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

REPLY TO ATTENTION OF
WW-16J

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency completed its review of the final Total Maximum Daily Loads (TMDL) for segments within the Upper Iowa River Watershed and Mississippi River-Reno Watershed (UIRMRRW), including supporting documentation. The UIRMRRW encompasses parts of Mower, Fillmore and Houston counties in southeastern Minnesota. The UIRMRRW TMDLs address impaired aquatic recreation due to excessive bacteria and impaired aquatic life use due to excessive sediment.

The UIRMRRW TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations set forth at 40 C.F.R. Part 130. Therefore, EPA approves Minnesota's nine (9) bacteria TMDLs and one (1) sediment TMDL. EPA describes Minnesota's compliance with the statutory and regulatory requirements in the enclosed decision document.

EPA acknowledges Minnesota's efforts in submitting these TMDLs and look forward to future TMDL submissions by the State of Minnesota. If you have any questions, please contact Mr. Paul Proto, at 312-353-8657.

Sincerely,

THOMAS SHORT
Digitally signed by THOMAS SHORT
Date: 2020.03.26 14:38:12 -05'00'

Thomas R. Short, Jr.
Acting Director, Water Division

wq-iw9-24g

TMDL: Upper Iowa River and Mississippi River-Reno Watershed bacteria and sediment TMDLs in portions of Mower, Fillmore and Houston counties in southeastern Minnesota
Date: March 26, 2020

DECISION DOCUMENT
FOR THE UPPER IOWA RIVER AND MISSISSIPPI RIVER-RENO WATERSHED TMDLS, IN PORTIONS OF MOWER, FILLMORE AND HOUSTON COUNTIES IN SOUTHEASTERN, MINNESOTA

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

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 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.

Comment:

Location Description/Spatial Extent:

The Upper Iowa River watershed (HUC 07060002) and Mississippi River-Reno watershed (HUC 07060001) basins are located in southeastern Minnesota and northeastern Iowa near Minnesota's southern border. The Upper Iowa River and the Mississippi River-Reno Watersheds (UIRMRRW) encompasses approximately 1,195 square miles (764,800 acres) in the Driftless Area (not impacted by the last glaciation) which includes karst areas of southeastern Minnesota. Karst areas can be characterized by soluble bedrock with depressions, sinkholes, springs, underground caves and surface/groundwater connections (Section 3 of the final TMDL document).

The Minnesota Pollution Control Agency (MPCA) developed Total Maximum Daily Load (TMDLs) in the headwaters areas of the Upper Iowa River Watershed (UIRW) and Mississippi River-Reno Watershed (MRRW). All TMDLs in the UIRW and MMRW address water bodies in the State of Minnesota only. Water flows in a southeasterly direction in the UIRMRRW into Iowa and eventually emptying into the Mississippi River.

The UIRW headwater areas are in portions of Fillmore, Houston and Mower counties. Water in the UIRW flows from Fillmore County eastward through Houston and Mower counties. The UIRW in Minnesota covers about 154,000 acres (Table 4 of the final TMDL document, incorporated by reference) and a significant part of the UIRW extends into Iowa but the focus of the TMDLs addressed by the UIRMRRW TMDL project are in subwatersheds on the Minnesota side of the border. MPCA considers the Upper Iowa River as a healthy river as it maintains coldwater fishing uses (i.e., trout), has an exceptional use classification and has been recognized as being eligible for a National Wild and Scenic River classification (Section 3 of the final TMDL document). The MRRW covers about 62.5 square miles (40,000 acres) in the southeast portion of the state. To the south of the MRRW is Iowa and to the east is Wisconsin. Water in the MRRW drains eastward toward the Mississippi River.

The UIRMRRW TMDL submittal includes nine TMDLs for bacteria (*E. coli*) and one TMDL for Total Suspended Solids (TSS) (Table 1 of this Decision Document).

Table 1: Upper Iowa River and Mississippi River-Reno watersheds impaired waters addressed by this TMDL

Water body name	Assessment Unit ID	Use Class	Affected Use	Pollutant or stressor	TMDL
Crooked Creek	07060001-519	2Bg	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Winnebago Creek	07060001-693	2Bg	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Upper Iowa River	07060002-550	2Bg	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Little Iowa River	07060002-548	2Bg	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Upper Iowa River (Little Iowa River to Beaver Creek)	07060002-509	2Bg	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL

Beaver Creek (Mover-Fillmore Rd to Upper Iowa River)	07060002-546	2Bg	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Pine Creek	07060002-512	7*	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Bear Creek	07060002-503	7*	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Bee Creek (Waterloo Creek)	07060002-515	1B, 2Ag	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
				TOTAL bacteria TMDLs	**9**
Winnebago Creek	07060001-693	1B, 2Ag	Aquatic Life	Sediment/TSS	TSS TMDL
				TOTAL TSS TMDLs	**1**

* = Limited Resource Value waters

Land Use:
Pre-settlement land cover was forested woods and hardwoods and several types of prairie. European settlement took place in the mid to late 1800s, and much of the forested acreage was transitioned to agricultural uses. In the MRRW, land use is generally 21-25% cropland, 28-30% grassland/pasture, 42-43% forest, and 1% or less wetlands and open water. In the UIRW, land use is generally 36-84% cropland (Table 5 of the final TMDL document) with developed areas 4-9%, forested areas 2-24% and wetlands and open water at less than 1%.

