REGION 5
CHICAGO, IL 60604

August 27, 2024

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency completed its review of the final Total Maximum Daily Load (TMDL) for the Mississippi River-St. Cloud River Watershed TMDL Report 2024 (MRSCW), including supporting documentation. The MRSCW is in central Minnesota in parts of Benton, Meeker, Mille Lacs, Morrison, Sherburne, Stearns, and Wright Counties. The MRSCW TMDLs address impaired aquatic recreation use due to excessive bacteria and excessive phosphorus, and impaired aquatic life use due to excessive sediment.

The TMDLs meet the requirements of Section 303(d) of the Clean Water Act and the EPA's implementing regulations set forth at 40 C.F.R. Part 130. Therefore, the EPA approves Minnesota's ten TMDLs for bacteria, six TMDLs for phosphorus and one TMDL for total suspended solids for a total of seventeen TMDLs. The EPA describes Minnesota's compliance with the statutory and regulatory requirements in the enclosed decision document.

The EPA acknowledges Minnesota's efforts in submitting this revised TMDL and look forward to future TMDL submissions by the State of Minnesota. If you have any questions, please contact Mr. David Werbach, at 312-886-4242 or Werbach.david@epa.gov.

Sincerely,

8/27/2024

X

Tera L. Fong
Division Director, Water Division
Signed by: TERA FONG

cc: Andrea Plevan, MPCA
Phil Votruba, MPCA

wq-iw8-64g

TMDL: Mississippi River – St. Cloud Watershed bacteria, nutrient and sediment TMDLs in portions of Benton, Meeker, Mille Lacs, Morrison, Sherburne, Stearns, and Wright Counties in central Minnesota
Date: 08/27/2024

DECISION DOCUMENT
FOR THE MISSISSIPPI RIVER - ST. CLOUD WATERSHED TMDLS IN CENTRAL MINNESOTA

Section 303(d) of the Clean Water Act (CWA) and the 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 the EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and the 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 the 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 the EPA's TMDL regulations should be resolved in favor of the regulations themselves.

1. Identification of Water body, Pollutant of Concern, Pollutant Sources, and Priority Ranking

The TMDL submittal should identify the water body as it appears on the State's/Tribe's 303(d) list. The water body 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 water body 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 water body. 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 the 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 water body 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.

The EPA Review of the Mississippi River-St. Cloud TMDL

Location Description/Spatial Extent:

The Mississippi River – St. Cloud Watershed (MRSCW) in central Minnesota is part of the Upper Mississippi River basin and covers parts of Benton, Meeker, Mille Lacs, Morrison, Sherburne, Stearns, and Wright counties (Section 3.0 of the final TMDL document). The MRSCW is approximately 1,121 square miles in size and is entirely in the North Central Hardwood Forest (NCHF) ecoregion. The MRSCW originates at the confluence of the Sauk and Mississippi Rivers, where surface waters generally flow south to southeast, terminating where the Mississippi River meets the North Fork Crow River in the southeastern portion of the watershed (Figure 2 in the final TMDL document).

The MRSCW TMDL address ten segments impaired due to excessive bacteria, one impaired river segment due to excessive sediment, and six impaired lakes due to excessive nutrients (Table 1 of this Decision Document and Figure 1 and Appendix A of final TMDL document).

Several TMDL projects have been approved in the MRSCW (Section 1.1 of the final TMDL document). None of the waterbodies in the MRSCW 2024 TMDL were previously addressed in TMDLs. The MPCA noted that some of the current 2024 TMDLs are upstream of previous TMDLs but would not impact the allocations in the existing TMDLs (Section 1.1 of final TMDL document).

The MPCA noted that for Fremont Lake (71-0016-00), the lake is listed as impaired for nutrients; however, the most recent water quality data indicates that the lake is meeting the phosphorus criteria. However, the lake does not meet the chlorophyll-*a* criteria, and there is insufficient data regarding Secchi depth data. Therefore, the MPCA decided to continue developing the TMDL for Fremont Lake to ensure the lake will continue to attain and maintain water quality standards.

Table 1. Impaired water bodies in the Mississippi River-St. Cloud Watershed addressed in this TMDL report.

AUID	Water body name	Water body description	Use class	Affected designated use	Listing Parameter	TMDL Pollutant
07010203-535	Battle Brook	CD 18 to Elk Lk	2Bg	AQR	*E. coli*	*E. coli*
07010203-507	Elk River	Mayhew Cr to Rice Cr	2Bg	AQR	*E. coli*	*E. coli*
07010203-508	Elk River	Headwaters to Mayhew Cr	2Bg	AQR	*E. coli*	*E. coli*
07010203-548	Elk River	St Francis R to Orono Lk	2Bg	AQR	*E. coli*	*E. coli*
07010203-750	Mayhew Creek	T36 R30W S21, west line to Elk R	2Bg	AQR	*E. coli*	*E. coli*
07010203-512	Rice Creek	Rice Lk to Elk R	2Bg	AQR	*E. coli*	*E. coli*
07010203-529	Snake River	Unnamed Cr to Eagle Lk outlet	1B, 2Ag	AQR	*E. coli*	*E. coli*

07010203-700	St. Francis River	Headwaters to Unnamed Lk (71-0371-00)	2Bg	AQR	*E. coli*	*E. coli*
07010203-736	Tibbets Brook	Unnamed ditch to Elk R	2Bg	AQR	*E. coli*	*E. coli*
07010203-565	Unnamed Creek (Fairhaven Creek)	Headwaters to Lk Marie	1B, 2Ag	AQR	*E. coli*	*E. coli*
07010203-528	Unnamed creek [a]	T121 R23W S19, south line to Mississippi R	2Bg	AQL	Benthic macroinvertebrates bioassessment; Fish bioassessments	TSS
71-0067-00	Eagle Lake	Sherburne County	2B	AQR	Nutrients	TP
71-0055-00	*Elk Lake*	Sherburne County	2B	AQR	Nutrients	TP
71-0016-00	*Fremont Lake*	Sherburne County	2B	AQR	Nutrients	TP
86-0139-02	*Little Mary (North Bay)*	Wright County	2B	AQR	Nutrients	TP
86-0139-01	*Little Mary (South Bay)*	Wright County	2B	AQR	Nutrients	TP
86-0152-00	*Millstone Lake*	Wright County	2B	AQR	Nutrients	TP

AQR: aquatic recreation; AQL: aquatic life; TP: total phosphorus; TSS: total suspended solids.
Italics - Elk Lake, Fremont Lake, Little Mary–North Bay, Little Mary–South Bay, and Millstone Lake are shallow lakes.
a. Unnamed creek (-528) is locally known as Otsego Creek.

The MPCA explained that the MRSCW is not located within the boundary of any federally recognized Tribal land. Also, no TMDLs developed as part of the 2024 MRSCW TMDL project allocate any pollutant load to any federally recognized Indian nation in this watershed (Section 1.3 of the final TMDL document).

Land Use:
Land use in the MRSCW is primarily agricultural with small, urbanized developments throughout (Section 3.4 of the final TMDL document). The MPCA noted that overall land use in the MRSCW is approximately 40% cropland, 14% pastureland and 14% forested land. The MPCA also noted that 30,700 acres of the MRSCW contain the Sherburne National Wildlife Refuge with predominantly forestland, wetlands and natural areas in and immediately surrounding the reserve (Table 2 in Decision Document and Figures 6 and 7 in final TMDL document).

Table 2. Land cover in TMDL subwatersheds

HUC-10 Name	Water body Name	Stream AUID / Lake ID	Percent of Watershed (%)						
			Open Water	Developed	Forest	Natural Areas [a]	Hay & Pasture	Cropland	Wetlands
Elk River	Elk River	07010203-548	2	8	15	1	17	37	20
	Rice Creek	07010203-512	1	7	10	1	16	49	16
	Snake River	07010203-529	4	8	30	1	15	18	24
	Tibbets Brook	07010203-736	3	16	24	1	20	8	28
	Eagle Lake	71-0067-00	10	11	42	2	12	11	12
	Fremont Lake	71-0016-00	19	21	17	<1	26	7	10

Headwaters Elk River	Elk River	07010203-507	1	8	8	<1	15	55	13
	Elk River	07010203-508	<1	5	8	<1	16	60	11
	Mayhew Creek	07010203-750	<1	6	7	<1	15	58	14
St. Francis River	St. Francis River	07010203-700	<1	5	9	<1	18	51	17
	Battle Brook	07010203-535	<1	9	10	<1	15	36	30
	Elk Lake	71-0055-00	3	10	12	<1	17	30	28
Silver Creek/ Mississippi River	Unnamed Creek [b]	07010203-528	3	32	2	<1	10	47	6
	Little Mary (South Bay)	86-0139-01	12	7	13	2	10	45	12
	Little Mary (North Bay)	86-0139-02	6	4	29	2	11	29	19
	Millstone Lake	86-0152-00	28	6	6	<1	4	54	2
Clearwater River	Unnamed Creek (Fairhaven)	07010203-565	<1	4	21	3	19	39	14

a. Natural areas land cover category includes barren, shrublands, and herbaceous areas.
b. Unnamed creek (-528) is locally known as Otsego Creek.

Problem Identification:
Bacteria TMDLs: Bacteria impaired segments identified in Table 1 of this Decision Document were included on the final 2024 Minnesota 303(d) list due to excessive bacteria. Water quality monitoring within the MRSCW indicated that these segments were not attaining their designated aquatic recreation uses due to exceedances of the bacteria criteria. Excessive bacteria can negatively impact recreational uses (e.g., swimming, wading, boating, fishing etc.) and public health. At elevated levels, bacteria may cause illness within humans who have contact with or ingest bacteria laden water. Recreation-based contact can lead to ear, nose, and throat infections, and stomach illness.

Phosphorus TMDLs: The lakes identified in Table 1 of this Decision Document were included on the final 2024 Minnesota 303(d) list due to excessive nutrients (phosphorus). Total phosphorus, chlorophyll-*a* (chl-*a*) and Secchi Disk depth (SD) measurements in the MRSCW indicated that these waters were not attaining their designated aquatic recreation uses due to exceedances of nutrient criteria. Water quality monitoring was completed throughout the MRSCW, and that data formed the foundation for phosphorus TMDL modeling efforts.

While phosphorus is an essential nutrient for aquatic life, elevated concentrations of phosphorus can lead to nuisance algal blooms that negatively impact aquatic life and recreation (e.g., swimming, boating, fishing, etc.). Algal decomposition depletes dissolved oxygen levels within the water column. The decreases in dissolved oxygen can stress benthic macroinvertebrates and fish. Depletion of oxygen in the water column can also lead to conditions where phosphorus is released from bottom sediments (i.e., internal loading). Also, excess algae can shade the water column which limits the distribution of aquatic vegetation. Aquatic vegetation stabilizes bottom sediments, and also is an important habitat for macroinvertebrates and fish.

Total Suspended Solids (TSS) TMDL: The segments identified in Table 1 of this Decision Document were included on the final 2024 Minnesota 303(d) list due to excessive TSS/sediment within the water column. Water quality monitoring within the MRSCW indicated that these segments were not attaining their designated aquatic life uses due to high sediment measurements and the negative impact of those conditions on aquatic life (i.e., fish and macroinvertebrate communities).

Total suspended solids (TSS) is a measurement of the sediment and organic material that inhibits natural light from penetrating the surface water column. Excessive sediment and organic material within the water column can negatively impact fish and macroinvertebrates within the ecosystem. Excess sediment and organic material may create turbid conditions within the water column and may increase the costs of treating surface waters used for drinking water or other industrial purposes (e.g., food processing).

Excessive amounts of fine sediment in stream environments can degrade aquatic communities. Sediment can reduce spawning and rearing areas for certain fish species. Excess suspended sediment can clog the gills of fish, stress certain sensitive species by abrading their tissue, and thus reduce fish health. When in suspension, sediment can limit visibility and light penetration which may impair foraging and predation activities by certain species.

Excessive fine sediment also may degrade aquatic habitats, alter natural flow conditions in stream environments and add organic materials to the water column. The potential addition of fine organic materials may lead to nuisance algal blooms which can negatively impact aquatic life and recreation (e.g., swimming, boating, fishing, etc.). Algal decomposition depletes oxygen levels which stresses benthic macroinvertebrates and fish. Excess algae can shade the water column and limit the distribution of aquatic vegetation. Established aquatic vegetation stabilizes bottom sediments and provides important habitat areas for healthy macroinvertebrates and fish communities.

