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

JUN 1 1 2019

REPLY TO THE ATTENTION OF
WW-16J

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the final bacteria Total Maximum Daily Loads (TMDL) for the main stem segments on the Minnesota River, including support documentation and follow up information. Contributing areas to the Minnesota River main stem bacteria TMDLs include parts of seventeen counties in southwestern Minnesota. These TMDLs address impaired aquatic recreation due to excessive bacteria.

EPA has determined that the Minnesota River main stem bacteria 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 five bacteria TMDLs. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's 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. David Pfeifer, Acting Chief of the Watersheds and Wetlands Branch, at 312-353-9024.

Sincerely,

Joan M. Tanaka

Joan M. Tanaka
Acting Director, Water Division

wq-iw7-48g

TMDL: Minnesota River (main stem) bacteria TMDLs, in portions of 17 counties in southwestern, Minnesota
Date: June 11, 2019

DECISION DOCUMENT FOR THE MINNESOTA RIVER (MAIN STEM) BACTERIA TMDLS, IN PORTIONS OF 17 COUNTIES IN SOUTHWESTERN, 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 Minnesota River Watershed (MRW) in southwestern Minnesota is a main tributary of the Mississippi River and drains approximately 16,770 square miles (10,732,800 acres). The Minnesota River starts near the Minnesota-South Dakota border and flows generally in a southeastern direction for 335 miles before joining the Mississippi River near St. Paul, Minnesota. The contributing areas addressed by Minnesota River Watershed main stem bacteria (MRWMSB) Total Maximum Daily Loads (TMDLs) occupy portions of seventeen counties including, Big Stone, Blue Earth, Brown, Carver, Chippewa, Cottonwood, Lac Qui Parle, Le Sueur, Nicollet, Redwood, Renville, Scott, Sibley, Stevens, Swift, Watonwan and Yellow Medicine.

The Minnesota River Watershed includes tribal lands for two federally recognized tribes, the Lower Sioux Indian Community and the Upper Sioux Community. MPCA explained that both the Lower and Upper Sioux Communities have lands near the Minnesota River (Blue Earth River to Cherry Creek) (07020007-723) segment but that the impaired segment does not flow through nor is adjacent to tribal lands (p. 9 of the final TMDL document). MPCA states that any potential bacteria loading from tribal lands will be minimal compared to the total bacteria loading calculated for 07020007-723. Therefore, MPCA did not specify any bacteria loading to Lower Sioux tribal lands nor Upper Sioux tribal lands and MPCA did not assign any TMDL loading reductions to tribal lands.

The MRWMSB TMDLs address five segments impaired due to excessive bacteria (Table 1 of this Decision Document) on the main stem of the Minnesota River (Figure 1 of the final TMDL document). On the hydrologic unit code (HUC) eight (HUC-8) scale these five impairments are located within the Minnesota River Headwaters (HUC-8, 07020001), Minnesota River– Yellow Medicine River (HUC-8, 07020004), Minnesota River-Mankato (HUC-8, 07020007), and Lower Minnesota River (HUC-8, 07020012) watersheds.

Table 1: The impaired bacteria (*E. coli*/fecal coliform) waters addressed by the MRWMSB TMDL

Water body name	Assessment Unit ID	Affected Use	Pollutant or stressor	TMDL
Minnesota River (Big Stone Lake to Marsh Lake Dam)	07020001-552	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Minnesota River (Lac qui Parle Dam to Granite Falls Dam)	07020004-747	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Minnesota River (Blue Earth River to Cherry Creek)	07020007-723	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Minnesota River (Cherry Creek to High Island Creek)	07020012-799	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Minnesota River (High Island Creek to Carver Creek)	07020012-800	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
			TOTAL bacteria TMDLs	**5**

Land Use:
Land use in the contributing subwatersheds to the five impaired segments is summarized in Table 2 of this Decision Document. The contributing subwatersheds are predominantly agricultural, approximately 80% of the land use (i.e., corn, soy, other crops and grassland/pasture values combined) and the remaining approximate 20% of land use is split between developed lands, forested lands, wetlands and open water. Significant development is not expected in these subwatershed of the Minnesota River basin. The land use within the watershed is primarily agricultural and is expected to remain agricultural for the foreseeable future.