Problem Identification:
Bacteria TMDLs: Bacteria impaired segments identified in Table 1 of this Decision Document were included on the final 2018 Minnesota 303(d) list due to excessive bacteria. Water quality monitoring within the UIRMRRW 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.

Sediment (Total Suspended Solids) TMDL: The sediment impaired segment identified in Table 1 of this Decision Document (i.e., Winnebago Creek 07060001-693) was included on the final 2018 Minnesota 303(d) list due to excessive sediment within the water column. Water quality monitoring within the MRRW indicated that this segment was not attaining its designated aquatic life use due to high turbidity measurements and the negative impact of those conditions on aquatic life (i.e., fish and macroinvertebrate communities).

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.

Priority Ranking:
MPCA's schedule for TMDL completions, as indicated on the 303(d) impaired waters list, reflects Minnesota's priority ranking of this TMDL. 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, to meet the needs of EPA's national measure (WQ-27) under 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 2022. The waters of the UIRMRRW addressed by this TMDL are part of the MPCA prioritization plan to meet EPA's national measure.

Pollutants of Concern:
The pollutants of concern are bacteria (*E. coli*) and TSS (sediment).

Source Identification (point and nonpoint sources):

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

UIRMRRW 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. MPCA determined that there are several wastewater treatment plants (WWTPs) in the UIRMRRW which contribute bacteria from treated wastewater releases (Table 2 of this Decision Document). MPCA assigned each of these facilities a portion of the bacteria wasteload allocation (WLA).

Table 2: NPDES facilities in the Upper Iowa River and Mississippi River-Reno watersheds which received a WLA

Facility Name	Permit #	Impaired Reach	WLA
Facilities assigned bacteria (*E. coli*) WLA (billions of bacteria/day)			
Caledonia WWTP	MN0020231	07060001-519	2.72
Eitzen WWTP	MN0049531	07060001-693	0.995
LeRoy WWTP	MN0021041	07060002-509	4.351
Harmony WWTP	MN0022322	07060002-512	0.93
Spring Grove WWTP	MN0021440	07060002-503	1.80
Facilities assigned Total Suspended Solids (TSS) WLA (lbs/day)			
Eitzen WWTP	MN0049531	07060001-693	78.00

Municipal Separate Storm Sewer System (MS4) communities: Stormwater from MS4s can transport bacteria to surface water bodies during or shortly after storm events. MPCA determined that there are no MS4 permittees in the UIRMRRW.

Concentrated Animal Feedlot Operations (CAFOs): MPCA recognized eight CAFOs in the UIRW and no CAFOs within the MRRW (Table 12 of the final TMDL document). CAFO facilities must be designed to contain all surface water runoff (i.e., have zero discharge from their facilities), must be designed to contain a 25-year, 24-hour storm event and have a current manure management plan. MPCA explained that these facilities do not discharge effluent and therefore were not assigned a portion of the WLA (WLA = 0).

Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs): MPCA determined that the UIRMRRW does not have CSOs nor SSOs which contribute bacteria to waters of the UIRMRRW.

<u>UIRMRRW sediment (TSS) TMDL:</u>
NPDES permitted facilities: NPDES permitted facilities may contribute sediment loads to surface waters through discharges of wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA determined that there is one facility (i.e., the Eitzen WWTP (MN0049531)) which contributes sediment from treated wastewater releases (Table 2 of this Decision Document). MPCA assigned this facility a sediment WLA.

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 UIRMRRW 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.

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

<u>UIRMRRW bacteria TMDLs:</u>
Non-regulated urban runoff: Runoff from urban areas (i.e., urban, residential, commercial or industrial land uses) can contribute bacteria to local water bodies. Stormwater from urban areas, which drain impervious surfaces, may introduce bacteria (e.g., derived from wildlife or pet droppings) to surface waters.

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 UIRMRRW. 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 UIRMRRW. 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: 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 UIRMRRW. 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.

Application of biosolids: Application of biosolids and sewage sludge could be a source of bacteria but is regulated under Minn. R. Ch. 7401. The application should not result in exceedance of Water Quality Standards (WQS).

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.

UIRMRRW sediment (TSS) TMDL:

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. Unrestricted livestock access to streams and streambank areas may lead to streambank degradation and sediment additions to stream environments.

Stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of sediment which may lead to impairments in the UIRMRRW. 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.

Wetland and Forest Sources: Sediment may be added to surface waters by stormwater flows through wetland or forested areas in the UIRMRRW. Storm events may mobilize decomposing vegetation, organic soil particles through the transport of suspended solids and other organic debris.

Atmospheric deposition: Sediment may be added via particulate deposition. Particles from the atmosphere may fall onto surface waters within the UIRMRRW.

Future Growth:

Section 3.2 of the final TMDL document explains that populations are expected to increase in Fillmore (11%), Mower (22%) and Houston (8%) counties. Section 6 of the final TMDL document states that in the future if any changes affect a new MS4, or change MS4 boundaries, WLA and or load allocation (LA) transfers will be calculated within or out of the MS4. New point sources for bacteria (*E. coli*) and TSS will have to consider new or expanding wastewater treatment, which may affect WLAs in a TMDL and result in a TMDL modification.

The EPA finds that the TMDL document submitted by 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)). 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.