Priority Ranking:

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 Watershed Restoration and Protection Strategy (WRAPS) cycle. The schedule for TMDL completion corresponds to the WRAPS report completion on the 10-year cycle. Mainstem river TMDLs, which are not contained in major watersheds and thus not addressed in WRAPS, must also be completed. The MPCA developed a state plan, Minnesota's TMDL Priority Framework Report under the EPA's Long-Term Vision for Assessment, Restoration and Protection under the CWA section 303(d) program. As part of these efforts, the MPCA identified water quality-impaired segments that will be addressed by TMDLs by 2032. The waters of the MRSCW addressed by this TMDL are part of the MPCA prioritization plan to meet the EPA's national goals.

Pollutants of Concern:

The pollutants of concern are bacteria, phosphorus and TSS.

Source Identification (point and nonpoint sources):

Point Source Identification: The potential point sources to the MRSCW are:

MRSCW bacteria TMDLs:

National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: NPDES permitted facilities may contribute bacteria loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. The MPCA determined that there are five wastewater treatment systems (WWTPs for purposes of this Decision Document) in the MRSCW which contribute bacteria from treated wastewater releases (Table 3 of this Decision Document; Section 3.6.1.1 of the final TMDL document). The MPCA noted that all of these treatment centers were assigned a WLA in the TMDL. The MPCA explained that all five of these facilities are municipal/domestic wastewater treatment facilities, with two being pond systems with controlled discharges (Foley and Gilman) and the remaining three continuous dischargers.

Table 3: Minnesota NPDES facilities in the Mississippi River – St. Cloud Watershed

Wastewater Facility	Permit #	Impaired Waterbody Name	Impaired Water Body AUID
Aspen Hills WWTF	MN0066028	Tibbets Brook	07010203-736
Becker WWTP	MN0025666	Elk River	07010203-548
Foley WWTP	MN0023451	Rice Creek (via Stony Brook)	07010203-512 (via -520)
Gilman WWTP	MNG580021	Elk River (via unnamed ditch)	07010203-508 (via -730)
Zimmerman WWTP	MN0042331	Tibbets Brook	07010203-736

Municipal Separate Storm Sewer System (MS4) communities: There are 13 MS4-regulated facilities noted by the MPCA within the MRSCW that could be contributing bacteria in or partially in the MRSCW TMDL watersheds (Table 4 in this Decision Document; Section 3.6.1.1 of the final TMDL document). The MPCA noted that there are also four communities within the MRSCW that are not currently regulated as a MS4, but that MPCA anticipates these communities will be recognized as MS4 communities and permitted under the NPDES program in the near future. Therefore, the MPCA calculated allocations for these future MS4s (Table 14, Section 4.1.3.2 and Figure 24 in final TMDL document).

Table 4: Regulated MS4s in impaired aquatic recreation use (bacteria) subwatersheds.

Impaired subwatershed	Baldwin Township *	Becker Township *	Benton County (MS400067)	Big Lake City (MS400249)	Big Lake Township (MS400234)	Elk River City (MS400089)	Livonia Township *	Minden Township (MS400147)	Minnesota Correctional–St. Cloud (MS400179)	MNDOT Outstate District (MS400180)	Sauk Rapids City (MS400118)	Sauk Rapids Township (MS400153)	Sherburne County (MS400155)	St. Cloud City (MS400052)	St. Cloud State University (MS400197)	Watab Township (MS400161)	Zimmerman City *
Battle Brook (-525)	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Elk River (-507)	–	–	X	–	–	–	–	X	X	X	X	X	X	X	X	X	–
Elk River (-508)	–	–	–	–	–	–	–	X	–	–	–	–	–	–	–	–	–
Elk River (-548)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mayhew Creek (-750)	–	–	X	–	–	–	–	X	–	X	X	X	–	X	–	X	–
Rice Creek (-512)	–	–	–	–	–	–	–	X	–	–	–	–	–	–	–	–	–
Snake River (-529)	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–
St. Francis River (-700)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Tibbets Brook (-736)	X	–	–	X	–	X	X	–	–	–	–	–	X	–	–	–	X

*These communities are not currently regulated but are expected to come under MS4 permit coverage in the near future.

Concentrated Animal Feedlot Operations (CAFOs): The MPCA recognized the presence of CAFOs in the MRSCW (Section 3.6.1.1, Tables 15 and 16, and Figure 15 of the final TMDL document). As explained by the MPCA, CAFO production areas must be designed to contain all manure, and direct precipitation and manure-contaminated runoff from precipitation events up to the 25-year, 24-hour storm event, and even in the event of a discharge, the discharge cannot cause or contribute to a violation of a WQS. The MPCA noted that any precipitation-caused runoff from the land application of manure at agronomic rates is not considered a point source discharge and is accounted for in the load allocation (LA) section of the TMDL.

Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs): The MPCA determined that the MRSCW does not have CSOs nor SSOs which contribute bacteria to waters of the MRSCW (Section 3.6.1.1 of the final TMDL document).

Stormwater runoff from permitted construction and industrial areas: The MPCA determined that stormwater discharges from permitted construction and industrial do not contribute bacteria to the MRSCW (Section 3.6.1.1 of the final TMDL document).

Land application of wastewater: The MPCA determined that land application of biosolids to areas in the MRSCW are assumed to not contribute bacteria to the MRSCW due to regulations regarding its application (Section 3.6.1.1 of the final TMDL document).

MRSCW TSS TMDL:

National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: The MPCA determined that there is one WWTP in the MRSCW which contributes TSS from treated wastewater releases to the segment impaired for TSS (Section 3.6.2.1 of final TMDL document). This facility, Otsego WWTP West (MN0066257) received a WLA for TSS (Table 57 of the final TMDL document).

Municipal Separate Storm Sewer System (MS4) communities: The MPCA identified four MS4 regulated communities that could contribute sediment to the MRSCW (Section 3.2.6.1, Table 4.2.3.2 and Figure 35 of the final TMNDL document). These four communities were assigned WLAs.

Stormwater runoff from permitted construction and industrial areas: Construction and industrial sites may contribute sediment via stormwater runoff during precipitation events. These areas within the MRSCW must comply with the requirements of the MPCA's NPDES Stormwater Program and create a Stormwater Pollution Prevention Plan (SWPPP) that summarizes how stormwater will be minimized from the site (Section 3.6.2.1 of the final TMDL document).

MRSCW phosphorus TMDL:

National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: NPDES permitted facilities may contribute phosphorus loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. The MPCA determined that there is one industrial operation that is able to discharge to surface waters within the MRSCW (Section 3.6.3.1 of final TMDL document). The facility was assigned a WLA for phosphorus.

Municipal Separate Storm Sewer System (MS4) communities: There are five communities noted by the MPCA within the MRSCW that could be contributing phosphorus. The MPCA noted that there are four communities within the MRSCW that are not currently regulated but they expect to enter regulation within the near future (Table 21, Section 4.3.4.2 and Figure 38 of the final TMDL document). MPCA assigned these facilities phosphorus WLAs.

Stormwater runoff from permitted construction and industrial areas: Construction and industrial sites may contribute phosphorus via sediment runoff during stormwater events. These areas within the MRSCW watershed must comply with the requirements of the MPCA's NPDES Stormwater Program and create a SWPPP that summarizes how stormwater will be minimized from the site. The MPCA determined that there are two facilities covered under the Nonmetallic Mining Operations General Permit (MNG490000) in the Elk Lake watershed. These facilities are;

- Knife River Central Minnesota (MNG490003 SD 028); 17.8 acres
- Hasting Sand and Gravel (MNG4900592 SD 005); 5.2 acres

Nonpoint Source Identification:
The potential nonpoint sources to the MRSCW are:

<u>MRSCW bacteria TMDLs:</u>
The MPCA utilized data from several sources to develop an overall bacteria source estimate for the MRSCW (Section 3.6.1 and Appendix A of the final TMDL document). Results of this analysis are displayed in a table (Table 19 of the final TMDL document) which estimate the likely significance of different potential bacteria sources throughout the TMDL watersheds.

Stormwater from agricultural land use practices and feedlots near surface waters: Animal Feeding Operations (AFOs) in close proximity to surface waters can be a source of bacteria to water bodies in the MRSCW. These areas may contribute bacteria via the mobilization and transportation of pollutant laden waters from feeding, holding and manure storage sites. Runoff from agricultural lands may contain significant amounts of bacteria which may lead to impairments in the MRSCW. Feedlots generate manure which may be spread onto fields. Runoff from fields with spread manure can be exacerbated by tile drainage lines, which channelize the stormwater flows and reduce the time available for bacteria to die-off.

Unrestricted livestock access to streams and livestock grazing: Livestock with access to stream environments may add bacteria directly to the surfaces waters or resuspend particles that had settled on the stream bottom. Direct deposition of animal wastes can result in very high localized bacteria counts and may contribute to downstream impairments. Smaller animal facilities may add bacteria to surface waters via wastewater from these facilities or stormwater runoff from near-stream pastures.

Discharges from Subsurface Sewage Treatment Systems (SSTS) or unsewered communities: Failing septic systems are a potential source of bacteria within the MRSCW. Septic systems generally do not discharge directly into a water body, but effluents from SSTS may leach into groundwater or pond at the surface where they can be washed into surface waters via stormwater runoff events. Age, construction, and use of SSTS can vary throughout a watershed and influence the bacteria contribution from these systems.

Failing SSTS are specifically defined as systems that are failing to protect groundwater from contamination, while those systems which discharge partially treated sewage to the ground surface, road ditches, tile lines, and directly into streams, rivers and lakes are considered an imminent threat to public health and safety (ITPHS). ITPHS systems also include illicit discharges from unsewered communities.

Wildlife: Wildlife is a known source of bacteria in water bodies as many animals spend time in or around water bodies. Deer, geese, ducks, raccoons, and other animals all create potential sources of bacteria via contaminated runoff from animal habitats, such as urban park areas, forest, and rural areas.

Domestic pets: Pet waste, when not disposed of properly, can contribute bacteria to the MRSCW.

MRSCW TSS TMDL:
The MPCA identified several nonpoint sources of TSS within the MRSCW.

Stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of sediment which may lead to impairments in the MRSCW. The MPCA estimated at least 10% of the MRSCW to be pastureland or hayfields (Section 3.6.2.2 of the final TMDL document). Sediment inputs to surface waters can be exacerbated by tile drainage lines, which channelize the stormwater flows. Tile lined fields and channelized ditches enable particles to move more efficiently into surface waters.

Stream channelization and streambank erosion: Eroding streambanks and channelization efforts may add sediment to local surface waters. Eroding riparian areas may be linked to soil inputs within the water column and potentially to changes in flow patterns. Changes in flow patterns may also encourage down-cutting of the streambed and streambanks. Stream channelization efforts can increase the velocity of flow (via the removal of the sinuosity of a natural channel) and disturb the natural sedimentation processes of the streambed. The MPCA explained that upstream channelization and development of urban areas near streambeds are contributing high degrees of sediment to the MRSCW, especially in times of peak flow. Unrestricted livestock access to streams and streambank areas may lead to streambank degradation and sediment additions to stream environments.

MRSCW phosphorus TMDLs:
Stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of nutrients, organic material and organic-rich sediment which may lead to impairments in the MRSCW. Manure spread onto fields is often a source of phosphorus, and can be exacerbated by tile drainage lines, which channelize the stormwater. Tile lined fields and channelized ditches enable particles to move more efficiently into surface waters. Phosphorus, organic material and organic-rich sediment may be added via surface runoff from upland areas which are being used for Conservation Reserve Program (CRP) lands, grasslands, and agricultural lands used for growing hay or other crops. Stormwater runoff may contribute nutrients and organic-rich sediment to surface waters from livestock manure, fertilizers, vegetation and erodible soils. The MPCA notes there are animal feedlots within the MRSCW (Figures 17 and 18 in final TMDL document).

Discharges from SSTS or unsewered communities: Failing septic systems are a potential source of nutrients within the MRSCW watershed. Septic systems generally do not discharge directly into a water body, but effluents from SSTS may leach into groundwater or pond at the surface where they can be washed into surface waters via stormwater runoff events. Age, construction and use of SSTS can vary throughout a watershed and influence the nutrient contribution from these systems.

Stream channelization and stream erosion: Eroding streambanks and channelization efforts may add nutrients, organic material and organic-rich sediment to local surface waters. Nutrients may be added if there is particulate phosphorus bound with eroding soils. Eroding riparian areas may be linked to soil inputs within the water column and potentially to changes in flow patterns. Changes in flow patterns may also encourage down-cutting of the streambed and streambanks. Stream channelization efforts can increase the velocity of flow (via the removal of the sinuosity of a natural channel) and disturb the natural sedimentation processes of the streambed.

Atmospheric deposition: Phosphorus and organic material may be added via particulate deposition. Particles from the atmosphere may fall onto lake surfaces or other surfaces within the MRSCW. Phosphorus can be bound to these particles which may add to the phosphorus inputs to surface water environments.

