwater (MNR050000)	0.264	0.043	0.012	0.004	0.001
Load Allocation		4,811	779	222	68	14
MOS		535	87	25	8	2
Loading Capacity		**5,346**	**866**	**247**	**76**	**16**
Existing Load		137,752	2,569	403	94	10
Percent Load Reduction		96%	66%	39%	19%	0%

Excerpted from the TMDL document
Excerpted from the TMDL document

The method to establish cause and effect relationship between POC and the numerical target is described and the TMDL analysis is documented and supported.

Section 4 of the TMDL document provides an explanation of how the relationship between suspended sediment loads and the water quality target was established. A flow duration curve based on an HSPF hydrographic model was used to develop load duration curves. A detailed description of the process for creating flow duration curves and load duration curves is included in the section.

HSPF Hydrographic Model:
An HSPF model was developed by MPCA to simulate the hydrograph for the Flute Reed river. The HSPF model report describing how the model was developed and calibrated is included in the TMDL as Appendix A. Weather data was aggregated from grid based data to better represent the watershed.

Meteorological time-series data in the LSN model are based on gridded products (NLDAS and PRISM) spatially aggregated to larger weather regions based on precipitation and temperature patterns. To facilitate parameterization and refine the model performance we have defined two new weather regions the FLR watershed - 5 and 6. With the exception of precipitation, these weather regions use the same meteorological time-series as weather regions 15 and 16, respectively, in the LSN HSPF model. The area along the Lake Superior shore has strong precipitation gradients and to maintain the local

precipitation patterns in the FLR, we have spatially aggregated the gridded precipitation data to the relatively smaller weather regions 5 and 6.
[Excerpted from the TMDL document]

Streamflow calibration focused on the period of available data (2013-2016) at the station on the Flute Reed River at Hovland, CR69 (01015001). Calibration was completed by comparing time-series model results to gaged daily average flow.
[Excerpted from the TMDL document]

Load duration curves:
Load duration curves were utilized to determine the maximum TSS load required to attain the water quality standard for all flow conditions.

Allowable pollutant loads in streams are determined through the use of load duration curves. A load duration curve is similar to a water quality duration curve except that loads rather than concentrations are plotted on the vertical axis. Discussions of load duration curves are presented in An Approach for Using Load Duration Curves in the Development of TMDLs (EPA 2007).
[Excerpted from the TMDL document]

The critical conditions are described and accounted for.

Critical conditions are addressed through the use of load duration curves. Load duration curves are often used in the TMDL approach when WQS are expressed in terms of numerical concentration criteria. The concentration of a pollutant is a function of both the loading of the pollutant to the waterbody as well as the volume of water flowing in the stream available to assimilate the load. The load duration curve approach accounts for critical conditions by directly determining the assimilative capacity of a waterbody across the range of stream discharges expected to occur based on the hydrographic record. Section 4.2.1 of the TMDL document addresses the use of load duration curves to address critical conditions.

The Clean Water Act requires that TMDLs take into account critical conditions for stream flow, loading, and water quality parameters as part of the analysis of loading capacity. Through the load duration curve approach it has been determined that load reductions are needed for specific flow conditions; however, the critical conditions (the periods when the greatest reductions are required) vary by location and are inherently addressed by specifying different levels of reduction according to flow. [Excerpted from the TMDL document]

The EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the third criterion.

Section 4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity attributed to existing and future nonpoint sources and to natural background. Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. §130.2(g)). Where possible, load allocations should be described separately for natural background and nonpoint sources.

Section 4 Review Comments

Load allocations for existing non-point sources are accounted for.

Section 4.2.2 of the document addresses the methodology used to develop the load allocations. Tables 9 and 10 of the TMDL document and in section 3 above present the load allocations in terms of lbs./day of TSS.

> *The LA represents the portion of the loading capacity that is allocated to pollutant loads that are not regulated through a National Pollutant Discharge Elimination System (NPDES) Permit (Permit) and is calculated as the loading capacity minus the MOS minus the WLAs. The LA implicitly includes natural background sources (e.g., beaver activities, load from forest land covers, etc.).*
> *[Excerpted from the TMDL document]*

The EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the forth criterion.

Section 5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to individual existing and future point source(s) (40 C.F.R. §130.2(h), 40 C.F.R. §130.2(i)). In some cases, WLAs may cover more than one discharger, e.g., if the source is contained within a general permit.