Comment:

Designated Uses:
Water quality standards 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), 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 UIRMRRW TMDLs are designated as Class 1 waters (1B) for domestic consumption (minimal treatment) and Class 2 waters for aquatic recreation use (i.e., fishing, swimming, boating, etc.) and aquatic life use. The Class 2 designated use is described in Minnesota Rule 7050.0140 (3):

> *"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."*

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, 2, and 7 waters. The impaired streams in this report are classified as Class 1B, 2Ag, 2Bg and/or 7 waters (Table 1 of this Decision Document and Table 2 of the final TMDL document).

Class 1B waters are protected for domestic consumption (requiring moderate treatment). Class 2Ag waters are protected for aquatic life and recreation—general cold-water habitat (lakes and streams). Class 2B waters are protected for aquatic life and recreation and Class 2Bg waters are protected for general warm water habitat. Class 7 waters are limited resource value waters and are protected for aesthetic qualities, secondary body contact use, and groundwater for use as a potable water supply.

Standards:

<u>Narrative Criteria:</u>

Minnesota Rule 7050.0221 (Subp. 3 and 4) set forth the following narrative criteria for Class 1B waters of the State:

> *"Class 1B waters - The quality of Class 1B waters of the state shall be such that with approved disinfection, such as simple chlorination or its equivalent, the treated water will meet both the primary (maximum contaminant levels) and secondary drinking water standards issued by the United States Environmental Protection Agency as referenced in subpart 1. The Environmental Protection Agency drinking water standards are adopted and incorporated by reference, except as noted in subpart 1.*
>
> *These standards will ordinarily be restricted to surface and underground waters with a moderately high degree of natural protection and apply to these waters in the untreated state."*

Minnesota Rule 7050.0150 (3) set forth narrative criteria for Class 2 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."*

<u>Numeric criteria:</u>

<u>Bacteria TMDLs:</u> The bacteria water quality standards for Class 2 waters are the most restrictive (Minnesota Rule 7050.0221). The bacteria water quality standards which apply to UIRMRRW TMDLs are:

Table 3: Bacteria Water Quality Standards Applicable in the Upper Iowa River and Mississippi River-Reno watersheds TMDLs

Class	Parameter	Units	Water Quality Standard
2A and 2B	*E. coli* [1]	# / 100 mL	1,260 in < 10% of samples [2]
			Geometric Mean < 126 [3]
7[5]	*E. coli* [4]	# / 100 mL	1,260 in < 10% of samples [2]
			Geometric Mean < 630 [3]

[1] = *E. coli* standards for Class 2A and 2B designated waters apply only between April 1 and October 31

[2] = Standard shall not be exceeded by more than 10% of the samples taken within any calendar month

[3] = Geometric mean based on minimum of 5 samples taken within any calendar month
[4] = *E. coli* standards for Class 7 designated waters apply only between May 1 and October 31
[5] = MPCA used the Iowa geometric mean criteria of less than 126 orgs/100 mL based upon a minimum of 5 samples taken within any calendar month to develop the TMDLs for the applicable waters

Bacteria TMDL Targets: The bacteria TMDL targets employed for the UIRMRRW bacteria TMDLs are the *E. coli* standards as stated in Table 3 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 for the Class 2A and 2B as well as the Class 7 designated waters of the Bear Creek (07060002-503) and Pine Creek (07060002-512) segments. MPCA explained that the Minnesota Class 7 waters of Bear Creek and Pine Creek flow across the Minnesota/Iowa state border and influence water quality in the downstream Iowa segments, Bear Creek in Iowa (01-UIA-255) and Pine Creek in Iowa (01-UIA-278) (Section 2.2 of the final TMDL document). Both downstream Iowa segments are designated by the State of Iowa as Class A1 waters and subject to a geometric mean bacteria water quality standard of 126 orgs/100 mL. MPCA calculated the bacteria TMDLs for the Bear Creek (07060002-503) and Pine Creek (07060002-512) segments to the more restrictive downstream Iowa WQS of 126 orgs/100 mL instead of the Minnesota Class 7 bacteria WQS of 630 orgs/100 mL.

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 UIRMRRW 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.

Sediment (TSS) TMDL: MPCA developed one sediment TMDL for Winnebago Creek (07060001-693) for the UIRMRRW TMDL project. The Class 2A TSS standard of 10 mg/L was used by MPCA to calculate a TSS TMDL for Winnebago Creek. The Class 2A TSS standard may be exceeded no more than 10% of the time and applies from April 1 through September 30 (Table 2 of the final TMDL document).

Sediment (TSS) TMDL Targets: MPCA employed the Class 2A TSS standard of **10 mg/L** for the UIRMRRW sediment TMDL for the Winnebago Creek (07060001-693) segment.

Given the location of the UIRW and the MRRW in the southeastern portion of Minnesota, MPCA considered water quality standards and targets from Iowa (Table 3 of the final TMDL document) during its development of UIRMRRW TMDLs. MPCA reviewed waters which traverse state boundaries and explained that its TMDL process calculates TMDL endpoints, based on Minnesota WQS, at the most downstream endpoint of the impaired reach, which is the state border for those waters which span state boundaries (e.g., waters originating in Minnesota which flow into Iowa). For the Bear Creek (07060002-503) and Pine Creek (07060002-512) bacteria TMDLs, MPCA used the more restrictive downstream Iowa bacteria WQS of 126 orgs/100 mL instead of the Minnesota Class 7 bacteria WQS of 630 orgs/100 mL. MPCA communicated that Minnesota WQS or in the case of the of the Bear Creek and Pine Creek bacteria TMDLs, the Iowa bacteria WQS of 126 orgs/100 mL, are to be achieved at the state border and that waters originating within its boundaries will not cause or contribute to impairments downstream. EPA believes that MPCA's consideration of Iowa WQS was reasonable.