Internal loading: The release of phosphorus from lake sediments, the release of phosphorus from lake sediments via physical disturbance from benthic fish (i.e., rough fish (e.g., carp)), the release of phosphorus from wind mixing the water column, and the release of phosphorus from decaying curly-leaf pondweed, may all contribute internal phosphorus loading to the lakes of the MRSCW. Phosphorus may build up in the bottom waters of the lake and may be resuspended or mixed into the water column when the thermocline decreases, and the lake water mixes. The MPCA discussed the relative impacts of internal loading, fish impacts, and plant impacts on dissolved oxygen levels in the lakes and adjusted the models as appropriate based upon the lake-specific analysis (Section 3.6.3.2 of the final TMDL document.)

Future Growth:
The MPCA noted that the TMDL watershed is largely agricultural and contains two large urban areas. Portions of the MRSCW have seen significant development, however, the MPCA did not set aside an allocation for future growth within TMDL equations calculated for the MRSC TMDLs (Section 5 of final TMDL document). The WLAs and LAs for the MRSCW TMDLs were calculated for all current and future sources. Any expansion of point or nonpoint sources will need to comply with the respective WLA and LA values calculated in the MRSCW TMDLs.

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

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 water body, the applicable numeric or narrative water quality criterion, and the antidegradation policy (40 C.F.R. §130.7(c)(1)). The 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.

<u>The EPA Review of the Mississippi River-St. Cloud TMDL:</u>

Designated Uses:

Water quality standards (WQS) are the fundamental benchmarks by which the quality of surface waters are measured. Within the State of Minnesota, WQS are developed pursuant to the Minnesota Statutes Chapter 115, Sections 03 and 44. Authority to adopt rules, regulations, and standards as are necessary and feasible to protect the environment and health of the citizens of the State is vested with the MPCA. Through adoption of WQS into Minnesota's administrative rules (principally Chapters 7050 and 7052), the MPCA has identified designated uses to be protected in each of its drainage basins and the criteria necessary to protect these uses.

Minnesota Rule Chapter 7050 designates uses for waters of the state. The segments addressed by the MRSCW TMDLs are designated as Class 1 or 2 waters for aquatic recreation use (fishing, swimming, boating, etc.) and aquatic life use (phosphorus and TSS). The Class 1 and 2 designated use is described in Minnesota Rule 7050.0140:

> *Domestic consumption includes all waters of the state that are or may be used as a source of supply for drinking, culinary or food processing use, or other domestic purposes and for which quality control is or may be necessary to protect the public health, safety, or welfare. (Class 1)*
>
> *"Aquatic life and recreation includes all waters of the state that support or may support fish, other aquatic life, bathing, boating, or other recreational purposes and for which quality control is or may be necessary to protect aquatic or terrestrial life or their habitats or the public health, safety, or welfare." (Class 2)*

Water use classifications for individual water bodies are provided in Minnesota Rules 7050.0470, 7050.0425, and 7050.0430. This TMDL report addresses the water bodies that do not meet the standards for Class 1 or 2 waters. The impaired streams and lake in this report are classified as Class 1B or 2B (Table 1 of the final TMDL document).

The MPCA identified two waters (Snake River, Segment -529 and Unnamed Creek, Segment -565) as also designated for Class 1B, domestic consumption. A bacteria TMDL was developed for both segments. The bacteria WQS for Class 1B and Class 2B are identical, and therefore the bacteria TMDLs for Snake River and Unnamed Creek are consistent with the other TMDLs in the watershed (Minnesota R. 7050.0221).

Standards:

Narrative Criteria:

Minnesota Rule 7050.0150 (3) set forth narrative criteria for Class 2[1] waters of the State:

> *"For all Class 2 waters, the aquatic habitat, which includes the waters of the state and stream bed, shall not be degraded in any material manner, there shall be no material increase in undesirable slime growths or aquatic plants, including algae, nor shall there be any significant increase in harmful pesticide or other residues in the waters, sediments, and aquatic flora and fauna; the normal fishery and lower aquatic biota upon which it is dependent and the use thereof shall not be seriously impaired or endangered, the species composition shall not be altered materially, and the propagation or migration of the fish and other biota normally present shall not be prevented or hindered by the discharge of any sewage, industrial waste, or other wastes to the waters."*

Numeric criteria:

Bacteria TMDLs: The bacteria water quality standards which apply to MRSCW TMDLs are:

Table 5: Bacteria Water Quality Standards Applicable to the MRSCW TMDLs

Parameter	Units	Water Quality Standard
E. coli [1]	# of organisms / 100 mL	Not to exceed 126 organisms per 100 milliliters (org/100 mL) as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than 10% of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters.

[1] = Standards apply only between April 1 and October 31

Bacteria TMDL Targets: The bacteria TMDL targets employed for the MRSCW bacteria TMDLs are the *E. coli* standards as stated in Table 5 of this Decision Document. The focus of this TMDL is on the 126 organisms (orgs) per 100 mL (126 orgs/100 mL) portion of the standard. The MPCA believes that using the 126 orgs/100 mL portion of the standard for TMDL calculations will result in the greatest bacteria reductions within the MRSCW and will result in the attainment of the 1,260 orgs/100 mL portion of the standard. While the bacteria TMDLs will focus on the geometric mean portion of the water quality standard, attainment of both parts of the water quality standard is required.

TSS TMDL: In January 2015, the EPA approved the MPCA's regionally based TSS criteria for rivers and streams. The TSS criteria replaced Minnesota's statewide turbidity criterion (measured in Nephelometric Turbidity Units (NTU)). The TSS criteria provide water clarity targets for measuring suspended particles in rivers and streams.

TSS TMDL Targets: The MPCA explained that there is one TSS-impaired segment within the MRSCW (Section 3.6.2 of the final TMDL document). Table 6 of this Decision Document identifies the TSS criteria for the impaired stream segment.

[1] The Aquatic Life Use for Class 1 is the same as for Class 2.

Table 6: TSS criteria for the Mississippi River - St. Cloud Watershed TMDL

AUID	Stream Name	TSS target (mg/L)
07010203-528	Unnamed Creek (Ostego Creek)	30*

* - to be exceeded no more than 10% of the time, from April 1 to September 30

<u>Phosphorus TMDL:</u> For lakes, numeric criteria for TP, chlorophyll-*a*, and Secchi Disk depth are set forth in Minnesota Rules 7050.0222. These three parameters form the MPCA eutrophication standard that must be achieved to attain the aquatic recreation designated use. The numeric eutrophication standards which are applicable to the MRSCW TMDL are found in Table 7 of this Decision Document.

In developing the lake nutrient standards for Minnesota lakes, the MPCA evaluated data from a large cross-section of lakes within each of the State's ecoregions. Clear relationships were established between the causal factor, TP, and the response variables, chl-*a* and SD depth. The MPCA anticipates that by meeting the TP concentrations of NCHF WQS the response variables chl-*a* and SD will be attained and MRSCW will achieve the designated beneficial uses. For lakes to achieve their designated beneficial use, the lake must not exhibit signs of eutrophication and must allow water-related recreation, fishing and aesthetic enjoyment. The MPCA views the control of eutrophication as the lake enduring minimal nuisance algal blooms and exhibiting desirable water clarity.

Table 7: **Minnesota Eutrophication Standards for lakes within the NCHF ecoregion (MRSCW)**

Parameter	NCHF Eutrophication Standard for Lakes*	NCHF Eutrophication Standard for Shallow Lakes*
Total Phosphorus (µg/L)	TP ≤ 40	TP ≤ 60
Chlorophyll-a (µg/L)	chl-*a* ≤ 14	chl-*a* ≤ 20
Secchi Depth (m)	SD > 1.4	SD > 1.0

* - Summer average of all samples; applies from June 1-September 30

<u>Nutrient TMDL Target:</u> The MPCA selected a TP target of **<u>40 µg/L for lakes and 60 µg/L for shallow lakes</u>** for MRSCW. The MPCA selected TP as the appropriate target parameter to address eutrophication problem because of the interrelationships between TP and chl-*a*, and TP and SD depth. Algal abundance is measured by chl-*a*, which is a pigment found in algal cells. As more phosphorus becomes available, algae growth can increase. Increased algae in the water column will decrease water clarity that is measured by SD depth. The EPA finds the nutrient targets employed for the MRSCW phosphorus TMDLs to be reasonable.

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

A TMDL must identify the loading capacity of a water body for the applicable pollutant. The 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 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. The 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.

The EPA Review of the Mississippi River-St. Cloud TMDL:
MRSCW bacteria TMDLs: The MPCA used the geometric mean (**126 orgs/100 mL**) of the *E. coli* water quality standard to calculate loading capacity values for the bacteria TMDLs. The MPCA believes the geometric mean of the WQS provides the best overall characterization of the status of the watershed. The EPA agrees with this assertion, as stated in the preamble of, *"The Water Quality Standards for Coastal and Great Lakes Recreation Waters Final Rule"* (69 FR 67218-67243, November 16, 2004) on page 67224, "…the geometric mean is the more relevant value for ensuring that appropriate actions are taken to protect and improve water quality because it is a more reliable measure, being less subject to random variation, and more directly linked to the underlying studies on which the 1986 bacteria criteria were based." The MPCA stated that the bacteria TMDLs will focus on the geometric mean portion of the water quality standard (126 orgs/100 mL) and that it expects that by attaining the 126 orgs/100 mL portion of the *E. coli* WQS the 1,260 orgs/100 mL portion of the *E. coli* WQS will also be attained. The EPA finds these assumptions to be reasonable.

Typically loading capacities are expressed as a mass per time (e.g., pounds per day). However, for *E. coli* loading capacity calculations, mass is not always an appropriate measure because *E. coli* is expressed in terms of organism counts. This approach is consistent with the EPA's regulations which define "load" as "an amount of matter that is introduced into a receiving water" (40 CFR §130.2). To establish the loading capacities for the MRSCW bacteria TMDLs, the MPCA used Minnesota's WQS for *E. coli* (126 orgs/100 mL). A loading capacity is, "the greatest amount of loading that a water can receive without violating water quality standards." (40 CFR §130.2). Therefore, a loading capacity set at the WQS will assure that the water does not violate WQS. The MPCA's *E. coli* TMDL approach is based upon the premise that all discharges (point and nonpoint) must meet the WQS when entering the water body. If all sources meet the WQS at discharge, then the water body should meet the WQS and the designated use.

Separate flow duration curves (FDCs) were created for the each of the bacteria TMDLs in the MRSCW. The MRSCW FDCs were developed using flow data generated from Hydrologic Simulation Program-Fortran (HSPF) modeling efforts at the outlet/pour point of each impaired reach as well as flow gages on several of the waterbodies (Section 3.5.1 of the final TMDL document). The MPCA focused on daily recorded flow measurements and HSPF modeled flows from approximately 2012 to 2021 and bacteria (*E. coli*) water quality data from 2019-2020. HSPF hydrologic models were developed to simulate flow characteristics within the MRSCW, and flow data focused on dates within the recreation season (April 1 to October 31). Daily stream flows were necessary to implement the load duration curve approach.

HSPF is a comprehensive modeling package used to simulate watershed hydrology and water quality on a basin scale. The package includes both an Agricultural Runoff Model and a more general nonpoint source model. HSPF parametrizes numerous hydrologic and hydrodynamic processes to determine flow rate, sediment, and nutrient loads. HSPF uses continuous meteorological records to create hydrographs and to estimate time series pollution concentrations.[2,3] The output of the HSPF process is a model of multiple hydrologic response units (HRUs), or subwatersheds of the overall MRSCW.

FDCs graphs have flow duration interval (percentage of time flow exceeded) on the X-axis and discharge (flow per unit time) on the Y-axis. The FDC were transformed into LDC by multiplying individual flow values by the WQS (126 orgs/100 mL) and then multiplying that value by a conversion factor. The resulting points are plotted onto a load duration curve graph. LDC graphs, for the MRSCW bacteria TMDLs, have flow duration interval (percentage of time flow exceeded) on the X-axis and *E. coli* loads (number of bacteria per unit time) on the Y-axis. The MRSCW LDC used *E. coli* measurements in billions of bacteria per day. The curved line on a LDC graph represents the TMDL of the respective flow conditions observed at that location.

Water quality monitoring was completed in the MRSCW and measured *E. coli* concentrations were converted to individual sampling loads by multiplying the sample concentration by the instantaneous flow measurement observed/estimated at the time of sample collection and then by a conversion factor which allows the individual samples to be plotted on the same figure as the LDCs (e.g., Figure 25 of the final TMDL document). Individual LDCs are found in Section 4.1.8 of the final TMDL document.