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. These individual WLAs may be adjusted during the NPDES permitting process. If the WLAs are adjusted, the individual effluent limits for each permit issued to a discharger on the impaired water must be consistent with the assumptions and requirements of the adjusted WLAs in the TMDL. If the WLAs are not adjusted, effluent limits contained in the permit must be consistent with the individual WLAs specified in the TMDL. If a draft permit provides for a higher load for a discharger than the corresponding individual WLA in the TMDL, the State/Tribe must demonstrate that the total WLA in the TMDL will be achieved through reductions in the remaining individual WLAs and that localized impairments will not result. All permittees should be notified of any deviations from the initial individual WLAs contained in the TMDL. EPA does not require the establishment of a new TMDL to reflect these revised allocations as long as the total WLA, as expressed in the TMDL, remains the same or decreases, and there is no reallocation between the total WLA and the total LA.

Section 5 Review Comments

WLAs are properly assigned

Section 4.2.3 of the TMDL document addresses the methodology for assigning waste load allocations. There are no NPDES permitted waste water treatment plants or municipal separate storm sewer systems (MS4s) allocated a waste load in the watershed. WLAs were derived for both construction and industrial stormwater and included in Tables 9 and 10 of the TMDL document and in section 3 above.

> *The WLA represents the portion of the loading capacity that is allocated to pollutant loads that are regulated through an NPDES Permit. Construction stormwater and industrial stormwater are NPDES regulated sources of TSS in the Flute Reed River Watershed (Construction Stormwater General Permit MNR100001 and Industrial*

Stormwater General Permit MNR050000). Categorical WLAs for construction and industrial stormwater are provided for each impaired segment. The average annual (2010 through 2015) percent area of Cook County that is regulated through the construction stormwater permit is 0.003% (Minnesota Stormwater Manual Contributors 2017). The construction stormwater WLA was calculated as the loading capacity (or TMDL) minus the MOS multiplied by the percent area:

construction stormwater WLA = (TMDL – MOS) x 0.003%

No known industrial stormwater sources are currently located within the Flute Reed River Watershed. To account for any potential future industrial activities in the watershed, a conservative estimate of double the construction stormwater WLA is used for the industrial stormwater WLAs.
[Excerpted from the TMDL document]

The EPA finds that the TMDL document submitted by MPCA satisfies the requirements of the fifth criterion.

Section 6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). EPA's 1991 TMDL Guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

Section 6 Review Comments:

Whether the MOS is expressed explicitly and/or implicitly, a justification must be provided that explains why the MOS chosen is believed to be adequate to account for any uncertainties and errors in the data and calculation of the TMDL.

A margin of safety is provided and justified.

The TMDL allocates 10% of the loading capacity to an explicit margin of safety to account for uncertainties and errors in the flow data used to develop the flow and load duration curves.

> *An explicit 10% MOS was calculated for the TSS TMDLs. This MOS accounts for uncertainty in the flow data used to derive the TMDLs. The flow data are based on a calibrated and validated HSPF model application (Appendix A; Tetra Tech 2017); however, calibration data were only available seasonally for 2013 through 2016 and, therefore, potential errors in the model's hydrologic calibration are expected.*
> *[Excerpted from the TMDL document]*

The quality of the calibration of the HSPF model used to derive the flow and load duration curves is cited as justification that the choice of 10% for the MOS is a reasonable number.

> *The revised HSPF model for the FLR is well calibrated and therefore provides reasonable estimates of source loads.*
> *[Excerpted from the TMDL document-Appendix A]*

The EPA finds that the TMDL document submitted by MPCA contains an appropriate MOS satisfying the requirements of the sixth criterion.

Section 7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The TMDL must describe the method chosen for including seasonal variations. (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

Section 7 Review Comments:

Seasonal variation in loads and/or effects are described and accounted for.

Seasonal variation is accounted for by both the seasonal applicability of the TSS water quality standard, and the use of load duration curves.

> *Seasonal variation is partially addressed by the TSS water quality standard's application*

during the period where the highest TSS concentrations are expected via snowmelt and storm event runoff. The load duration approach accounts for seasonal variation by evaluating allowable loads on a daily basis over the entire range of observed flows and by presenting daily allowable loads that vary by flow.
[Excerpted from the TMDL document]

The EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the seventh criterion.

Section 8. Reasonable Assurances

When a TMDL is developed for waters impaired by point sources only, the issuance of a National Pollutant Discharge Elimination System (NPDES) permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R. 122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL. When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

EPA's August 1997 TMDL Guidance also directs Regions to work with States to achieve TMDL load allocations in waters impaired only by nonpoint sources. However, EPA cannot disapprove a TMDL for nonpoint source-only impaired waters, which do not have a demonstration of reasonable assurance that LAs will be achieved, because such a showing is not required by current regulations.