Table 2: Land Use for the MRWMSB TMDLs based on land use data from U.S. Department of Agriculture (USDA) National Agricultural Statistics Service's Cropland Data Layer (2015)

Reach (AUID)	Developed	Corn	Soy	Other Crops	Grassland/ Pasture	Forest	Wetlands	Open Water	Subwatershed Area
	Percent of Watershed Area								*(square miles)*
Minnesota River, Big Stone Lake to Marsh Lake Dam (07020001-552)	5	22	26	5	25	2	10	5	1,976
Minnesota River, Lac qui Parle Dam to Granite Falls Dam (07020004-747)	5	28	27	5	16	4	10	5	6,375
Minnesota River, Blue Earth River to Cherry Creek (07020007-723)	6	36	31	3	10	3	8	3	15,174
Minnesota River, Cherry Creek to High Island Creek (07020012-799)	6	37	31	3	9	3	8	3	15,823
Minnesota River, High Island Creek to Carver Creek (07020012-800)	6	37	31	3	9	3	8	3	16,559
Averages	**5.6**	**32**	**29**	**3.8**	**13.8**	**3**	**8.8**	**3.8**	**--**

Problem Identification:
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 Minnesota River basin indicated that these segments were not attaining their designated aquatic recreation uses due to exceedances of bacteria criteria. Bacteria exceedances can negatively impact recreational uses (i.e., swimming, wading, boating, fishing) 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.

Priority Ranking:
The water bodies addressed by the MRWMSB TMDLs were given a priority ranking for TMDL development due to: the impairment impacts on public health, the public value of the impaired water resource, the likelihood of completing the TMDL in an expedient manner, the inclusion of a strong base of existing data, the restorability of the water body, the technical capability and the willingness of local partners to assist with the TMDL, and the appropriate sequencing of TMDLs within a watershed or basin. Areas within the Minnesota River basin are popular locations for aquatic recreation. Water quality

degradation has led to efforts to improve the overall water quality within the Minnesota River basin, and to the development of TMDLs for these water bodies. Additionally, MPCA explained that its TMDL development priorities were prioritized to align with its Statewide watershed monitoring approach and its 10-year Watershed Restoration and Protection Strategies (WRAPS) schedule.

Pollutant of Concern:
The pollutant of concern is bacteria.

Source Identification (point and nonpoint sources):

Point Source Identification: The potential point sources to the MRWMSB TMDLs are:

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 twenty-six wastewater treatment plants (WWTP) and three other NPDES permitted facilities which contribute bacteria from treated wastewater releases (Table 3 of this Decision Document) in the subwatersheds contributing to the impaired reaches of the MRWMSB TMDLs. MPCA assigned each of these facilities a portion of the bacteria wasteload allocation (WLA).

Table 3: NPDES facilities which contribute bacteria loading to the segments in the MRWMSB TMDLs

MS4/Facility Name	Permit #	Impaired Reach	WLA
Facilities assigned bacteria (*E. coli*) WLA (billions of bacteria/day)			
Clinton WWTP	MNG580193	07020001-552	3.60
Odessa WWTP	MNG580099		0.93
Ortonville WWTP	MNG580151		17.00
Bellingham WWTP	MNG580152	07020004-747	1.60
ISD 2853 Lac qui Parle Valley High School	MNG580091		1.40
Milan WWTP	MNG580141		2.60
Belview WWTP	MNG580003	07020007-723	4.1
Cleveland WWTP	MNG580009		5.1
Comfrey WWTP	MN0021687		0.036
Delhi WWTP	MN0067008		0.067
Evan WWTP	MNG580202		0.69
Fairfax WWTP	MNG580060		20
Franklin WWTP	MN0021083		0.55
Granite Falls WWTP	MN0021211		3.8
Hanley Falls WWTP	MNG580122		1.2
Hanska WWTP	MN0052663		3.6
Jeffers WWTP	MNG580111		1.6
Lake Crystal WWTP	MN0055981		2.8
Mankato Water Resource Recovery Facility	MN0030171		54
Morgan WWTP	MN0020443		11
Morton WWTP	MN0051292		0.63
New Ulm WWTP	MN0030066		32
Nicollet WWTP	MNG580037		12
Redwood Falls WWTP	MN0020401		6.3