The EPA finds that the TMDL document submitted by 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. 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. 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.

Comment:
UIRMRRW bacteria TMDLs: 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. MPCA believes the geometric mean of the WQS provides the best overall characterization of the status of the watershed. 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." 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. 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 UIRMRRW bacteria TMDLs, 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. 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 UIRMRRW. The UIRMRRW FDCs were developed using flow data from simulated flow data from Hydrologic Simulation Program-Fortran (HSPF) modeling efforts. HSPF simulated daily average flows for the UIRW and MRRW were calibrated and validated with data from United States Geological Survey (USGS) at gaging stations on the Upper Iowa River (USGS gage 05387440) and Crooked Creek (USGS gage 05387030). HSPF hydrologic models were developed to simulate flow characteristics within the UIRMRRW and flow data focused on dates within the recreation season (April 1 to October 31 for Class 2A and 2B waters or May 1 to October 31 for Class 7 waters). 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.[1,2] The output of the HSPF process is a model of multiple hydrologic response units (HRUs), or subwatersheds of the overall UIRMRRW. The modeled flow estimates from these HRUs were calibrated to different USGS gage sites in the UIRMRRW.

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 UIRMRRW 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 UIRMRRW 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 queried from 2008-2017 at impaired reaches in the UIRMRRW 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 15 of the final TMDL document). Individual LDCs are found in Section 5 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

[1] HSPF User's Manual - https://water.usgs.gov/software/HSPF/code/doc/hspfhelp.zip
[2] 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, MPCA believes and 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 UIRMRRW were calculated and those results are found in Table 4 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.

MPCA calculated a loading value attributed to bacteria inputs from contributing subwatershed areas in Iowa (i.e., the boundary condition line item of Table 4 of this Decision Document) for three subwatersheds in the UIRMRRW. These subwatersheds included the impaired segments of; Winnebago Creek (07060001-693), Upper Iowa River (07060002-550) and the Upper Iowa River (07060002-509) segments. MPCA explained that its boundary condition allocation assumed that WQS were being met at the state line between Iowa and Minnesota. Boundary conditions were estimated using the proportion of the total watershed area in Iowa and calculated via the following approach, the percent of the total watershed area in Iowa, multiplied by the loading capacity, minus the MOS minus wastewater WLAs (where applicable) (Section 4.4 of the final TMDL document).

Table 4 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. Table 4 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.

Table 4: Bacteria (*E. coli*) TMDLs for the Upper Iowa River and Mississippi River-Reno Watersheds are located at the end of this Decision Document

Table 4 of this Decision Document presents MPCA's loading reduction estimates for each of the bacteria TMDLs of this project. These loading reductions were calculated from field sampling data collected in the segments addressed by the UIRMRRW TMDLs. MPCA explained that its load reduction estimates are likely more conservative since they are based on a limited water quality data set.

EPA concurs with the data analysis and LDC approach utilized by MPCA in its calculation of loading capacities, wasteload allocations, load allocations and the margin of safety for the UIRMRRW bacteria TMDLs. The methods used for determining the TMDL are consistent with U.S. EPA technical memos.[3]

UIRMRRW sediment (TSS) TMDL: MPCA developed LDCs to calculate a sediment TMDL for the Winnebago Creek (07060001-693) segment. The same LDC development strategy was employed for the sediment and bacteria TMDLs (e.g., the incorporation of HSPF model simulated flows to develop FDCs, water quality monitoring information collected within the Winnebago Creek which informed the LDC, etc.). The FDC were transformed into LDC by multiplying individual flow values by the TSS target (10 mg/L) and then multiplying that value by a conversion factor.

The Winnebago Creek (07060001-693) sediment (TSS) TMDL was calculated and it is presented in Table 5 of this Decision Document. The TSS load allocation was calculated after the determination of the WLA, and the MOS. The TSS load allocation (e.g., stormwater runoff from agricultural land use practices) was not split along individual nonpoint contributors. Instead, the TSS load allocation was combined together into one value to cover all nonpoint source contributions. Table 5 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. Loading capacities were determined for each segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 5 of this Decision Document identifies the loading capacity for each segment at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

[3] 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 5: TSS TMDL for the Upper Iowa River and Mississippi River-Reno watersheds

Allocation	Source	Very High	High	Mid	Low	Very Low
		0 - 10%	10% - 40%	40% - 60%	60% - 90%	90% - 100%
		Sediment (lbs/day)				
TMDL for Winnebago Creek (07060001-693)						
Wasteload Allocation	Construction Stormwater (MNR100001)	1.20	0.44	0.21	0.11	0.047
	Industrial Stormwater (MNR050000)	1.20	0.44	0.21	0.11	0.047
	Eitzen WWTP (MN0049531)	78.00	78.00	78.00	78.00	78.00
	WLA Totals	80.40	78.88	78.42	78.22	78.09
Load Allocation	Watershed Load	6161.00	2282.00	1081.00	567.00	247.00
	LA Totals	6161.00	2282.00	1081.00	567.00	247.00
Boundary Condition at Iowa State Line*		27.00	10.00	4.70	2.50	1.10
Margin Of Safety (10%)		697.00	263.00	129.00	72.00	36.00
Loading Capacity (TMDL)		**6965.40**	**2633.88**	**1293.12**	**719.72**	**362.19**
Estimated Load Reduction (%)		#				

* = The boundary condition allocation is equal to the percent of the total watershed area in Iowa multiplied by the loading capacity minus the MOS minus wastewater WLAs.