Section 8 Review Comments:

Reasonable Assurance that NPS Load Reductions will occur is provided in the document

The parties responsible for implementation are identified:

Reasonable assurance that the stormwater related point source waste load allocations will be achieved is provided through the MN general permits for construction and industrial stormwater.

Point sources in the watershed are limited to those activities permitted under general stormwater permits (i.e., General Stormwater Permit for Construction Activity [MNR100001], NPDES/ State Disposal System (SDS) Industrial Stormwater Multi- Sector General Permit [MNR050000]). There are no point source reductions needed for this TMDL beyond meeting the requirements of the general permits. See Section 7.2 for more information on the permits.
[Excerpted from the TMDL document]

A diverse group of public and private entities has been and is expected to continue to be active in restoration activities within the Flute Reed river watershed.

Restoration of the Flute Reed River will occur as part of local, regional, state, and federal efforts and will be led by the Flute Reed Watershed Partnership, Cook County, Cook County SWCD, state and federal agencies, non-profit organization, and residents. A record of past and on-going activities along with many potential funding sources provide reasonable assurance that progress will be made toward pollutant load reductions and meeting the TMDLs.
Excerpted from the TMDL document

Between 2008 and 2010, the Flute Reed Partnership led tree-planting activities that resulted in over 2,500 additional pine and spruce trees in the watershed. A Great Lakes Restoration Initiative grant was obtained in 2011 to reduce sediment and nutrient loading to Lake Superior by implementing high priority projects to stabilize streambanks and replace problem culvert crossings (Cook County SWCD 2014b). This project was led by Cook County, Flute Reed Watershed Partnership, and the MPCA with additional support provided by other state and federal agencies. Five streambank restoration projects were completed and four culverts were replaced along the Flute Reed River or its tributaries. The project was completed in 2014 and included post-construction tree and vegetation plantings. In 2017, Cook County SWCD offered shoreline restoration grants and technical assistance to residents funded in part by the Clean Water Land and Legacy Funds. During 2017, the U.S. Forest Service/Natural Resources Conservation Service forest management program focused on management development plans for

residents in the watershed. The 2016 Otis Creek flood mitigation project corrected drainage and a culvert flooding residential property.
[Excerpted from the TMDL document]

Interest in ongoing restoration activities in the watershed by watershed residents is a good indication that future restoration activities are likely to continue.

The Flute Reed Watershed Partnership, a volunteer group of watershed residents, has been working to protect and restore the Flute Reed River since 2006. They provide outreach and education opportunities and lead monitoring activities and restoration projects throughout the watershed. This organization is expected to maintain a presence in the future advocating for watershed stewardship and protection and restoration activities.
[Excerpted from the TMDL document]

Potential measures to achieve load reductions are identified:

A watershed based plan developed by both the Cook and Lake counties and the Soil and Water Conservation Districts includes priorities, management goals, and implementation activities.

A watershed-based plan, referred to as One Watershed One Plan, was finalized in 2016 and addresses the greater Lake Superior North major watershed and a portion of the Lake Superior South major watershed, including the Flute Reed River Watershed.
[Excerpted from the TMDL document]

The Flute Reed watershed is also included in the larger Lake Superior North Watershed Restoration and Protection Strategies (WRAPS) report, which was finalized in 2018[1].

The Lake Superior North WRAPS Report outlines additional implementation opportunities and best management practices that will lead to water quality improvements and achieving the TMDLs.
[Excerpted from the TMDL document]

Potential resources needed for implementation are identified:

The TMDL includes both an estimate of the amount of funding needed to implement the

[1] Lake Superior North Watershed WRAPS Report (wq-ws4-51a) (MPCA approval 8/9/2018) https://www.pca.state.mn.us/sites/default/files/wq-ws4-51a.pdf

restoration and mitigation measures needed, as well as a list of potential funding resources.

> *TMDLs are required to include an overall approximation of implementation costs (Minn. Stat. 2007, § 114D.25). The costs to implement the activities outlined in the strategy are approximately $1.5 to $2.5 million over the next 20 years. The cost estimate is based on historical project costs and best professional judgement. Easements are not included in the cost estimate nor is the cost for road reconstruction. Upgrading the stream crossings is assumed to be part of regular road construction activities.*
> *[Excerpted from the TMDL document]*

Potential funding sources for implementation activities in the Flute Reed River Watershed include:

- *Clean Water Fund, part of the Clean Water, Land, and Legacy Amendment*
- *Local government cost-share and loan programs*
- *Federal grants and technical assistance programs*
- *Federal Section 319 program for watershed improvements*
- *Great Lakes Restoration Initiative and other federal grant programs*

[Excerpted from the TMDL document]

Clean Water Legacy Act:
The CWLA was passed in Minnesota in 2006 for the purposes of protecting, restoring, and preserving Minnesota water. The CWLA provides the protocols and practices to be followed in order to protect, enhance, and restore water quality in Minnesota.