Sacred Heart WWTP	MN0024708		1.1
Saint George District Sewer System	MN0064785		0.033
Saint Peter WWTP	MN0022535		19
Serles WWTP	MNG580080		1.8
MRVPUC WWTP	MN0068195	07020012-799	8.8
MS4 communities which contribute bacteria loading to the segments in the MRWMSB TMDLs			
Montevideo City MS4	MS400261	07020004-747	Varies depending on flow regime
Blue Earth County MS4	MS400276	07020007-723	Varies depending on flow regime
Mankato City MS4	MS400226	07020007-723	
Mankato Township MS4	MS400297		
Minnesota State University - Mankato MS4	MS400279		
MnDOT Outstate District MS4	MS400180		
New Ulm City MS4	MS400228		
North Mankato City MS4	MS400229		
Redwood Falls MS4	MS400236		
Skyline City MS4	MS400292		
South Bend Township MS4	MS400299		
St. Peter City MS4	MS400245		
Le Sueur City MS4	TBD*	07020012-799	
Belle Plaine City MS4	TBD*	07020012-800	
Carver City MS4	MS400077		
Jordan City MS4	TBD*		
Louisville Township MS4	MS400144		

TBD* = MS4 communities which are not currently regulated as MS4s but are anticipated to be permitted as MS4s in the next permit cycle

Municipal Separate Storm Sewer System (MS4) communities: Stormwater from MS4s can transport bacteria to surface water bodies during or shortly after storm events. MPCA identified seventeen MS4 permittees (Table 1 of this Decision Document) which were assigned a portion of the WLA for the MRWMSB TMDLs.

Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs): MPCA determined that the segments addressed in the MRWMSB TMDL do not have CSOs nor SSOs which contribute bacteria to these waters.

Concentrated Animal Feedlot Operations (CAFOs): MPCA recognized the presence of one hundred and twenty-eight (128) CAFOs in the project area (Section 3.4, p. 28 of the final TMDL document). CAFO facilities must be designed to contain all surface water runoff (i.e., have zero discharge from their facilities) 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).

Nonpoint Source Identification: The potential nonpoint sources to the MRWMSB TMDLs are:

Non-regulated urban runoff: Runoff from urban areas (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 (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 Minnesota River basin. 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 Minnesota River basin. 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 surface 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 Minnesota River basin. 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 (ITPH). ITPH systems also include illicit discharges from unsewered communities.

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

Future Growth:
Significant development is not expected in the contributing subwatersheds of the impaired segments of the MRWMSB TMDLs. The land use within the MRWMSB TMDL focus area is primarily agricultural with small cities and towns scattered throughout the watershed. MPCA expects that land use in the contributing subwatersheds of the impaired segments of the MRWMSB TMDLs will remain unchanged for the foreseeable future. The WLA and load allocations (LA) for the MRWMSB TMDLs were calculated for all current and future sources. Any expansion of point or nonpoint sources will need to comply with the respective WLA and LA values calculated in the MRWMSB TMDLs.

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 (WQS) are the fundamental benchmarks by which the quality of surface waters are measured. Within the State of Minnesota, WQS are developed pursuant to the Minnesota Statutes Chapter 115, Sections 03 and 44. Authority to adopt rules, regulations, and standards as are necessary and feasible to protect the environment and health of the citizens of the State is vested with the MPCA. Through adoption of WQS into Minnesota's administrative rules (principally Chapters 7050 and 7052), 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 MRWMSB TMDLs are designated as Class 2 waters for aquatic recreation use (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."*

Standards:

Narrative Criteria: 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."