The LDC plots were subdivided into five flow regimes; very high flow conditions (exceeded 0–10% of the time), high flow conditions (exceeded 10–40% of the time), mid-range flow conditions (exceeded 40–60% of the time), low flow conditions (exceeded 60–90% of the time), and very low flow conditions (exceeded 90–100% of the time). LDC plots can be organized to display individual sampling loads with

[2] HSPF User's Manual - https://water.usgs.gov/software/HSPF/code/doc/hspfhelp.zip

[3] EPA TMDL Models Webpage - https://www.epa.gov/exposure-assessment-models/tmdl-models-and-tools

the calculated LDC. Watershed managers can interpret LDC graphs with individual sampling points plotted alongside the LDC to understand the relationship between flow conditions and water quality exceedances within the watershed. Individual sampling loads which plot above the LDC represent violations of the WQS and the allowable load under those flow conditions at those locations. The difference between individual sampling loads plotting above the LDC and the LDC, measured at the same flow, is the amount of reduction necessary to meet WQS.

The strengths of using the LDC method are that critical conditions and seasonal variation are considered in the creation of the FDC by plotting hydrologic conditions over the flows measured during the recreation season. Additionally, the LDC methodology is relatively easy to use and cost-effective. The weaknesses of the LDC method are that nonpoint source allocations cannot be assigned to specific sources, and specific source reductions are not quantified. Overall, the MPCA believes and the EPA concurs that the strengths outweigh the weaknesses for the LDC method.

Implementing the results shown by the LDC requires watershed managers to understand the sources contributing to the water quality impairment and which Best Management Practices (BMPs) may be the most effective for reducing bacteria loads based on flow magnitudes. Different sources will contribute bacteria loads under varying flow conditions. For example, if exceedances are significant during high flow events this would suggest storm events are the cause and implementation efforts can target BMPs that will reduce stormwater runoff and consequently bacteria loading into surface waters. This allows for a more efficient implementation effort.

Bacteria TMDLs for the MRSCW were calculated and those results are found in Tables 8-17 of this Decision Document. The load allocations were calculated after the determination of the WLA, and the Margin of Safety (MOS) (10% of the loading capacity). Load allocations (e.g., stormwater runoff from agricultural land use practices and feedlots, SSTS, wildlife inputs etc.) were not split among individual nonpoint contributors. Instead, load allocations were combined together into a categorical LA ('Watershed Load') to cover all nonpoint source contributions.

Tables 8-17 of this Decision Document reports five points (the midpoints of the designated flow regime) on the loading capacity curve. However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve. The LDC method can be used to display collected bacteria monitoring data and allows for the estimation of load reductions necessary for attainment of the bacteria water quality standard. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for the segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Tables 8-17 of this Decision Document identifies the loading capacity for the water body at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Tables 8-17: Bacteria (*E. coli*) TMDLs for the Mississippi River-St. Cloud Watershed are located at the end of this Decision Document in Attachment 1

Tables 8-17 of this Decision Document communicates the MPCA's estimates of reductions required for streams impaired due to excessive bacteria. Attaining these reduction percentage estimates under the flow conditions which the reductions are prescribed to will allow the impaired segment to meet their water quality targets. These loading reductions (i.e., the percentage column) were estimated from existing and TMDL load calculations. The MPCA expects that these reductions will result in the attainment of the water quality targets and the stream segment's water quality will return to a level where the designated uses are no longer considered impaired.

The EPA concurs with the data analysis and LDC approach utilized by the MPCA in its calculation of loading capacities, wasteload allocations, load allocations and the margin of safety for the MRSCW bacteria TMDLs. The methods used for determining the TMDL are consistent with the EPA's technical memos.[4]

MRSCW TSS TMDL: The MPCA used the same LDC development strategy as it did for the MRSCW bacteria TMDLs to calculate the loading capacity for the sediment TMDL in the MRSCW. This strategy included incorporating HSPF model simulated flows to develop a FDC and water quality monitoring information collected within the MRSCW informing the LDC. The FDC were transformed into LDC by multiplying individual flow values by the TSS target (30 mg/L) and then multiplying that value by a conversion factor.

The TSS TMDL was calculated (Table 18 of this Decision Document). The LA was calculated after the determination of the WLA, and the MOS. The LA (e.g., stormwater runoff from agricultural land use practices) was not split among individual nonpoint contributors. Instead, load allocations were combined together into one value to cover all nonpoint source contributions. Table 18 of this Decision Document reports five points (i.e., the midpoints of the designated flow regime) on the loading capacity curve. However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve.

The LDC method can be used to display collected sediment monitoring data and allows for the estimation of load reductions necessary for attainment of the TSS water quality standard. Using this method, daily loads were developed based upon the flow in the water body. The loading capacity was determined for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 18 of this Decision Document identifies the loading capacity for each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

The MPCA estimated load reductions needed for the TSS TMDL to attain the sediment water quality target of 30 mg/L. These loading reductions (i.e., the percentage column) were estimated from existing and TMDL load calculations. The MPCA expects that these reductions will result in the attainment of the water quality targets and that water quality will return to a level where the designated uses are no longer considered impaired.

---

[4] U.S. Environmental Protection Agency. August 2007. *An Approach for Using Load Duration Curves in the Development of TMDLs*. Office of Water. EPA-841-B-07-006. Washington, D.C.

Table 18: TSS TMDL in the Mississippi River - St. Cloud Watershed is located at the end of this Decision Document in Attachment 2

The EPA supports the data analysis and modeling approach utilized by the MPCA in its calculation of wasteload allocations, load allocations and the margin of safety for the TSS TMDL. Additionally, the EPA concurs with the loading capacity calculated by the MPCA in the TSS TMDL. The EPA finds the MPCA's approach for calculating the loading capacity for the TSS TMDL to be reasonable and consistent with the EPA's guidance.

MRSCW phosphorus TMDLs: MPCA used the U.S. Army Corps of Engineers (USACE) BATHTUB model to calculate the loading capacities for the lakes in the MRSCW TMDL (Section 4.3 of the final TMDL document). The BATHTUB model was utilized to link observed phosphorus water quality conditions and estimated phosphorus loads to in-lake water quality estimates. The MPCA has previously employed BATHTUB successfully in many lake studies in Minnesota. BATHTUB is a steady-state annual or seasonal model that predicts a lake's growing season (June 1 to September 30) average surface water quality. BATHTUB utilizes annual or seasonal timescales which are appropriate because watershed phosphorus loads are normally impacted by seasonal conditions.

BATHTUB has built-in statistical calculations which account for data variability and provide a means for estimating confidence in model predictions. BATHTUB employs a mass-balance phosphorus model that accounts for water and phosphorus inputs from tributaries, direct watershed runoff, the atmosphere, and sources internal to the lake, and outputs through the lake outlet, water loss via evaporation, and phosphorus sedimentation and retention in the lake sediments. BATHTUB provides flexibility to tailor model inputs to specific lake morphometry, watershed characteristics and watershed inputs. The BATHTUB model also allows the MPCA to assess different impacts of changes in nutrient loading. BATHTUB allows the user the choice of several different mass-balance phosphorus models for estimating loading capacity.

The BATHTUB modeling efforts were used to calculate the loading capacity for each of the lakes. The loading capacity is the maximum phosphorus load which the lake can receive over an annual period and still meet the lake nutrient WQS (Tables 19-24 of this Decision Document). Loading capacities on the annual scale (pounds per year (lbs/year)) were calculated to meet the WQS during the growing season (June 1 through September 30). The time period of June to September was chosen by the MPCA as the growing season because it corresponds to the eutrophication criteria, contains the months that the general public typically uses the lake for aquatic recreation, and is the time of the year when water quality is likely to be impaired by excessive nutrient loading. Loading capacities were divided by 365 to calculate the daily loading capacities.

The MPCA subdivided the loading capacities among the WLA, LA, and MOS components of the TMDL (Tables 19-24 of this Decision Document). These calculations were based on the critical condition, the summer growing season, which is typically when the water quality in each lake is typically degraded and phosphorus loading inputs are the greatest. TMDL allocations assigned during the summer growing season will protect MRSCW during the worst water quality conditions of the year. The MPCA assumed that the loading capacities established by the TMDL will be protective of water quality during the remainder of the calendar year (October through May).

Tables 19-24 of this Decision Document communicate the MPCA's estimates of the reductions required for MRSCW to meet the water quality targets. These loading reductions (i.e., the percentage column) were estimated from existing and TMDL load calculations. The MPCA expects that these reductions will result in the attainment of the water quality targets and the lake water quality will return to a level where the designated uses are no longer considered impaired.

Tables 19-24: Phosphorus TMDLs for the Mississippi River - St. Cloud Watershed are located at the end of this Decision Document in Attachment 3

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

4. Load Allocations (LA)

The 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.

<u>The EPA Review of the Mississippi River-St. Cloud TMDL:</u>
The MPCA determined the LA calculations for each of the TMDLs based on the applicable WQS. The MPCA recognized that LAs for each of the individual TMDLs addressed by the MRSCW TMDLs can be attributed to different nonpoint sources.

<u>MRSCW bacteria TMDLs:</u> The calculated LA values for the bacteria TMDLs are applicable across all flow conditions in the MRSCW (Tables 8-17 of this Decision Document). The MPCA identified several nonpoint sources which contribute bacteria loads to the surface waters of the MRSCW, including; stormwater from agricultural and feedlot areas, failing septic systems, wildlife (e.g., deer, geese, ducks, raccoons, turkeys and other animals) and bacteria contributions from upstream subwatersheds. The MPCA did not determine load allocation values for each of these potential nonpoint source considerations but aggregated the nonpoint sources into one 'watershed load' LA calculation.

<u>MRSCW TSS TMDL:</u> The calculated LA values for the TSS TMDL are applicable across all flow conditions. The MPCA identified several nonpoint sources which contribute sediment loads to the impaired segment in the MRSCW (Table 18 of this Decision Document). Load allocations were recognized as originating from many diverse nonpoint sources including; stormwater contributions from agricultural lands, stream channelization and streambank erosion, wetland and forest sources, and atmospheric deposition. The MPCA did not determine load allocation values for each of these potential nonpoint source considerations but aggregated the nonpoint sources into one "watershed load" LA calculation.

<u>MRSCW phosphorus TMDLs:</u> The MPCA identified several nonpoint sources which contribute nutrient loading to MRSCW (Tables 19-24 of this Decision Document). These nonpoint sources included: watershed contributions from the lake's direct watershed (i.e., lakeshed loading), internal loading, contributions from SSTS and atmospheric deposition. The MPCA calculated load allocation values for each of these potential nonpoint source considerations.

The EPA finds The MPCA's approach for calculating the LA for bacteria, phosphorus and TSS to be reasonable. The EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the fourth criterion.

5. Wasteload Allocations (WLAs)

The 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.

<u>The EPA Review of the Mississippi River-St. Cloud TMDL:</u>
<u>MRSCW bacteria TMDLs:</u> The MPCA identified five NPDES permitted facilities (Table 3 of this Decision Document) within the MRSCW and assigned those facilities a portion of the WLA (Tables 8-17 of this Decision Document). Two of the facilities are controlled systems (ponds) and three are mechanical discharge (Table 12 of the final TMDL document). The WLAs were based upon the maximum daily flow based on a six-inch per day discharge from the facility's secondary pond or the permitted flow rate for the mechanical systems multiplied by the 126 orgs/100 mL geometric mean portion of the standard (Section 4.1.3.1 of the final TMDL document).

The MPCA also explained that the WLA for each individual WWTP was calculated based on the *E. coli* WQS, but WWTP permits are regulated for the fecal coliform WQS (200 orgs /100 mL) and that if a facility is meeting its fecal coliform limits, which are set in the facility's discharge permit, the MPCA assumes the facility is also meeting the calculated *E. coli* WLA from the MRSCW TMDLs. The WLA was therefore calculated using the assumption that the *E. coli* standard of 126 orgs/100 mL provides equivalent protection from illness due to primary contact recreation as the fecal coliform WQS of 200 orgs/100 mL.

The MPCA identified several MS4 permittees discharging to bacteria impaired waters in the MRSCW (Section 4.1.3.2 of the final TMDL document). The MPCA assigned a portion of the WLA based upon the areal extent of each of the MS4 permitted portion of the watershed (Table 26 of the final TMDL document).

The MPCA acknowledged the presence of CAFOs in the MRSCW in Sections 3.6.1.1 of the final TMDL document. CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota Rule 7020.2003). CAFOs were assigned a WLA of zero (WLA = 0) by the MPCA for the MRSCW bacteria TMDLs. As explained by the MPCA, CAFO production areas must be designed to contain all manure, and direct precipitation and manure-contaminated runoff from precipitation events up to the 25-year, 24-hour storm event, and even in the event of a discharge, the discharge cannot cause or contribute to a violation of a WQS. The MPCA noted that any precipitation-caused runoff from the land application of manure at agronomic rates is not considered a point source discharge and is accounted for in the LA section of the TMDL.

The EPA finds the MPCA's approach for calculating the WLAs for the MRSCW bacteria TMDLs to be reasonable and consistent with the EPA's guidance.