= Estimated percent reduction is approximately 77% which is based on the existing 90th percentile concentration (approx. 43 mg/L) minus the TSS standard (10 mg/L) divided by the existing 90th percentile concentration.

Table 5 of this Decision Document presents MPCA's loading reduction estimates for the Winnebago Creek TSS TMDL. The loading reduction estimate was calculated from field sampling data collected in the Winnebago Creek segment and MPCA explained that its load reduction estimates are likely more conservative since they are based on a limited water quality data set.

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

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

4. Load Allocations (LA)

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.

Comment:
MPCA determined the LA calculations for each of the TMDLs based on the applicable WQS. MPCA recognized that LAs for each of the individual TMDLs addressed by the UIRMRRW TMDLs can be attributed to different nonpoint sources.

UIRMRRW bacteria TMDLs: The calculated LA values for the bacteria TMDLs are applicable across all flow conditions in the UIRMRRW (Table 4 of this Decision Document). MPCA identified several nonpoint sources which contribute bacteria loads to the surface waters of the UIRMRRW, including; non-regulated urban stormwater runoff, 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. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations but aggregated the nonpoint sources into one 'watershed load' LA calculation (Table 4 of this Decision Document).

UIRMRRW sediment (TSS) TMDL: The calculated LA values for the sediment (TSS) TMDL for Winnebago Creek are applicable across all flow conditions. MPCA identified several nonpoint sources which contribute sediment loads to the surface waters in the Winnebago Creek subwatershed (Table 5 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. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations but aggregated the nonpoint sources into one 'watershed load' LA calculation (Table 5 of this Decision Document).

EPA finds MPCA's approach for calculating the LA for bacteria and TSS to be reasonable.

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

5. Wasteload Allocations (WLAs)

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

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

Comment:

UIRMRRW bacteria TMDLs: MPCA identified NPDES permitted facilities within the UIRMRRW and assigned those facilities a portion of the WLA (Table 2 and Table 4 of this Decision Document). The WLAs for each of these individual facilities were calculated based on the facility's average wet weather design flow (AWWDF) in millions of gallons per day (MGD) and the *E. coli* WQS (126 orgs /100 mL). For WWTPs with a controlled discharge, the maximum daily discharge volume (i.e., maximum daily pond flow, see Table 15 of the final TMDL document) for that facility was used in place of the AWWDF.

MPCA 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 (a geometric mean of 200 orgs /100 mL) and that if a facility is meeting its fecal coliform limits, which are set in the facility's discharge permit, MPCA assumes the facility is also meeting the calculated *E. coli* WLA from the UIRMRRW TMDLs. The WLA was therefore calculated by MPCA 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.

MPCA acknowledged the presence of CAFOs in the UIRMRRW in Section 3.5 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 MPCA for the UIRMRRW bacteria TMDLs.

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

UIRMRRW sediment (TSS) TMDL: MPCA identified one NPDES permitted facility (Eitzen WWTP (MN0049531)) which contributes to the Winnebago Creek (07060001-693) segment and assigned that facility a WLA (Table 5 of this Decision Document). The WLA was calculated based on the calendar monthly average TSS load limit in the facility's NPDES permit (Table 16 of the final TMDL document) and the calendar monthly average concentration limit of 45 mg/L for TSS. MPCA explained that this concentration limit is higher than the stream WQS (10 mg/L) but due to the infrequency of discharge from the Eitzen WWTP, this facility is not considered to contribute to TSS impairment in Winnebago Creek, and the current TSS permit limits are sufficient to protect water quality in Winnebago Creek (Section 4.8.2.1 of the final TMDL document).

MPCA identified construction and industrial stormwater contributions as necessitating a WLA (Table 5 of this Decision Document). The WLA assigned to construction stormwater was based on the average annual percent area of Houston County that is permitted through a construction stormwater permit multiplied by the loading capacity minus the MOS and wastewater WLA (Section 4.5 of the final TMDL document). Houston County was targeted and not Mower or Fillmore counties because Winnebago Creek is in Houston County. The industrial stormwater WLA was set equal to the construction stormwater WLA in the Winnebago Creek TSS TMDL (Table 5 of this Decision Document). MPCA acknowledged that there are individual industrial stormwater sources in the Winnebago Creek subwatershed, namely quarry operations; Eitzen Quarry and Shultz Quarry (MNG490087) and the Winnebago Quarry Houston County (MNG490115) (Section 4.5 of the final TMDL document). These potential sources of industrial stormwater were addressed via categorical WLA for industrial stormwater.

MPCA explained that it assumed that loads from permitted construction stormwater sites and/or industrial sites that operate in compliance with their permits are meeting their respective WLA. Attaining the construction stormwater and industrial stormwater loads described in the Winnebago Creek TSS TMDL is the responsibility of construction and industrial site managers. For example, local 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 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 (sediment) are defined in MNR100001.