Numeric criteria:

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

Table 4: Bacteria Water Quality Standards Applicable to the MRWMSB TMDLs

Parameter	Units	Water Quality Standard
E. coli [1]	# of organisms / 100 mL	The geometric mean of a minimum of 5 samples taken within any calendar month may not exceed 126 organisms
		No more than 10% of all samples collected during any calendar month may individually exceed 1,260 organisms

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

Bacteria TMDL Targets: The bacteria TMDL targets employed for the MRWMSB TMDLs are the *E. coli* standards as stated in Table 4 of this Decision Document. The focus of bacteria TMDLs is on the 126 organisms (orgs) per 100 mL (126 orgs/100 mL) portion of the standard (Table 4 of this Decision Document). 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 main stem of the Minnesota River 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.

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:

MPCA used the geometric mean portion (**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 portion 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 MRWMSB 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. The FDCs were developed using daily simulated flows generated from Hydrologic Simulation Program-FORTRAN (HSPF) model runs for the Minnesota River (07020001-552) segment. HSPF hydrologic models were developed to simulate daily flow characteristics within this segment from 1993-2012. The other four segments utilized flow data from local USGS gages and area-weighted that flow data to match the contributing watershed area of that specific segment (Section 3.3 of the final TMDL document). Flow data focused on dates within the recreation season (April 1 to October 31). Daily stream flows were necessary to implement the load duration curve approach.

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

MRWMSB 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 MRWMSB 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.

MPCA queried bacteria water quality data collected between 2006-2015 (Section 3.3 of the final TMDL document). 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, *E. coli* LDC for Minnesota River (07020001-552) of the final TMDL document). Individual LDCs are found in Section 4 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 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 impaired segments of the MRWMSB TMDLs were calculated and those results are found in Table 5 of this Decision Document. The load allocations were calculated after the determination of the WLA, and the Margin of Safety (MOS) (5% 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 into a categorical LA value to cover all nonpoint source contributions.

MPCA calculated a loading value attributed to upstream bacteria contributions (i.e., the boundary condition line item of Table 5 of this Decision Document). Two separate boundary condition calculations were made for the MRWMSB TMDLs, one boundary condition was assigned to upstream approved bacteria TMDLs and the other was assigned to bacteria inputs from contributing subwatershed areas in South Dakota (see p. 38 of the TMDL document). For both instances, MPCA estimated boundary condition contributions on an area basis as the percent of the watershed area that the boundary condition represents multiplied by the loading capacity minus the MOS minus the unallocated load (where applicable) minus wastewater WLAs (see p. 38 of the TMDL document).

MPCA also included calculations for unallocated load as part of their MRWMSB TMDLs (pp. 37-38 of the final TMDL document). Some TMDLs include this unallocated load as part of their LA calculation, but for the MRWMSB TMDLs, MPCA chose to give this load its own line item in the TMDL equation. Unallocated loads were calculated by MPCA for those flow regimes where the geometric mean of the measured water quality data for that flow regime is less than the standard (i.e., the LDC). In Figure 15 of the final TMDL document (p. 43), the blue circles of this figure represent the observed geometric mean load calculated from water quality samples recorded during the flow conditions of that flow regime. If the blue circles are below the LDC, then that flow regime included a unallocated flow calculation (see Table 27 and Figure 15 of the final TMDL document). The unallocated load calculation for an individual flow regime is completed by subtracting the MOS and the geometric mean of measured water quality data (i.e., the existing load of that flow regime) from the loading capacity value for that flow regime

Unallocated loads can be included in TMDL equations as antidegradation provisions which discourage current dischargers from increasing their pollutant loading in that flow regime. The idea being that if the segment/flow regime is estimated to be below the WQS established in the LDC, dischargers to that segment cannot, without due consideration to antidegradation requirements, increase their contributions up to the LDC/WQS.