MRSCW TSS TMDL: The MPCA identified one NPDES permitted facility (i.e., the Otsego WWTP West facility (MN006257)) within the MRSCW and assigned this facility a portion of the WLA (Table 18 of this Decision Document). The facility is a mechanical system, and the permitted flow rate multiplied times the 30 mg/L TMDL target was used to calculated the WLA (Section 4.2.3.1 of the final TMDL document). The MPCA identified several MS4 permittee discharging to the TSS impaired water in the MRSCW (Section 4.2.3.2 of the final TMDL document). The MPCA assigned a portion of the WLA based upon the areal extent of the MS4 permitted portion of the watershed in the impacted segment.

The MPCA identified construction and industrial stormwater contributions as necessitating a WLA (Table 18 of this Decision Document). Construction and industrial stormwater contributions were combined together to a single line item in the TMDL equations. The WLA for construction stormwater was calculated based on the average percent area (0.2%) of the MRSCW which was covered under a NPDES/SDS Construction Stormwater General Permit during the previous five years. The construction and industrial stormwater WLA was calculated as the percent area (0.2%) multiplied by the loading capacity (Section 4.1.4.3 of the final TMDL document).

Attaining the construction stormwater and industrial stormwater loads described in the MRSCW TSS TMDL is the responsibility of construction and industrial site managers. Local MS4 permittees are required to have a construction stormwater ordinance at least as stringent as the State's NPDES/SDS General Stormwater Permit for Construction Activity (MNR100001). In the final TMDL document the MPCA explained that if a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit (MNR100001) and properly selects, installs and maintains all BMPs required under MNR100001 and applicable local construction stormwater ordinances, including those related to impaired waters discharges and any applicable additional requirements found in Appendix A of the Construction General Permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL. BMPs and other stormwater control measures which act to limit the discharge of the pollutant of concern (TSS) are defined in MNR100001.

The MPCA is responsible for overseeing industrial stormwater loads which impact water quality to lakes and stream segments in the MRSCW. Industrial sites within lake subwatersheds are expected to comply with the requirements of the State's NPDES/SDS Industrial Stormwater Multi-Sector General

Permit (MNR050000) or NPDES/SDS General Permit for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production facilities (MNG490000). The MPCA explained that if a facility owner/operator obtains coverage under the appropriate NPDES/SDS General Stormwater Permit and properly selects, installs and maintains all BMPs required under the permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL. BMPs and other stormwater control measures which act to limit the discharge of the pollutant of concern (TSS) are defined in MNR050000 and MNG490000.

The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit (MNR100001) and applicable local construction stormwater ordinances, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan complies with the applicable requirements in the State permits and local ordinances. As noted above, the MPCA has explained that meeting the terms of the applicable permits will be consistent with the WLAs set in the MRSCW TSS TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18-months of the approval of the TMDL by the EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

The EPA finds the MPCA's approach for calculating the WLA for the MRSCW TSS TMDL to be reasonable and consistent with the EPA's guidance.

MRSCW phosphorus TMDLs: The MPCA identified one NPDES permitted facility (i.e., Knife River Central Minnesota (MNG490003)) within the MRSCW that discharges to an impaired lake (Elk Lake), and assigned this facility a portion of the WLA (Table 20 of this Decision Document). The facility is a sand and gravel aggregate facility that discharges dewatering effluent (Table 60 of the final TMDL document).

The MPCA identified several MS4 permittees discharging to three of the impaired lakes (Elk Lake, Fremont Lake, and Eagle Lake) (Figure 38 of the final TMDL document). The MPCA assigned a portion of the WLA based upon the areal extent of the MS4 permitted portion of the watershed in the impacted lake watersheds. Table 61 of the final TMDL document contains the acreage used by the MPCA in determining the WLAs.

Similar to the TSS TMDL, the MPCA calculated a WLA for construction and industrial stormwater for the phosphorus TMDLs (Tables 19-24 of this Decision Document). This WLA was represented as a categorical WLA for construction and industrial stormwater. The construction and industrial stormwater allocations for the MRSCW TMDL was calculated in the same manner as the construction and industrial stormwater allocations for the MRSCW TSS TMDLs (i.e., see calculative method in ***Section 5 – MRSCW TSS TMDL***, within this Decision Document).

The MPCA's expectations and responsibilities for overseeing construction and industrial stormwater loads for the phosphorus TMDLs are the same for the TSS TMDL. Construction and industrial sites are expected to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit (MNR100001) and applicable local construction stormwater ordinances, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan complies with the applicable requirements in the State permits and local ordinances. As noted above, the MPCA has explained that meeting the terms of the applicable permits will be consistent with the WLAs set in the phosphorus TMDLs for MRSCW. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18-months of the approval of the TMDL by the EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

The EPA finds the MPCA's approach for calculating the WLA for the MRSCW phosphorus TMDLs to be reasonable and consistent with the EPA's guidance. The EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the fifth criterion.

6. Margin of Safety (MOS)

The Clean Water Act, § 303(d)(1)(c), and 40 C.F.R. 130.7 (c)(1) require that a TMDL include a margin of safety (MOS) "which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." The 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. The MOS may include both explicit and implicit components.

The EPA Review of the Mississippi River-St. Cloud TMDL:
The final TMDL submittal outlines the determination of the Margin of Safety for the bacteria, nutrient and TSS TMDLs.

MRSCW bacteria and TSS TMDLs: The MRSCW bacteria and sediment TMDLs incorporated a 10% explicit MOS applied to the total loading capacity calculation for each flow regime of the LDC. Ten percent of the total loading capacity was reserved for MOS with the remaining load allocated to point and nonpoint sources (Tables 8-18 of this Decision Document). The MPCA explained that the explicit MOS was set at 10% due to the following factors discovered during TMDL development for these pollutants:

- Uncertainty in simulated flow data from the HSPF model;
- Environmental variability in pollutant loading and water quality data (i.e., collected water quality monitoring data, field sampling error, etc.); and
- Calibration and validation processes of the LDC modeling efforts, uncertainty in modeling outputs, and conservative assumptions made during the modeling efforts.

Challenges associated with quantifying *E. coli* loads include the dynamics and complexity of bacteria in stream environments. Factors such as die-off and re-growth contribute to general uncertainty that makes quantifying stormwater bacteria loads particularly difficult. The MOS for the MRSCW bacteria

TMDLs also incorporated certain conservative assumptions in the calculation of the TMDLs. No rate of decay, or die-off rate of pathogen species, was used in the TMDL calculations or in the creation of load duration curves for *E. coli*. Bacteria have a limited capability of surviving outside their hosts, and normally a rate of decay would be incorporated. The MPCA determined that it was more conservative to use the WQS (126 orgs/100 mL) and not to apply a rate of decay, which could result in a discharge limit greater than the WQS.

As stated in the *EPA's Protocol for Developing Pathogen TMDLs* (EPA 841-R-00-002), many different factors affect the survival of pathogens, including the physical condition of the water. These factors include, but are not limited to sunlight, temperature, salinity, and nutrient deficiencies. These factors vary depending on the environmental condition/circumstances of the water, and therefore it would be difficult to assert that the rate of decay caused by any given combination of these environmental variables was sufficient to meet the WQS of 126 orgs/100 mL. Thus, it is more conservative to apply the State's WQS as the bacteria target value because this standard must be met at all times under all environmental conditions.

MRSCW phosphorus TMDLs: The phosphorus TMDLs for MRSCW used an explicit MOS for most of the lakes (Tables 19-24 of this Decision Document; Section 4.3.5 of the final TMDL document). The MPCA utilized an explicit MOS of 10% to account for any uncertainties in the HSPF model, uncertainties in the assumptions made for estimating internal loading rates and other assumptions used for calibrating the BATHTUB modeling efforts for the lake.

For two lakes (Fremont Lake and Little Mary Lake-South Bay), the MPCA did not include an explicit MOS. As noted in Section 1 above, the impairment status of Fremont Lake is unclear at this time and may be attaining WQS. The MPCA determined that the MOS was implicit, as the lake is possibly meeting WQS, and thus, additional explicit MOS would be overly conservative. For Little Mary Lake-South Bay, the lake is downstream of Little Mary Lake-North Bay and Silver Lake (in a previous TMDL). The MPCA determined that the reductions calculated for Little Mary Lake-South Bay based upon the reductions for Little Mary Lake-North Bay and Silver Lake will more than sufficient to meet the loading capacity for Little Mary Lake-South Bay, and that an additional explicit MOS would be over conservative. Therefore, the MOS for Little Mary Lake-South Bay is an implicit MOS based on the ongoing TMDL work (Section 4.3.5 of the final TMDL document).

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

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)).

The EPA Review of the Mississippi River-St. Cloud TMDL:

MRSCW bacteria TMDLs: Bacterial loads vary by season, typically reaching higher numbers in the dry summer months when low flows and bacterial growth rates contribute to their abundance, and reaching relatively lower values in colder months when bacterial growth rates attenuate and loading events, driven by stormwater runoff events aren't as frequent. Bacterial WQS need to be met between April 1st to October 31st, regardless of the flow condition. The development of the LDCs utilized simulated flow data which were validated and calibrated with local flow gage data. Modeled flow measurements represented a variety of flow conditions from the recreation season. LDCs developed from these modeled flow conditions represented a range of flow conditions within the MRSCW and thereby accounted for seasonal variability over the recreation season.

Critical conditions for *E. coli* loading occur in the dry summer months. This is typically when stream flows are lowest, and bacterial growth rates can be high. By meeting the water quality targets during the summer months, it can reasonably be assumed that the loading capacity values will be protective of water quality during the remainder of the calendar year (November through March).

MRSCW TSS TMDL: The TSS WQS applies from April to September which is also the time period when high concentrations of sediment are expected in the surface waters of the MRSCW. Sediment loading in the MRSCW varies depending on surface water flow, land cover and climate/season. Spring is typically associated with large flows from snowmelt, the summer is associated with the growing season as well as periodic storm events and receding streamflows, and the fall brings increasing precipitation and rapidly changing agricultural landscapes. In all seasons, sediment inputs to surface waters typically occur primarily through wet weather events. Critical conditions that impact the response of MRSCW water bodies to sediment inputs may typically occur during periods of low flow. During low flow periods, sediment can accumulate within the impacted water bodies, there is less assimilative capacity within the water body, and generally sediment is not transported through the water body at the same rate it is under normal flow conditions.

Critical conditions that impact loading, or the rate that sediment is delivered to the water body, were identified as those periods where large precipitation events coincide with periods of minimal vegetative cover on fields. Large precipitation events and minimally covered land surfaces can lead to large runoff volumes, especially to those areas which drain agricultural fields. The conditions generally occur in the spring and early summer seasons.

MRSCW phosphorus TMDLs: Seasonal variation was considered for the MRSCW TMDLs as described in Section 4.3.6 of the final TMDL document. The nutrient targets employed in the TMDLs were based on the average nutrient values collected during the growing season (June 1 to September 30). The water quality target was designed to meet the NCHF eutrophication WQS during the period of the year where the frequency and severity of algal growth is the greatest.

The Minnesota eutrophication standards state that total phosphorus WQS are defined as the mean concentration of phosphorus values measured during the growing season. In the MRSCW phosphorus TMDL effort, the LA and WLA estimates were calculated from modeling efforts which incorporated mean growing season total phosphorus values. Nutrient loading capacities were set in the TMDL development process to meet the WQS during the most critical period. The mid to late summer period is typically when eutrophication standards are exceeded and water quality within the MRSCW is deficient. By calibrating the modeling efforts to protect the lake during the worst water quality conditions of the year, it is assumed that the loading capacity established by the TMDL will be protective of water quality during the remainder of the calendar year (October through May).

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

8. Reasonable Assurance

When a TMDL is developed for waters impaired by point sources only, the issuance of a 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, the 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 the EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

The EPA Review of the Mississippi River-St. Cloud TMDL:
The MRSCW bacteria, nutrient and TSS TMDLs provide reasonable assurance that actions identified in the implementation section of the final TMDL (i.e., Sections 6 and 8 of the final TMDL document), will be applied to attain the loading capacities and allocations calculated for the impaired reaches within the MRSCW. The recommendations made by the MPCA will be successful at improving water quality if the appropriate local groups work to implement these recommendations. Those mitigation suggestions, which fall outside of regulatory authority, will require commitment from state agencies and local stakeholders to carry out the suggested actions.