The MPCA is responsible for overseeing industrial stormwater loads which impact water quality to the Winnebago Creek subwatershed in the MRRW. Industrial sites in the Winnebago Creek subwatershed 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). 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 (phosphorus) 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, MPCA has explained that meeting the terms of the applicable permits will be consistent with the WLAs set in the Winnebago Creek TSS TMDL. 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 U.S. EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

EPA finds the MPCA's approach for calculating the WLA for the Winnebago Creek TSS TMDL in the MRRW to be reasonable and consistent with EPA guidance.

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

6. Margin of Safety (MOS)

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

Comment:
The final TMDL submittal outlines the determination of the Margin of Safety for the bacteria and the sediment (TSS) TMDL. All five parameters employed an explicit MOS set at 10% of the loading capacity.

UIRMRRW bacteria and sediment (TSS) TMDLs: The UIRMRRW 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 4 and 5 of this Decision Document). MPCA explained that the explicit MOS was set at 10% due to the following factors discovered during TMDL development for these pollutants:

- Environmental variability in pollutant loading;
- Variability in water quality data (i.e., collected water quality monitoring data, field sampling error, etc.); and
- Calibration and validation processes of LDC modeling efforts, uncertainty in modeling outputs, and conservative assumptions made during the modeling efforts (Section 4.1 of the final TMDL document).

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 UIRMRRW 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. 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 *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.

The EPA finds that the TMDL document submitted by 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)).

Comment:
UIRMRRW 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 (Class 2A and 2B waters) or May 1st to October 31st (Class 7 waters) 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 UIRMRRW 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/April).

UIRMRRW sediment (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 UIRMRRW (Section 4.2 of the final TMDL document). Sediment loading in the UIRMRRW 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 UIRMRRW 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.

The EPA finds that the TMDL document submitted by 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, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

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

Comment:
The UIRMRRW bacteria and sediment (TSS) TMDLs provide reasonable assurance that actions identified in the implementation section of the final TMDL (i.e., Sections 7 and 9 of the final TMDL document), will be applied to attain the loading capacities and allocations calculated for the impaired reaches within the UIRMRRW. The recommendations made by MPCA are expected to 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.

MPCA has identified several local partners which have expressed interest in working to improve water quality within the UIRMRRW. 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 Mower and Fillmore county SWCDs as well as the Root River SWCD) staff, local Minnesota Board of Soil and Water Resources (BWSR) offices, and other local watershed groups, will work together to reduce pollutant inputs to the UIRMRRW. MPCA has authored an Upper Iowa River and Mississippi River-Reno WRAPS document (approved March 2020) and the Root River One Watershed One Plan (1W1P) document which provides information on the development of scientifically-supported restoration and protection strategies for implementation planning and action. MPCA sees the WRAPS and 1W1P documents as a starting point for which MPCA and local partners can develop tools that will help local governments, land owners, 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.

The Root River 1W1P document written by the Fillmore County SWCD in December 2016 was developed to focus on county level water challenges (e.g., reducing priority pollutants (bacteria and sediment among others), septic system improvements, working with local agricultural partners on feedlot maintenance, erosion and runoff minimization, etc.). The 1W1P document is grounded on hydrologic management practices, environmental protection efforts and efficient management practices. The Root River 1W1P and the Upper Iowa River and Mississippi River- Reno WRAPS document demonstrate that at the county level there is great interest in improving water quality and restoring impaired water bodies as well as protecting waters which are threatened with potential further degradation. Between the county level water plans and planning efforts of local county SWCDs, EPA acknowledges that there is significant local interest in preserving and restoring water quality in the UIRMRRW.

Continued water quality monitoring within the basin is supported by MPCA. Additional water quality monitoring results could provide insight into the success or failure of BMP systems designed to reduce bacteria 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 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. 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 UIRMRRW 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).

Various funding mechanisms will be utilized to execute the recommendations made in the implementation section of this TMDL. 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 MPCA, public agencies and private entities should coordinate in their efforts toward improving land use management practices and water management. The CWLA anticipates that all agencies (i.e., MPCA, public agencies, local authorities and private entities, etc.) will cooperate regarding planning and restoration efforts. Cooperative efforts would likely include informal and formal agreements to jointly use technical, educational, and financial resources.

The CWLA also provides details on public and stakeholder participation, and how the funding will be used. In part to attain these goals, the CWLA requires MPCA to develop WRAPS. The WRAPS are required to contain such elements as the identification of impaired waters, watershed modeling outputs, point and nonpoint sources, load reductions, etc. (*Chapter 114D.26*; CWLA). The WRAPS also contain an implementation table of strategies and actions that are capable of achieving the needed load reductions, for both point and nonpoint sources (*Chapter 114D.26*, Subd. 1(8); CWLA). Implementation plans developed for the TMDLs are included in the table, and are considered "priority areas" under the WRAPS process (*Watershed Restoration and Protection Strategy Report Template*, MPCA). This table includes not only needed actions but a timeline for achieving water quality targets, the reductions needed from both point and nonpoint sources, the governmental units responsible, and interim milestones for achieving the actions. MPCA has developed guidance on what is required in the WRAPS (*Watershed Restoration and Protection Strategy Report Template*, MPCA).