The CWLA outlines how MPCA, public agencies and private entities should coordinate in their efforts toward improving land use management practices and water management. The CWLA anticipates that all agencies (i.e., MPCA, public agencies, local authorities and private entities, etc.) will cooperate regarding planning and restoration efforts. Cooperative efforts would likely include informal and formal agreements to jointly use technical, educational, and financial resources.

The CWLA also provides details on public and stakeholder participation, and how the funding will be used. In part to attain these goals, the CWLA requires MPCA to develop WRAPS. The WRAPS are required to contain such elements as the identification of impaired waters, watershed modeling outputs, point and nonpoint sources, load reductions, etc. (Chapter 114D.26; CWLA). The WRAPS also contain an implementation table of strategies and actions that are capable of achieving the needed load reductions, for both point and nonpoint sources (Chapter 114D.26, Subd. 1(8); CWLA). Implementation plans developed for the TMDLs are included in the table, and are considered “priority areas” under the WRAPS process (Watershed Restoration and Protection Strategy Report Template, MPCA).

This table includes not only needed actions but a timeline for achieving water quality targets, the reductions needed from both point and nonpoint sources, the governmental units responsible, and interim milestones for achieving the actions. MPCA has developed guidance on what is required in the WRAPS (Watershed Restoration and Protection Strategy Report Template, MPCA).

Additional reasonable assurance is provided by MPCA through the commitment to utilize an adaptive management approach during implementation.

> *The adaptive management approach, described in Section 7.4, will address any further uncertainty related to the nonpoint sources in the watershed. This approach allows for the adjustment of implementation activities in the future, as projects are put into place and monitoring reveals the effect of those projects on the stream sediment conditions. [Excerpted from the TMDL document]*

The EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the eighth criterion.

Section 9. Monitoring Plan to Track TMDL Effectiveness

EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions and, such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

Section 9 Review Comments

An effective monitoring plan is provided.

Section 6 of the TMDL document discusses the need and future plans for monitoring as the TMDL is implemented.

The purpose and goals of additional monitoring is discussed.

Monitoring is important for several reasons:

- *To evaluate water bodies to determine if they are meeting water quality standards and tracking trends*
- *To assess potential sources of pollutants*
- *To determine the effectiveness of implementation activities in the watershed*
- *To de-list waters that are no longer impaired Monitoring is also a critical component of an adaptive management approach and can be used to help determine when a change in management is needed.*

[Excerpted from the TMDL document]

Specific recommendations for additional monitoring are made to achieve the goals discussed.

Additional monitoring of continuous flow would be beneficial to further understand the sources of sediment in the Flute Reed River Watershed. In addition, the following monitoring activities are recommended, contingent on resources available and priorities:

- *Tributary monitoring to identify sources of turbidity;*

- *Monitoring station at Tower Road crossing to determine sediment-related impacts from Moosehorn Lake;*
- *In-lake monitoring of Moosehorn Lake including nutrients, algae, turbidity, and clarity;*
- *Additional longitudinal/synoptic sampling to further identify focus areas for implementation; and*
- *Bluff and bank erosion over time; further evaluate high erosion risk bluffs identified in NRRI 2015.*

[Excerpted from the TMDL document]

A brief summary is provided on the status of current and planned future monitoring efforts.

The Flute Reed River is scheduled for intensive monitoring in 2023 as part of the MPCA's Watershed Approach.
[Excerpted from the TMDL document]

The DNR (2016) developed a stream management plan for the Flute Reed River. As part of that plan, the DNR has plans to monitor fish population annually at multiple stations along the Flute Reed River as well as temperature and discrete flow measurements.
[Excerpted from the TMDL document]

Flute Reed Partnership members have expressed interest in engaging in an expanded citizen stream sampling program to include tributaries and roadside ditches. Cook SWCD staff are also engaged in support to citizen stream monitoring programs.
[Excerpted from the TMDL document]

The EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the ninth criterion.

Section 10. Implementation

EPA policy encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. In addition, EPA policy recognizes that

other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.

Section 10 Review Comments

Section 7 of the TMDL document provides a summary of the activities necessary to achieve the necessary sediment load reductions and attain water quality standards.