The MPCA has identified several local partners which have expressed interest in working to improve water quality within the MRSCW. Implementation practices will be implemented over the next several years. It is anticipated that staff from Soil and Water Conservation District (SWCDs) (e.g., the Benton County, Sherburne County, Stearns County, and Wrights County SWCD) staff, local Minnesota Board of Water and Soil Resources (BWSR) offices, Clearwater River Watershed District and other local watershed groups, will work together to reduce pollutant inputs to the MRSCW. The MPCA has authored a Mississippi River - St. Cloud WRAPS document (March 2015 and updated in June 2024) which provides information on the development of scientifically-supported restoration and protection strategies for implementation planning and action. The MPCA sees the WRAPS document as a starting point for which the MPCA and local partners can develop tools that will help local governments, landowners, and special interest groups determine (1) the best strategies for making improvements and protecting resources that are already in good condition, and (2) focus those strategies in the best places to do work.

County SWCDs, such as those noted above, have a history of implementation efforts in the MRSCW. Sections 6.3 and 6.4 of the final TMDL document discusses numerous efforts in the TMDL watershed where local groups have implemented efforts to reduce pollutants. The SWCDs employ various programming, such as shoreline planting programming, native plant, tree and seed planting programming, cost-share opportunities, equipment rentals and other technical services to ensure that efforts are made to improve water quality and conserve water resources in the MRSCW. Other county SWCDs in the MRSCW has similar programming efforts which locals can utilize. Section 6.3 of the final TMDL document also contains information on the various county-scale watershed plans developed and implemented by the counties in the TMDL watershed that are designed to control and reduce pollutants in the watersheds.

Section 6.5 of the final TMDL document describes the previous and ongoing funding made available to landowners in the MRSCW. Examples of some of the major funding sources include Watershed-based Implementation Funding (WBIF), Clean Water Fund Competitive Grants (e.g., Projects and Practices), and conservation funds from Natural Resources Conservation Service (NRCS) (e.g., Environmental Quality Incentives Program and Conservation Stewardship Program). Figure 43 of the final TMDL document shows the funding amounts and sources per years withing the TMDL watershed. Over $98 million has been spent since 2004 in the watershed.

Continued water quality monitoring within the basin is supported by the MPCA. Additional water quality monitoring results could provide insight into the success or failure of BMP systems designed to reduce bacteria, nutrient and sediment loading into the surface waters of the watershed. Local watershed managers would be able to reflect on the progress of the various pollutant removal strategies and would have the opportunity to change course if observed progress is unsatisfactory.

The MPCA regulates the collection, transportation, storage, processing and disposal of animal manure and other livestock operation wastes at State registered animal feeding operation (AFO) facilities. The MPCA Feedlot Program implements rules governing these activities and provides assistance to counties and the livestock industry. The feedlot rules apply to most aspects of livestock waste management including the location, design, construction, operation and management of feedlots and manure handling facilities.

Reasonable assurance that the WLA set forth will be implemented is provided by regulatory actions. According to 40 CFR 122.44(d)(1)(vii)(B), NPDES permit effluent limits must be consistent with assumptions and requirements of all WLAs in an approved TMDL. The MPCA's stormwater program and the NPDES permit program are the implementing programs for ensuring WLA are consistent with the TMDL. The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan meets WLA set in the

MRSCW TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified. This applies to sites under the MPCA's General Stormwater Permit for Construction Activity (MNR100001) and its NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) or NPDES/SDS General Permit for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production facilities (MNG490000).

The Clean Water Legacy Act (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 the 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., the 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 the 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. The MPCA has developed guidance on what is required in the WRAPS (*Watershed Restoration and Protection Strategy Report Template*, MPCA).

The Minnesota Board of Soil and Water Resources administers the Clean Water Fund as well, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (*http://bwsr.state.mn.us/cwf_programs*).

The EPA finds that this criterion has been adequately addressed.

9. Monitoring Plan to Track TMDL Effectiveness

The 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.

The EPA Review of the Mississippi River-St. Cloud TMDL:
The final TMDL document outlines the water monitoring efforts in the MRSCW (Section 7 of the final TMDL document). Progress of TMDL implementation will be measured through regular monitoring efforts of water quality and total BMPs completed. The MPCA anticipates that monitoring will be completed by local groups (e.g., the Benton SWCD, Sherburne County SWCD, Stearns County SWCD, and Wrights County SWCD) and volunteers, as long as there is sufficient funding to support the efforts of these local entities. At a minimum, the MRSCW will be monitored once every 10 years as part of the MPCA's Intensive Watershed Monitoring cycle.

Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation efforts utilized in the MRSCW. Water quality information will aid watershed managers in understanding how BMP pollutant removal efforts are impacting water quality. Water quality monitoring combined with an annual review of BMP efficiency will provide information on the success or failure of BMP systems designed to reduce pollutant loading into water bodies of the MRSCW. Watershed managers will have the opportunity to reflect on the progress or lack of progress and will have the opportunity to change course if progress is unsatisfactory. Review of BMP efficiency is expected to be completed by the local and county partners.

Stream Monitoring:
River and stream monitoring in the MRSCW, has been completed by a variety of organizations (i.e., SWCDs) and funded by Clean Water Partnership Grants, and other available local funds. The MPCA anticipates that stream monitoring in the MRSCW should continue in order to build on the current water quality dataset and track changes based on implementation progress. Continuing to monitor water quality and biota scores in the listed segments will determine whether or not stream habitat restoration measures are required to bring the watershed into attainment with water quality standards. At a minimum, fish and macroinvertebrate sampling should be conducted by the MPCA, Minnesota Department of Natural Resources (MDNR), or other agencies every five to ten years during the summer season.

Lake Monitoring:
The lakes in the MRSCW (including MRSCW) have all been periodically monitored by volunteers and staff over the years. Monitoring for some of these locations is planned for the future in order to keep a record of the changing water quality as funding allows. Lakes are generally monitored for TP, chl-*a*, and Secchi disk transparency. The MPCA expects that in-lake monitoring will continue as implementation activities are installed across the watersheds. These monitoring activities should continue until water quality goals are met. Some tributary monitoring has been completed on the inlets to the lakes and may be important to continue as implementation activities take place throughout the subwatersheds.

The EPA finds that this criterion has been adequately addressed.

10. Implementation

The 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, the EPA's policy recognizes that other relevant watershed management processes may be used in the TMDL process. The EPA is not required to and does not approve TMDL implementation plans.

The EPA Review of the Mississippi River-St. Cloud TMDL:

The findings from the MRSCW TMDLs will be used to inform the selection of implementation activities as part of the Mississippi River - St. Cloud WRAPS process. The purpose of the WRAPS report is to support local working groups and jointly develop scientifically-supported restoration and protection strategies to be used for subsequent implementation planning.

The TMDL outlined some implementation strategies in Section 8 of the final TMDL document. The MPCA outlined the importance of prioritizing areas within the MRSCW, education and outreach efforts with local partners, and partnering with local stakeholders to improve water quality within the watershed. The MRSCW WRAPS document (June 2024) includes additional detail regarding specific recommendations from the MPCA to aid in the reduction of bacteria, nutrients and TSS to surface waters of the MRSCW. Additionally, the MPCA referenced the Statewide Nutrient Reduction Strategy (https://www.pca.state.mn.us/water/nutrient-reduction-strategy) for focused implementation efforts targeting phosphorus nonpoint sources in MRSCW. The reduction goals for the bacteria, nutrient and TSS TMDLs may be met via components of the following strategies:

MRSCW bacteria TMDLs:

Pasture management/livestock exclusion plans: Reducing livestock access to stream environments will lower the opportunity for direct transport of bacteria to surface waters. The installation of exclusion fencing near stream and river environments to prevent direct access for livestock, installing alternative water supplies, and installing stream crossings between pastures, would work to reduce the influxes of bacteria and improve water quality within the watershed. Additionally, introducing rotational grazing to increase grass coverage in pastures, and maintaining appropriate numbers of livestock per acre for grazing, can also aid in the reduction of bacteria inputs.

Manure Collection and Storage Practices: Manure has been identified as a source of bacteria. Bacteria can be transported to surface water bodies via stormwater runoff. Bacteria laden water can also leach into groundwater resources. Improved strategies for the collection, storage and management of manure can minimize impacts of bacteria entering the surface and groundwater system. Repairing manure storage facilities or building roofs over manure storage areas may decrease the amount of bacteria in stormwater runoff.

Manure management plans: Developing manure management plans can ensure that the storage and application rates of manure are appropriate for land conditions. Determining application rates that take into account the crop to be grown on that particular field and soil type will ensure that the correct amount of manure is spread on a field given the conditions. Spreading the correct amount of manure will reduce the availability of bacteria to migrate to surface waters.

Feedlot runoff controls: Treatment of feedlot runoff via diversion structures, holding/storage areas, and stream buffering areas can all reduce the transmission of bacteria to surface water environments. Additionally, cleaner stormwater runoff can be diverted away from feedlots so as to not liberate bacteria.

Subsurface septic treatment systems: Improvements to septic management programs and educational opportunities can reduce the occurrence of septic pollution. Educating the public on proper septic maintenance, finding and eliminating illicit discharges and repairing failing systems could lessen the impacts of septic derived bacteria inputs into the MRSCW.

Stormwater wetland treatment systems: Constructed wetlands with the purpose of treating wastewater or stormwater inputs could be explored in selected areas of the MRSCW. Constructed wetland systems may be vegetated, open water, or a combination of vegetated and open water. The MPCA explained that recent studies have found that the more effective constructed wetland designs employ large treatment volumes in proportion to the contributing drainage area, have open water areas between vegetated areas, have long flow paths and a resulting longer detention time, and are designed to allow few overflow events.

Riparian Area Management Practices: Protection of streambanks within the watershed through planting of vegetated/buffer areas with grasses, legumes, shrubs or trees will mitigate bacteria inputs into surface waters. These areas will filter stormwater runoff before the runoff enters the main stem or tributaries of the MRSCW.

Bioinfiltration of stormwater: Biofiltration practices rely on the transport of stormwater and watershed runoff through a medium such as sand, compost or soil. This process allows the medium to filter out sediment and therefore sediment-associated bacteria. Biofiltration/bioretention systems, are vegetated and are expected to be most effective when sized to limit overflows and designed to provide the longest flow path from inlet to outlet.

MRSCW TSS TMDL:

Improved Agricultural Drainage Practices: A review of local agricultural drainage networks should be completed to examine how improving drainage ditches and drainage channels could be reorganized to reduce the influx of sediment to the surface waters in the MRSCW. The reorganization of the drainage network could include the installation of drainage ditches or sediment traps to encourage particle settling during high flow events. Additionally, cover cropping, and residue management is recommended to reduce erosion and thus siltation and runoff into streams.

Reducing Livestock Access to Stream Environments: Livestock managers should be encouraged to implement measures to protect riparian areas. Managers should install exclusion fencing near stream environments to prevent direct access to these areas by livestock. Additionally, installing alternative watering locations and stream crossings between pastures may aid in reducing sediments to surface waters.

Identification of Stream, River, and Lakeshore Erosional Areas: An assessment of stream channel, river channel, and lakeshore erosional areas should be completed to evaluate areas where erosion control strategies could be implemented in the MRSCW. Implementation actions (e.g., planting deep-rooted vegetation near water bodies to stabilize streambanks) could be prioritized to target areas which are actively eroding. This strategy could prevent additional sediment inputs into surface waters of the MRSCW and minimize or eliminate degradation of habitat.

MRSCW phosphorus TMDLs:

Septic Field Maintenance: Septic systems are believed to be a source of nutrients to MRSCW. Failing systems are expected to be identified and addressed via upgrades to those SSTS not meeting septic ordinances. The MPCA explained that SSTS improvement priority should be given to those failing SSTS on lakeshore properties or those SSTS adjacent to streams within the direct watersheds for the lake. The MPCA aims to greatly reduce the number of failing SSTS in the future via local septic management programs and educational opportunities. Educating the public on proper septic maintenance, finding and eliminating illicit discharges, and repairing failing systems could lessen the impacts of septic derived nutrients inputs into the MRSCW.

Internal Loading Reduction Strategies: Internal nutrient loads may be addressed to meet the TMDL allocations outlined in the MRSCW phosphorus TMDLs. The MPCA recommends that before any strategy is put into action, an intensive technical review, to evaluate the costs and feasibility of internal load reduction options be completed. Several options should be considered to manage internal load inputs to each of the water bodies addressed in this TMDL.

- *Management of fish populations:* Monitor and manage fish populations to maintain healthy game fish populations and reduce rough fish (i.e. carp, bullheads, fathead minnows) populations.
- *Vegetation management:* Improved management of in-lake vegetation in order to limit phosphorus loading and to increase water clarity. Controlling the vitality of curly-leaf pondweeds via chemical treatments (herbicide applications) will reduce one of the significant sources of internal loading, the senescence of curly-leaf plants in the summer months.
- *Chemical treatment:* The addition of chemical reactants (e.g., aluminum sulfate) to lakes of the MRSCW in order for those reactants to permanently bind phosphorus into the lake bottom sediments. This effort could decrease phosphorus releases from sediment into the lake water column during anoxic conditions.