The Minnesota BWSR 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 (FY 2014 Clean Water Fund Competitive Grants Request for Proposal (*RFP*); *Minnesota Board of Soil and Water Resources*, 2014).

The EPA finds that this criterion has been adequately addressed.

9. Monitoring Plan to Track TMDL Effectiveness

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

Comment:

The final TMDL document outlines the water monitoring efforts in the UIRMRRW (Section 8 of the final TMDL document). Progress of TMDL implementation will be measured through regular monitoring efforts of water quality and total BMPs completed. MPCA anticipates that implementation monitoring will be conducted by the local BWSR partners such as county water managers and or county

SWCDs in Mower and Fillmore counties as well as the Root River SWCD. Water quality monitoring will be completed by local groups (e.g., the Mower County SWCD, Fillmore County SWCD and/or Root River SWCD) and volunteers, as long as there is sufficient funding to support the efforts of these local entities. At a minimum, the UIRMRRW 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 UIRMRRW. 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 UIRMRRW. 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 UIRMRRW, has been completed by a variety of organizations (i.e., SWCDs) and funded by Clean Water Partnership Grants, and other available local funds. MPCA anticipates that stream monitoring in the UIRMRRW 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.

The EPA finds that this criterion has been adequately addressed.

10. Implementation

EPA policy encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. In addition, EPA policy recognizes that other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.

Comment:
The findings from the UIRMRRW TMDLs will be used to inform the selection of implementation activities as part of the Upper Iowa River and Mississippi River-Reno 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 9 of the final TMDL document. MPCA outlined the importance of prioritizing areas within the UIRMRRW, education and outreach efforts with local partners, and partnering with local stakeholders to improve water quality within the watershed. The UIRMRRW WRAPS document (approved by MPCA on March 12, 2020) includes additional detail regarding specific recommendations from MPCA to aid in the reduction of bacteria and sediment (TSS) to surface waters of the UIRMRRW. The reduction goals for the bacteria and sediment (TSS) TMDLs may be met via components of the following strategies:

UIRMRRW 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 UIRMRRW.

Stormwater wetland treatment systems: Constructed wetlands with the purpose of treating wastewater or stormwater inputs could be explored in selected areas of the UIRMRRW. Constructed wetland systems may be vegetated, open water, or a combination of vegetated and open water. 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 UIRMRRW.

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.

UIRMRRW sediment (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 UIRMRRW. 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 UIRMRRW. 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 UIRMRRW and minimize or eliminate degradation of habitat.

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

11. Public Participation

EPA policy is that there should be full and meaningful public participation in the TMDL development process. The TMDL regulations require that each State/Tribe must subject calculations to establish TMDLs to public review consistent with its own continuing planning process (40 C.F.R. §130.7(c)(1)(ii)). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval should describe the State's/Tribe's public participation process, including a summary of significant comments and the State's/Tribe's responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 C.F.R. §130.7(d)(2)).

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

Comment:
The public participation section of the TMDL submittal is found in Section 10 of the final TMDL document. Throughout the development of the UIRMRRW 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, MPCA worked with county, SWCD staff and township officials from the Mower, Fillmore and Houston counties in the UIRMRRW to promote water quality, to gain input from landowners via surveys and interviews and to better understand the social dynamics of stakeholders in the UIRMRRW. MPCA's goal was to create civic engagement and discussion which would enhance the content of the TMDL and WRAPS documents. A full description of civic engagement activities associated with the TMDL process is available within in the UIRMRRW WRAPS report (Section 3.3 of the final WRAPS document of March 2020).

MPCA posted the draft TMDL online at (http://www.pca.state.mn.us/water/tmdl) during the public comment period which was started on December 30, 2019 and ended on January 29, 2020. MPCA received one (1) public comment from the U.S. EPA during the public comment period. EPA's comment requested that MPCA include greater detail in their final UIRMRRW TMDL related to MPCA's discussion of CAFO and AFO facilities. MPCA responded to EPA's requests by providing additional discussion in the final UIRMRRW TMDL document and revising the final UIRMRRW TMDL where appropriate.

EPA believes that MPCA adequately addressed the comments received during the public notice period. All public comments and MPCA responses to publicly submitted comments were shared with EPA.

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

Comment:

The EPA received the final Upper Iowa River and Mississippi River-Reno watersheds TMDL document, submittal letter and accompanying documentation from MPCA on March 16, 2020. The transmittal letter explicitly stated that the final TMDLs referenced in Table 1 of this Decision Document were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for 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 Upper Iowa River and Mississippi River-Reno watersheds TMDLs by MPCA satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the 9 bacteria TMDLs and the 1 sediment (TSS) TMDL satisfy all elements for approvable TMDLs. This TMDL approval is for **ten 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: Table 4: Bacteria (*E. coli*) TMDLs for the Upper Iowa River and Mississippi River-Reno Watersheds

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Table 4: Bacteria (*E. coli*) TMDLs for the Upper Iowa River and Mississippi River-Reno watersheds