A variety of activities are presented and discussed for reducing sediment from non-NPDES permitted (non-point) sources including;

- Streambank restoration and stabilization,
- Stream channel restoration,
- Developing new guidance for ditch maintenance,
- Developing guidelines for management of open lands and forestry practices,
- Improved Culvert Design and management,
- Education and outreach to private land owners on BMPs, and
- Improved Land Use Planning.

Implementation of measures to control sediment loads in stormwater runoff from construction and industrial sites will be achieved through the NPDES permitting program.

Additional detailed discussion of activities related to implementation can be found in Sections 8 and 9 of this review document.

EPA believes the implementation plan serves to provide additional reasonable assurance that load allocations will be achieved. EPA does not approve implementation plans.

Section 11. Public Participation

EPA policy is that there should be full and meaningful public participation in the TMDL development process. The TMDL regulations require that each State/Tribe must subject calculations to establish TMDLs to public review consistent with its own continuing planning process (40 C.F.R. §130.7(c)(1)(ii)). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval should describe the State's/Tribe's public participation process, including a summary of significant comments and the State's/Tribe's responses to

those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 C.F.R. §130.7(d)(2)).

Provision of inadequate public participation may be a basis for disapproving a TMDL. If EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by EPA.

Section 11 Review Comments

Section 8 of the TMDL describes the public participation process.

> *A series of stakeholder meetings were held to obtain input on TMDL development. Representatives from various state and federal agencies as well as interested stakeholders, including the Flute Reed River Partnership, participated. Meetings were held on the following dates:*
> ***May 24, 2017*** *This meeting kicked off TMDL and WRAPS development and included an overview of the Watershed Approach, details on the Flute Reed River TMDLs, introduction to WRAPS, discussion on integrating the One Watershed One Plan, and discussion on potential modeling scenarios. Attendees shared information on current projects and efforts in the watershed.*
> ***July 17, 2017*** *This TMDL-specific meeting was held with the Flute Reed River Partnership. Topics included TMDL development, water quality assessment, pollutant reductions, and potential implementation activities.*
> ***July 27, 2017*** *TMDL updates were provided to the group in attendance. A list of potential implementation activities were shared.*
>
> *An opportunity for public comment on the draft TMDL report was provided via a public notice in the State Register from June 18, 2018 through July 18, 2018. There were no comment letters received.*
> *Excerpted from the TMDL document*

EPA finds that adequate public participation was provided for as part of the TMDL development process, meeting the requirements of the 11th criterion.

Section 12. Submittal Letter

A submittal letter should be included with the TMDL submittal, and should specify whether the TMDL is being submitted for a *technical review* or *final review and approval*. Each final TMDL submitted to EPA should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final review and approval, should contain such identifying information as the name and location of the waterbody, and the pollutant(s) of concern.

Section 12 Review Comments:

A letter was included along with the TMDL report submission requesting final approval of the Lake Superior North Watershed total suspended solids/turbidity TMDL.

MINNESOTA POLLUTION CONTROL AGENCY

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300
800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

August 15, 2018

Linda Holst
Water Division Acting Director
U.S. Environmental Protection Agency
Region 5, W-15J
77 West Jackson Boulevard
Chicago, IL 60604-3507

RE: Lake Superior North Watershed TMDL Report, Request for Final Approval

Dear Ms. Holst:

I am pleased to submit the Lake Superior North Watershed total suspended solids/turbidity Total Maximum Daily Load (TMDL) study to the U.S. Environmental Protection Agency (EPA) for final review and approval.

This TMDL study was open for public comment from June 18, 2018 to July 19, 2018. We are also including supporting documentation and information with this submittal, under Section 303(d) of the Clean Water Act.

Approval of this TMDL study is an important step towards reduction in the current level of total suspended solids/turbidity pollutants in the Lake Superior North Watershed of the Lake Superior Basin. We look forward to receiving the EPA's decision document for final approval of this TMDL Study.

Thank you for your consideration.

Sincerely,

Glenn Skuta

This document has been electronically signed.

Glenn Skuta, Division Director
Watershed Division

KE:jdf

Enclosure

t-wq-ws2-05 · 6/1/17

The EPA finds that the accompanying submittal letter satisfies the requirements of the twelfth criterion.

Section 13 Conclusion

After a full and complete review, the EPA finds that the TMDLs for the Lake Superior North Watershed- Flute Reed River basin satisfy all of the elements of approvable TMDLs. This approval is for 2 TMDLs, addressing aquatic life use impairments due to TSS.

The EPA's approval of these TMDLs extends to the water bodies which are identified in Table 1 of this Decision Document with the exception of any portions of the water bodies that are within Indian Country, as defined in 18 U.S.C. Section 1151. The EPA is taking no action to approve or disapprove TMDLs for those waters at this time. The EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.