The EPA finds that this criterion has been adequately addressed. The EPA reviews but does not approve implementation plans.

11. Public Participation

The 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, the EPA has explained that final TMDLs submitted to the 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 the EPA establishes a TMDL, the EPA regulations require the 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 the EPA determines that a State/Tribe has not provided adequate public participation, the EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by the EPA.

The EPA Review of the Mississippi River-St. Cloud TMDL:
The public participation section of the TMDL submittal is found in Section 9 of the final TMDL document. Throughout the development of the MRSCW TMDLs the public was given various opportunities to participate. As part of the strategy to communicate the goals of the TMDL project and to engage with members of the public, the MPCA worked with county and SWCD staff in the MRSCW to promote water quality, to gain input from landowners via surveys and interviews and to better understand the social dynamics of stakeholders in the MRSCW. The MPCA's goal was to create civic engagement and discussion which would enhance the content of the TMDL, WRAPS and 1W1P documents.

The MPCA posted the draft TMDL online at (http://www.pca.state.mn.us/water/tmdl) for a public comment period. The public comment period was started on May 13, 2024 and ended on June 12, 2024. Three comment letters were received, all regarding boundaries of the MS4 permits. The MPCA reviewed the information submitted, and revised the MS4 boundaries as appropriate and revised the TMDL allocations accordingly. The MPCA also added Appendices C and D to the TMDL report to better illustrate the MS4 boundaries (Section 9 of the final TMDL document).

The EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of this eleventh element.

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 the 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 the EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and the 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 water body, and the pollutant(s) of concern.

The EPA Review of the Mississippi River-St. Cloud TMDL:
The EPA received the final Mississippi River - St. Cloud Watershed TMDL document, submittal letter and accompanying documentation from the MPCA on July 30, 2024. The transmittal letter explicitly stated that the final TMDLs referenced in Table 1 of this Decision Document were being submitted to the EPA pursuant to Section 303(d) of the Clean Water Act for the EPA review and approval.

The letter clearly stated that this was a final TMDL submittal under Section 303(d) of CWA. The letter also contained the name of the watershed as it appears on Minnesota's 303(d) list, and the causes/pollutants of concern. This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130.

The EPA finds that the TMDL transmittal letter submitted for the Mississippi River - St. Cloud Watershed TMDLs by the MPCA satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the ten (10) bacteria TMDLs, the one (1) TSS TMDL, and six (6) phosphorus TMDLs satisfy all elements for approvable TMDLs. This TMDL approval is for **seventeen TMDLs,** addressing segments for aquatic recreational and aquatic life use impairments (Table 1 of this Decision Document).

The EPA's approval of these TMDLs extends to the water bodies which are identified above 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.

ATTACHMENTS

Attachment #1: Tables 8-17: Bacteria (*E. coli*) TMDLs for the Mississippi River - St. Cloud Watershed TMDL Report

Attachment #2: Table 18: TSS TMDL for the Mississippi River - St. Cloud Watershed TMDL Report

Attachment #3: Tables 19-24: Total phosphorus TMDLs for the Mississippi River - St. Cloud Watershed TMDL Report

ATTACHMENT #1

Table 8: *E. coli* TMDL summary, Elk River (AUID 07010203-507).

- Use class: 2Bg
- Numeric standard used to calculate TMDL: 126 organisms per 100 milliliters
- Standard applicable: April–October

TMDL Parameter		Flow Zones				
		Very high	**High**	**Mid-range**	**Low**	**Very low**
Sources		***E. coli* load (billion organisms per day)**				
Wasteload	Gilman WWTP (MNG585021)	1.9	1.9	1.9	1.9	1.9
	Saint Cloud City MS4 (MS400052)	34	12	4.5	1.7	0.31
	Benton County MS4 (MS400067)	0.45	0.16	0.060	0.022	0.0042
	Sauk Rapids City MS4 (MS400118)	13	4.6	1.7	0.63	0.12
	Minden Township MS4 (MS400147)	206	74	27	10	1.9
	Sauk Rapids Township MS4 (MS400153)	16	5.8	2.2	0.79	0.15
	Sherburne County MS4 (MS400155)	0.12	0.043	0.016	0.0059	0.0011
	Watab Township MS4 (MS400161)	8.8	3.1	1.2	0.43	0.081
	Minnesota Correctional–St. Cloud MS4 (MS400179)	0.47	0.17	0.063	0.023	0.0044
	MNDOT Outstate District MS4 (MS400180)	1.0	0.36	0.13	0.049	0.0092
	St. Cloud University MS4 (MS400197)	0.16	0.057	0.021	0.0078	0.0015
	Total WLA	**282**	**102**	**39**	**16**	**4.5**
Load	**Total LA**	**778**	**280**	**104**	**38**	**7.2**
MOS		**118**	**43**	**16**	**6.0**	**1.3**
Total load		**1,178**	**425**	**159**	**60**	**13**
Maximum monthly geomean (org/100 mL)		**219**				
Overall estimated percent reduction		**42%**				

Table 9: *E. coli* TMDL summary, Elk River (AUID 07010203-508).

- Use class: 2Bg
- Numeric standard used to calculate TMDL: 126 organisms per 100 milliliters
- Standard applicable: April–October

TMDL Parameter		Flow Zones				
		Very high	**High**	**Mid-range**	**Low**	**Very low**
Sources		***E. coli* load (billion organisms per day)**				
Wasteload	Gilman WWTP (MNG585021)	1.9	1.9	1.9	1.9	1.9
	Minden Township MS4 (MS400147)	83	29	10.0	3.3	0.45
	Total WLA	**85**	**31**	**12**	**5.2**	**2.4**
Load	**Total LA**	**477**	**163**	**57**	**19**	**2.5**
MOS		**63**	**22**	**8**	**2.7**	**0.55**
Total load		**625**	**216**	**77**	**27**	**5.4**
Maximum monthly geomean (org/100 mL)		**671**				
Overall estimated percent reduction		**81%**				

Table 10: *E. coli* TMDL summary, Mayhew Creek (AUID 07010203-750).

- Use class: 2Bg
- Numeric standard used to calculate TMDL: 126 organisms per 100 milliliters
- Standard applicable: April–October

TMDL Parameter		Flow Zones				
		Very high	**High**	**Mid-range**	**Low**	**Very low**
Sources		***E. coli* load (billion organisms per day)**				
Wasteload	Saint Cloud City MS4 (MS400052)	0.039	0.014	0.0051	0.0019	0.00034
	Benton County MS4 (MS400067)	0.072	0.025	0.0093	0.0034	0.00063
	Sauk Rapids City MS4 (MS400118)	5.1	1.8	0.66	0.24	0.045
	Minden Township MS4 (MS400147)	69	24	8.9	3.3	0.60
	Sauk Rapids Township MS4 (MS400153)	14	4.8	1.8	0.66	0.12
	Watab Township MS4 (MS400161)	8.8	3.1	1.1	0.42	0.077
	MNDOT Outstate District MS4 (MS400180)	0.054	0.019	0.0069	0.0026	0.00047
	Total WLA	**97**	**34**	**12**	**4.6**	**0.84**
Load	**Total LA**	**222**	**78**	**29**	**11**	**1.9**
MOS		**36**	**13**	**4.6**	**1.7**	**0.31**
Total load		**355**	**125**	**46**	**17**	**3.1**
Maximum monthly geomean (org/100 mL)		**1,416**				
Overall estimated percent reduction		**91%**				

Table 11: *E. coli* TMDL summary, Rice Creek (AUID 07010203-512).

- Use class: 2Bg
- Numeric standard used to calculate TMDL: 126 organisms per 100 milliliters
- Standard applicable: April-October

TMDL Parameter		Flow Zones				
		Very high	**High**	**Mid-range**	**Low**	**Very low**
Sources		***E. coli* load (billion organisms per day)**				
Wasteload	Foley WWTP (MN0023451)	14	14	14	– [a]	– [a]
	Minden Township MS4 (MS400147)	1.5	0.46	0.14	– [a]	– [a]
	Total WLA	**16**	**14**	**14**	**– [a]**	**– [a]**
Load	**Total LA**	**233**	**71**	**22**	**– [a]**	**– [a]**
MOS		**28**	**9.4**	**4.0**	**1.5**	**0.32**
Total load		**277**	**95**	**40**	**15**	**3.2**
Maximum monthly geomean (org/100 mL)		**288**				
Overall estimated percent reduction		**56%**				

a. The permitted wastewater design flows exceed the stream flow in the indicated flow zones. The allocations are expressed as an equation rather than an absolute number: allocation = (flow contribution from a given source) x (126 org. per 100 mL) x conversion factors. See Section 4.1.3 for more detail.

Table 12: *E. coli* TMDL summary, Snake River (AUID 07010203-529).

- Use class: 1B, 2Ag
- Numeric standard used to calculate TMDL: 126 organisms per 100 milliliters
- Standard applicable: April–October

TMDL Parameter		Flow Zones				
		Very high	**High**	**Mid-range**	**Low**	**Very low**
Sources		***E. coli* load (billion organisms per day)**				
Wasteload	Big Lake Township MS4 (MS400234)	3.0	1.6	0.99	0.67	0.42
	Becker Township MS4 *	81	42	26	18	11
	Total WLA	**84**	**44**	**27**	**19**	**11**
Load	**Total LA**	**84**	**43**	**28**	**18**	**12**
MOS		**19**	**10**	**6.1**	**4.1**	**2.6**
Total load		**187**	**97**	**61**	**41**	**26**
Maximum monthly geomean (org/100 mL)		**454**				
Overall estimated percent reduction		**72%**				

*This community is not currently regulated but is expected to come under MS4s permit coverage in the near future.

Table 13: *E. coli* TMDL summary, Battle Brook (AUID 07010203-535).

- Use class: 2Bg
- Numeric standard used to calculate TMDL: 126 organisms per 100 milliliters
- Standard applicable: April–October

TMDL Parameter		Flow Zones				
		Very high	High	Mid-range	Low	Very low
Sources		*E. coli* load (billion organisms per day)				
Wasteload	Baldwin Township MS4 *	41	19	10	6.3	3.7
	Total WLA	**41**	**19**	**10**	**6.3**	**3.7**
Load	**Total LA**	**116**	**53**	**31**	**18**	**11**
MOS		**18**	**8**	**4.5**	**2.7**	**1.6**
Total load		**175**	**80**	**46**	**27**	**16**
Maximum monthly geomean (org/100 mL)		**284**				
Overall estimated percent reduction		**56%**				

*This community is not currently regulated but is expected to come under MS4s permit coverage in the near future.

Table 14: *E. coli* TMDL summary, Elk River (AUID 07010203-548).

- Use class: 2Bg
- Numeric standard used to calculate TMDL: 126 organisms per 100 milliliters
- Standard applicable: April–October

TMDL Parameter		Flow Zones				
		Very high	High	Mid-range	Low	Very low
Sources		*E. coli* load (billion organisms per day)				
Wasteload	Aspen Hills WWTF (MN0066028)	0.095	0.095	0.095	0.095	0.095
	Becker WWTP (MN0025666)	10	10	10	10	10
	Foley WWTP (MN0023451)	14	14	14	14	14
	Gilman WWTP (MNG585021)	1.9	1.9	1.9	1.9	1.9
	Zimmerman WWTP (MN0042331)	2.2	2.2	2.2	2.2	2.2
	Saint Cloud City MS4 (MS400052)	27	11	4.9	3.0	1.4
	Benton County MS4 (MS400067)	0.36	0.15	0.065	0.039	0.019
	Elk River City MS4 (MS400089)	43	18	7.7	4.6	2.2
	Sauk Rapids City MS4 (MS400118)	10	4.3	1.9	1.1	0.53
	Minden Township (MS400147)	169	69	30	18	8.6
	Sauk Rapids Township MS4 (MS400153)	13	5.4	2.4	1.4	0.67

	Sherburne County MS4 (MS400155)	0.21	0.086	0.038	0.023	0.011
	Watab Township MS4 (MS400161)	7.1	2.9	1.3	0.77	0.36
	Minnesota Correctional–St. Cloud (MS400179)	0.38	0.16	0.069	0.041	0.020
	MNDOT Outstate District MS4 (MS400180)	1.0	0.41	0.18	0.11	0.051
	St. Cloud University (MS400197)	0.13	0.053	0.023	0.014	0.0066
	Big Lake Township MS4 (MS400234)	136	56	25	15	7.0
	Big Lake City MS4 (MS400249)	28	11	5.0	3.0	1.4
	Baldwin Township MS4 *	74	30	13	8.0	3.8
	Becker Township MS4 *	220	90	40	24	11
	Livonia Township MS4 *	103	42	19	11	5.3
	Zimmerman City MS4 *	20	8.0	3.5	2.1	1.0
	Total WLA	**880**	**377**	**182**	**120**	**72**
Load	**Total LA**	**2,139**	**875**	**440**	**231**	**109**
	MOS	**336**	**139**	**69**	**39**	**20**
	Total load	**3,355**	**1,391**	**691**	**390**	**201**
Maximum monthly geomean (org/100 mL)		**146**				
Overall estimated percent reduction		**14%**				

*These communities are not currently regulated but are expected to come under MS4s permit coverage in the near future.