Table 5 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 5 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 5: Bacteria (*E. coli*) TMDLs for the MRWMSB TMDL

Allocation	Very High	High	Mid	Low	Very Low
	0 - 10	10 - 40	40 - 60	60 - 90	90 - 100
	E. coli (billions of bacteria/day)				
Minnesota River (Big Stone Lake to Marsh Lake Dam) (07020001-552) bacteria TMDL					
WLA: Clinton WWTP (MNG580193)	3.60	3.60	3.60	3.60	3.60
WLA: Odessa WWTP (MNG580099)	0.93	0.93	0.93	0.93	0.93
WLA: Ortonville WWTP (MNG580151)	17.00	17.00	17.00	17.00	17.00
WLA Total	21.53	21.53	21.53	21.53	21.53
Load Allocation (watershed load)	1,667.00	162.00	39.00	26.00	5.60
Boundary Condition - Upstream Approved TMDL Area in MN and SD	1,392.00	135.00	33.00	21.00	4.70
Boundary Condition - SD (area not addressed by SD bacteria TMDLs)	2,921.00	284.00	69.00	45.00	10.00
Unallocated Load	0.00	489.00	146.00	0.00	0.00
Margin Of Safety (5%)	316.00	58.00	16.00	5.90	2.20
Loading Capacity (TMDL)	**6,317.53**	**1,149.53**	**324.53**	**119.43**	**44.03**
Estimated percent reduction - 19%					
Minnesota River (Lac qui Parle Dam to Granite Falls Dam) (07020004-747) bacteria TMDL					
WLA: Bellingham WWTP (MNG580152)	1.60	1.60	1.60	1.60	1.60
WLA: ISD 2853 Lac qui Parle Valley High School (MNG580091)	1.40	1.40	1.40	1.40	1.40
WLA: Milan WWTP (MNG580141)	2.60	2.60	2.60	2.60	2.60
WLA: MS4 - Montevideo City MS4 (MS400261)	4.40	0.39	0.54	0.23	0.03
WLA Total	10.00	5.99	6.14	5.83	5.63
Load Allocation (watershed load)	775.00	69.00	94.00	41.00	4.90
Boundary Condition - Upstream Approved TMDL Area	18,132.00	1,616.00	2,199.00	953.00	131.00
Unallocated Load	0.00	4,230.00	0.00	0.00	0.00
Margin Of Safety (5%)	996.00	312.00	121.00	53.00	7.50
Loading Capacity (TMDL)	**19,913.00**	**6,232.99**	**2,420.14**	**1,052.83**	**149.03**
Estimated percent reduction - 26%					
Minnesota River (Blue Earth River to Cherry Creek) (07020007-723) bacteria TMDL					
WLA: Belview WWTP (MNG580003)	4.10	4.10	4.10	4.10	4.10
WLA: Cleveland WWTP (MNG580009)	5.10	5.10	5.10	5.10	5.10
WLA: Comfrey WWTP (MN0021687)	0.04	0.04	0.04	0.04	0.04
WLA: Delhi WWTP (MN0067008)	0.07	0.07	0.07	0.07	0.07
WLA: Evan WWTP (MNG580202)	0.69	0.69	0.69	0.69	0.69
WLA: Fairfax WWTP (MNG580060)	20.00	20.00	20.00	20.00	20.00
WLA: Franklin WWTP (MN0021083)	0.55	0.55	0.55	0.55	0.55
WLA: Granite Falls WWTP (MN0021211)	3.80	3.80	3.80	3.80	3.80
WLA: Hanley Falls WWTP (MNG580122)	1.20	1.20	1.20	1.20	1.20
WLA: Hanska WWTP (MN0052663)	3.60	3.60	3.60	3.60	3.60
WLA: Jeffers WWTP (MNG580111)	1.60	1.60	1.60	1.60	1.60