Allocation	Source	Very High	High	Mid	Low	Very Low
		0 - 10%	10% - 40%	40% - 60%	60% - 90%	90% - 100%
		E. coli (billions of bacteria/day)				
TMDL for Crooked Creek (07060001-519)						
Wasteload Allocation	Caledonia WWTP (MN0020231)	2.72	2.72	2.72	2.72	2.72
	WLA Totals	2.72	2.72	2.72	2.72	2.72
Load Allocation	Watershed Load	397.00	152.00	74.00	40.00	20.00
	LA Totals	397.00	152.00	74.00	40.00	20.00
Margin Of Safety (10%)		45.00	17.00	8.50	4.80	2.50
Loading Capacity (TMDL)		**444.72**	**171.72**	**85.22**	**47.52**	**25.22**
Estimated Load Reduction (%)		**90%**				
TMDL for Winnebago Creek (07060001-693)						
Wasteload Allocation	Eitzen WWTP (MN0049531)	0.995	0.995	0.995	0.995	0.995
	WLA Totals	0.995	0.995	0.995	0.995	0.995
Load Allocation	Watershed Load	355.00	134.00	65.00	36.00	18.00
	LA Totals	355.00	134.00	65.00	36.00	18.00
Boundary Condition at Iowa State Line*		1.60	0.59	0.29	0.16	0.078
Margin Of Safety (10%)		40.00	15.00	7.40	4.10	2.10
Loading Capacity (TMDL)		**397.60**	**150.59**	**73.69**	**41.26**	**21.17**
Estimated Load Reduction (%)		**87%**				
TMDL for Upper Iowa River (07060002-550)						
Wasteload Allocation	***WLA Totals***	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed Load	288.00	101.00	50.00	24.00	10.00
	LA Totals	288.00	101.00	50.00	24.00	10.00
Boundary Condition at Iowa State Line*		14.00	4.70	2.30	1.10	0.48
Margin Of Safety (10%)		34.00	12.00	5.80	2.80	1.20
Loading Capacity (TMDL)		**336.00**	**117.70**	**58.10**	**27.90**	**11.68**
Estimated Load Reduction (%)		**87%**				
TMDL for Little Iowa River (07060002-548)						
Wasteload Allocation	***WLA Totals***	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed Load	221.00	77.00	38.00	18.00	8.30
	LA Totals	221.00	77.00	38.00	18.00	8.30
Margin Of Safety (10%)		25.00	8.60	4.20	2.00	0.92

Loading Capacity (TMDL)		**246.00**	**85.60**	**42.20**	**20.00**	**9.22**
Estimated Load Reduction (%)		**69%**				
TMDL for Upper Iowa River (07060002-509)						
Wasteload Allocation	Le Roy WWTP (MN0021041)	4.351	4.351	4.351	4.351	4.351
	WLA Totals	4.351	4.351	4.351	4.351	4.351
Load Allocation	Watershed Load	557.00	192.00	94.00	45.00	18.00
	LA Totals	557.00	192.00	94.00	45.00	18.00
Boundary Condition at Iowa State Line*		254.00	87.00	42.00	20.00	8.20
Margin Of Safety (10%)		91.00	32.00	16.00	7.70	3.40
Loading Capacity (TMDL)		**906.35**	**315.35**	**156.35**	**77.05**	**33.95**
Estimated Load Reduction (%)		**53%**				
TMDL for Beaver Creek (07060002-546)						
Wasteload Allocation	***WLA Totals***	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed Load	126.00	43.00	22.00	11.00	4.50
	LA Totals	126.00	43.00	22.00	11.00	4.50
Margin Of Safety (10%)		14.00	4.80	2.40	1.20	0.50
Loading Capacity (TMDL)		**140.00**	**47.80**	**24.40**	**12.20**	**5.00**
Estimated Load Reduction (%)		**81%**				
TMDL for Pine Creek (07060002-512)						
Wasteload Allocation	Harmony WWTP (MN0022322)	0.93	0.93	0.93	0.93	0.93
	WLA Totals	0.93	0.93	0.93	0.93	0.93
Load Allocation	Watershed Load	83.00	30.00	15.00	7.30	2.80
	LA Totals	83.00	30.00	15.00	7.30	2.80
Margin Of Safety (10%)		9.30	3.40	1.80	0.91	0.42
Loading Capacity (TMDL)		**93.23**	**34.33**	**17.73**	**9.14**	**4.15**
Estimated Load Reduction (%)		**87%**				
TMDL for Bear Creek (07060002-503)						
Wasteload Allocation	Spring Grove WWTP (MN0021440)	1.80	1.80	1.80	1.80	1.80
	WLA Totals	1.80	1.80	1.80	1.80	1.80
Load Allocation	Watershed Load	61.00	22.00	9.90	4.90	1.70
	LA Totals	61.00	22.00	9.90	4.90	1.70
Margin Of Safety (10%)		7.00	2.60	1.30	0.75	0.39
Loading Capacity (TMDL)		**69.80**	**26.40**	**13.00**	**7.45**	**3.89**
Estimated Load Reduction (%)		**92%**				
TMDL for Bee Creek (Waterloo Creek) (07060001-515)						
Wasteload Allocation	***WLA Totals***	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed Load	85.00	29.00	14.00	7.30	3.70

	LA Totals	85.00	29.00	14.00	7.30	3.70
Margin Of Safety (10%)		9.40	3.20	1.50	0.81	0.41
Loading Capacity (TMDL)		**94.40**	**32.20**	**15.50**	**8.11**	**4.11**
Estimated Load Reduction (%)		**97%**				

* = The boundary condition allocation is equal to the percent of the total watershed area in Iowa multiplied by the loading capacity minus the MOS minus wastewater WLAs.