Table 15: *E. coli* TMDL summary, Unnamed creek (Fairhaven Creek) (AUID 07010203-565).

- Use class: 1B, 2Ag
- Numeric standard used to calculate TMDL: 126 organisms per 100 milliliters
- Standard applicable: April–October

		Flow Zones				
TMDL Parameter		**Very high**	**High**	**Mid-range**	**Low**	**Very low**
Sources		***E. coli* load (billion organisms per day)**				
Load	**Total LA**	**14**	**5.6**	**2.8**	**1.3**	**0.62**
	MOS	**1.6**	**0.62**	**0.31**	**0.15**	**0.069**
	Total load	**16**	**6.2**	**3.1**	**1.5**	**0.69**
Maximum monthly geomean (org/100 mL)		**932**				
Overall estimated percent reduction		**86%**				

Table 16: *E. coli* TMDL summary, St. Francis River (AUID 07010203-700).

- Use class: 2Bg
- Numeric standard used to calculate TMDL: 126 organisms per 100 milliliters
- Standard applicable: April–October

TMDL Parameter		Flow Zones				
		Very high	**High**	**Mid-range**	**Low**	**Very low**
Sources		***E. coli* load (billion organisms per day)**				
Load	**Total LA**	**603**	**229**	**110**	**52**	**22**
	MOS	**67**	**25**	**12.2**	**5.8**	**2.4**
	Total load	**670**	**254**	**122**	**58**	**24**
Maximum monthly geomean (org/100 mL)		**497**				
Overall estimated percent reduction		**75%**				

Table 17: *E. coli* TMDL summary, Tibbets Brook (AUID 07010203-736).

- Use class: 2Bg
- Numeric standard used to calculate TMDL: 126 organisms per 100 milliliters
- Standard applicable: April–October

TMDL Parameter		Flow Zones				
		Very high	**High**	**Mid-range**	**Low**	**Very low**
Sources		***E. coli* load (billion organisms per day)**				
Wasteload	Aspen Hills WWTF (MN0066028)	0.095	0.095	0.095	0.095	0.095
	Zimmerman WWTP (MN0042331)	2.2	2.2	2.2	2.2	2.2
	Elk River City MS4 (MS400089)	23	11	6.6	4.3	2.6
	Sherburne County MS4 (MS400155)	0.024	0.011	0.0069	0.0045	0.0027
	Big Lake Township MS4 (MS400234)	24	12	7.0	4.6	2.7
	Baldwin Township MS4 *	1.8	0.84	0.51	0.33	0.20
	Livonia Township MS4 *	63	30	18	12	7.1
	Zimmerman City MS4 *	13	6.4	3.9	2.5	1.5
	Total WLA	**127**	**63**	**38**	**26**	**16**
Load	**Total LA**	**8.0**	**2.7**	**2.5**	**1.0**	**1.1**
	MOS	**15**	**7.3**	**4.5**	**3.0**	**1.9**
	Total load	**150**	**73**	**45**	**30**	**19**
Maximum monthly geomean (org/100 mL)		**233**				
Overall estimated percent reduction		**46%**				

* These communities are not currently regulated but are expected to come under MS4s permit coverage in the near future.

ATTACHMENT #2

Table 18: TSS TMDL summary, Unnamed creek (AUID 07010203-528).

- Use class: 2Bg
- Numeric standard used to calculate TMDL: 30 mg/L TSS
- Standard applicable: April–September

TMDL Parameter		Flow Zones				
		Very high	**High**	**Mid-range**	**Low**	**Very low**
Sources		**TSS load (pounds per day)**				
Wasteload	Otsego WWTP West (MN006257)	180	180	180	180	180
	MNDOT Outstate District MS4 (MS400180) [a]	20	9.1	5.4	3.5	1.9
	Otsego City MS4 (MS400243) [a]	1,804	814	485	314	172
	Saint Michael City MS4 (MS400246) [a]	92	41	25	16	8.7
	Albertville City MS4 (MS400281) [a]	490	221	132	85	47
	Industrial stormwater	42	19	11	7.9	4.0
	Construction stormwater	5.6	2.5	1.5	0.97	0.53
	Total WLA	**2,634**	**1,287**	**840**	**607**	**414**
Load	**Total LA**	**331**	**150**	**88**	**57**	**31**
MOS		**329**	**160**	**103**	**74**	**50**
Total load		**3,294**	**1,597**	**1,031**	**738**	**495**
Maximum observed (mg/L)		**33.2**				
Overall estimated percent reduction		**10%**				

[a] To evaluate compliance with the TSS TMDL WLA, MS4 permittees should use the 10% reduction target from their baseline loads in 2019 (Section 8.1.3.2).

ATTACHMENT #3

Table 19: TP TMDL summary, Eagle Lake (AUID 71-0067-00).

- Use class: 2B
- Numeric standard used to calculate TMDL: 40 µg/L TP
- Standard applicable: June–September

TMDL parameter		Existing load	TMDL allocation		Load reduction needed	
		lb/year	lb/year	lb/day	lb/year	%
WLA	Construction stormwater	0.87	0.87	0.0024	0	0%
	Big Lake Township (MS400234)	17	9.3	0.025	7.7	45%
	Becker Township (future MS4)	44 [a]	24	0.066	20	45%
	Total WLA	**62**	**34**	**0.093**	**28**	**45%**
LA	Watershed Runoff (unregulated)	304	166	0.45	138	45%
	SSTS	181	127	0.35	54	30%
	Atmospheric Deposition	110	110	0.30	0	0%
	Total LA	**595**	**403**	**1.1**	**192**	**32%**
MOS		**-**	**49**	**0.13**	**-**	**-**
Total Load		**657**	**486**	**1.3**	**220**	**33%**

a. The existing load from Becker Township is represented as future MS4.

Table 20: TP TMDL summary, Elk Lake (AUID 71-0055-00).

- Use class: 2B
- Numeric standard used to calculate TMDL: 60 µg/L TP
- Standard applicable: June–September

TMDL parameter		Existing load	TMDL allocation		Load reduction needed	
		lb/year	lb/year	lb/day	lb/year	%
Boundary condition at Diann Lake (71-0046-00) [a]		**377**	**306**	**0.84**	**71**	**19%**
WLA	Construction stormwater	5.1	5.1	0.014	0	0%
	Industrial stormwater	2.5	2.5	0.0068	0	0%
	Knife River Central Minnesota (MNG490003)	9.8	9.8	0.027	0	0%
	Baldwin Township (future MS4)	792 [b]	528	1.4	264	33%
	Total WLA	**809**	**545**	**1.4**	264	33%
LA	Watershed Runoff (unregulated)	2,304	1,537	4.2	767	33%
	SSTS	112	78	0.21	34	30%
	Atmospheric Deposition	86	86	0.24	0	0%
	Internal Loading	529	0	0	529	100% [c]
	Total LA	**3,031**	**1,701**	**4.7**	1,330	44%
MOS		**-**	**284**	**0.77**	**-**	**-**
Total Load		**4,217**	**2,836**	**7.7**	**1,665**	**39%**

a. The Diann Lake boundary condition addresses the load from the Diann Lake outlet (Section 4.3.2).
b. The existing load from Baldwin Township is represented as future MS4.
c. 100% reduction in internal load assumes that the additional internal load is removed, and the remaining internal load to the lake equals the average rate of internal loading that is implicit in BATHTUB.

Table 21: TP TMDL summary, Fremont Lake (AUID 71-0016-00).

- Use class: 2B
- Numeric target used to calculate TMDL: 44 µg/L TP
  (The numeric standard for this lake is 60 µg/L but the lake currently meets this standard. The target represents the expected lake concentration that results from a 5% reduction in phosphorus loads to the lake.)
- Standard applicable: June–September

TMDL parameter		Existing load [a]	TMDL allocation		Load reduction needed	
		lb/year	lb/year	lb/day	lb/year	%
WLA	Construction stormwater	0.83	0.83	0.0023	0	0%
	Baldwin Township (future MS4)	24.3	23.8	0.065	0.5	2% [b]
	Livonia Township (future MS4)	163	160	0.44	3.0	2%
	Zimmerman City (future MS4)	11.9	11.7	0.032	0.2	2%
	Total WLA	**200**	**196**	**0.54**	**3.7**	2%
LA	SSTS	167	147 [c]	0.40	20	12%
	Atmospheric Deposition	118	118	0.32	0	0%
	Total LA	**285**	**265**	**0.72**	**20**	**7%**
Total Load		**485**	**461**	**1.3**	**24**	**5%**

a. The entire Fremont Lake drainage area is future MS4. The existing load from the area is represented as future MS4 area.

b. A nominal reduction was chosen for presumed future MS4s in the Fremont Lake Watershed. Although the lake currently meets water quality standards, all sources, including MS4s, should be reduced to ensure maintenance of lake water quality conditions.

c. The SSTS LA represents a portion of all SSTS around the lake being in compliance; additional reductions could be achieved with 100% compliance.

Table 22: TP TMDL summary, Little Mary Lake–North Bay (AUID 86-0139-02).

- Use class: 2B
- Numeric standard used to calculate TMDL: 60 µg/L TP
- Standard applicable: June–September

TMDL parameter		Existing load	TMDL allocation		Load reduction needed	
		lb/year	lb/year	lb/day	lb/year	%
WLA	Construction stormwater	1.4	1.4	0.0038	0	0%
	Total WLA	**1.4**	**1.4**	**0.0038**	**0**	**0%**
LA	Watershed Runoff	605	286	0.78	319	53%
	Atmospheric Deposition	21	21	0.058	0	0%
	Internal Loading	1,392	378	1.0	1,015	73%
	Total LA	**2,018**	**685**	**1.8**	**1,334**	**66%**
MOS		**-**	**76**	**0.21**	**-**	**-**
Total Load		**2,019**	**762**	**2.1**	**1,334**	**66%**

Table 23: TP TMDL summary, Little Mary Lake–South Bay (AUID 86-0139-01).

- Use class: 2B
- Numeric standard used to calculate TMDL: 60 µg/L TP
- Standard applicable: June–September

TMDL parameter		Existing load	TMDL allocation		Load reduction needed	
		lb/year	lb/year	lb/day	lb/year	%
Boundary condition at Silver Lake (86-0140-00) [a]		**2,193**	**1,110**	**3.0**	**1,082**	**49%**
Boundary condition at Little Mary North Bay (86-0139-02)		**2,019**	**762**	**2.1**	**1,257**	**62%**
WLA	Construction stormwater	3.8	3.8	0.010	0	0%
	Total WLA	**3.8**	**3.8**	**0.010**	**0**	**0%**
LA	Watershed Runoff	14.5	5.5	0.015	9	62%
	Atmospheric Deposition	3.5	3.5	0.010	0	0%
	Total LA	**18.1**	**9.0**	**0.025**	**9.0**	**62%**
MOS [b]		**-**	**-**	**-**	**-**	**-**
Total Load		**4,234**	**1,885**	**5.1**	**2,348**	**55%**

a. Industrial stormwater permittees are located upstream of Silver Lake

b. An explicit MOS is not allocated to Little Mary Lake–South Bay. The North Bay and South Bay were simulated together in the same BATHTUB model, and explicit MOS was assigned to the Little Mary Lake–North Bay TMDL (Table 69). Additionally, explicit MOS was allocated in the Silver Lake TMDL. Together, the Little Mary Lake–North Bay and Silver Lake boundary conditions are >99% of the allocated load to Little Mary Lake–South Bay. Including an additional explicit MOS for the South Bay would be overly conservative.

Table 24: TP TMDL summary, Millstone Lake (AUID 80-0152-00).

- Use class: 2B
- Numeric standard used to calculate TMDL: 60 µg/L TP
- Standard applicable: June–September

TMDL parameter		Existing load	TMDL allocations		Load reduction needed	
		lb/year	lb/year	lb/day	lb/year	%
WLA	Construction stormwater	1.3	1.3	0.0036	0	0%
	Total WLA	**1.3**	**1.3**	**0.0036**	**0**	**0%**
LA	Watershed Runoff	199	57	0.16	142	71%
	Atmospheric Deposition	48	48	0.13	0	0%
	Internal loading	388	51	0.14	337	87%
	Total LA	**635**	**156**	**0.43**	**479**	**75%**
MOS		**-**	**18**	**0.048**	**-**	**-**
Total Load		**636**	**175**	**0.48**	**479**	**75%**