WLA: Lake Crystal WWTP (MN0055981)	2.80	2.80	2.80	2.80	2.80
WLA: Mankato Water Resource Recovery Facility (MN0030171)	54.00	54.00	54.00	54.00	54.00
WLA: Morgan WWTP (MN0020443)	11.00	11.00	11.00	11.00	11.00
WLA: Morton WWTP (MN0051292)	0.63	0.63	0.63	0.63	0.63
WLA: New Ulm WWTP (MN0030066)	32.00	32.00	32.00	32.00	32.00
WLA: Nicollet WWTP (MNG580037)	12.00	12.00	12.00	12.00	12.00
WLA: Redwood Falls WWTP (MN0020401)	6.30	6.30	6.30	6.30	6.30
WLA: Sacred Heart WWTP (MN0024708)	1.10	1.10	1.10	1.10	1.10
WLA: Saint George District Sewer System (MN0064785)	0.03	0.03	0.03	0.03	0.03
WLA: Saint Peter WWTP (MN0022535)	19.00	19.00	19.00	19.00	19.00
WLA: Searles WWTP (MNG580080)	1.80	1.80	1.80	1.80	1.80
WLA: MS4 - 11 Communities (see Table 26 of final TMDL)	108.00	21.00	3.60	0.45	1.00
WLA: MS4 - MnDOT Outstate MS4	3.00	0.58	0.10	0.01	0.03
WLA Total	292.41	202.99	185.11	181.87	182.44
Load Allocation (watershed load)	6,461.00	1,267.00	218.00	27.00	63.00
Boundary Condition - Upstream Approved TMDL Area	56,473.00	11,074.00	1,903.00	234.00	550.00
Unallocated Load	0.00	9,854.00	6,194.00	2,600.00	0.00
Margin Of Safety (5%)	3,328.00	1,179.00	447.00	160.00	42.00
Loading Capacity (TMDL)	**66,554.41**	**23,576.99**	**8,947.11**	**3,202.87**	**837.44**
Estimated percent reduction - 38%					
Minnesota River (Cherry Creek to High Island Creek) (07020012-799) bacteria TMDL					
WLA: MRVPUC WWTP (MN0068195)	8.80	8.80	8.80	8.80	8.80
WLA: MS4 - Le Sueur City (MS4 ID TBD)	7.90	1.90	0.15	0.08	0.13
WLA Total	16.70	10.70	8.95	8.88	8.93
Load Allocation (watershed load)	243.00	59.00	5.10	2.10	5.10
Boundary Condition - Upstream Approved TMDL Area	66,387.00	16,287.00	1,243.00	636.00	1,133.00
Unallocated Load	0.00	8,042.00	8,154.00	2,929.00	0.00
Margin Of Safety (5%)	3,508.00	1,284.00	495.00	188.00	60.00
Loading Capacity (TMDL)	**70,154.70**	**25,682.70**	**9,906.05**	**3,763.98**	**1,207.03**
Estimated percent reduction - 45%					
Minnesota River (High Island Creek to Carver Creek) (07020012-800) bacteria TMDL					
WLA: MS4 - 4 Communities (see Table 26 of final TMDL)	4.10	1.70	0.23	0.06	0.02
WLA Total	4.10	1.70	0.23	0.06	0.02
Load Allocation (watershed load)	108.00	45.00	5.80	1.90	1.00
Boundary Condition - Upstream Approved TMDL Area	28,269.00	11,745.00	1,574.00	411.00	131.00
Unallocated Load	41,366.00	13,742.00	8,269.00	3,329.00	1,068.00
Margin Of Safety (5%)	3,671.00	1,344.00	518.00	197.00	63.00
Loading Capacity (TMDL)	**73,418.10**	**26,877.70**	**10,367.03**	**3,938.96**	**1,263.02**
Estimated percent reduction - 60%					

Table 5 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 MRWMSB 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 MRWMSB TMDLs. The methods used for determining the TMDL are consistent with U.S. EPA technical memos.[1]

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 MRWMSB TMDLs can be attributed to different nonpoint sources.

The calculated LA values for the bacteria TMDLs are applicable across all flow conditions in the Minnesota River main stem (Table 5 of this Decision Document). MPCA identified several nonpoint sources which contribute bacteria loads to the surface waters of the Minnesota River basin, including; non-regulated urban stormwater runoff, stormwater from agricultural and feedlot areas, failing septic systems, and wildlife (deer, geese, ducks, raccoons, turkeys and other animals). MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations but aggregated the nonpoint sources into a categorical LA value.

EPA finds MPCA's approach for calculating the LA 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

[1] 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.

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:
MPCA identified NPDES permitted facilities within the contributing subwatersheds to the bacteria impaired segments of the MRWMSB TMDLs and assigned those facilities a portion of the WLA (Table 5 of this Decision Document). The WLAs for each of these individual facilities were calculated based on the facility's average wet weather design flow (for continuous dischargers) or the maximum daily discharge volume (for WWTPs with controlled discharge) (p. 38 of the final TMDL document) and the *E. coli* WQS (126 orgs /100 mL).

MPCA explained that the WLA for each individual NPDES facility was calculated based on the *E. coli* WQS but WWTP permits are regulated for the fecal coliform effluent limits (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 MRWMSB TMDLs. The WLA was therefore calculated using the assumption that the *E. coli* standard of 126 orgs/100 mL provides equivalent protection from illness due to primary contact recreation as the fecal coliform WQS of 200 orgs/100 mL.

MPCA assigned WLAs to MS4 communities with jurisdictional areas (i.e., regulated area) in the contributing subwatershed to the impaired segment. MPCA explained that it estimated the regulated area of all the permitted MS4 communities within contributing subwatershed to an impaired segment. The summation of permitted MS4 community areas was divided by total area of the contributing subwatershed to the impaired segment to calculate a percent coverage of permitted MS4s. This percentage was then multiplied by the loading capacity minus the MOS minus the unallocated load (where applicable) minus the wastewater WLAs.

$$\text{MS4 bacteria WLA} = \%\ \text{MS4 Area} * (\text{TLC} - \text{MOS} - \text{WLA}_{\text{NPDES Facilities}})$$

Where:
% MS4 Area: The ratio of the total MS4 area to the total drainage area for the given AUID.
TLC: Total loading capacity for the individual segment

MOS: Margin of safety calculation (5% of the TLC)
WLA (NPDES Facilities): The total WLA for all permitted industrial and municipal NPDES facilities that discharge into the AUID's drainage area

The MnDOT MS4 WLA was calculated as an individual WLA, and the remaining permitted MS4s were combined into one categorical WLA for each applicable impairment.

MPCA acknowledged the presence of CAFOs in the contributing areas to the segments addressed in the MRWMSB TMDLs in Section 3.4 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) for the MRWMSB TMDLs.

EPA finds the MPCA's approach for calculating the WLA for the MRWMSB TMDLs 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:
Section 4 (pp. 41-42) of the final TMDL submittal outlines the determination of the Margin of Safety. The bacteria TMDLs employed an explicit MOS set at 5% of the loading capacity. MPCA explained that a 5% MOS was appropriate given that the TMDLs were grounded in long-term USGS flow monitoring data or high quality HSPF-simulated daily flow data. USGS flow monitoring data included 16-years of daily flow records and HSPF modeling was calibrated and validated using 3 gaging stations for each HUC-8 subwatersheds. The 5% attributed to the MOS accounts for the uncertainty in flow that results from area-weighting flows from a nearby flow gauge or model reach.

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 MRWMSB 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:
Bacterial loads vary by season, typically reaching higher numbers in the dry summer months when low flows and bacterial growth rates contribute to their abundance and reaching relatively lower values in colder months when bacterial growth rates attenuate and loading events, driven by stormwater runoff events aren't as frequent. Bacterial WQS need to be met between April 1st to October 31st, regardless of the flow condition. The development of the LDCs utilized simulated HSPF flows which were validated and calibrated with USGS flow gage data and daily flow data from USGS gages in the Minnesota River basin. Modeled flow measurements (HSPF) and daily flow data (USGS gage data) 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 subwatersheds of the MRWMSB TMDLs 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).

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

MPCA has identified several local partners which have expressed interest in working to improve water quality within the subwatersheds contributing to the impaired segments of the MRWMSB TMDLs. Implementation practices will be implemented over the next several years. The following groups[2] are expected to work closely with one another to ensure that pollutant reduction efforts via BMPs are being implemented within the Minnesota River basin: the Chippewa River Watershed Project (CRWP), Hawk Creek Watershed Project (HCWP), Greater Blue Earth River Alliance (GBERA), county Soil and Water Conservation Districts (SWCDs), the Minnesota Department of Natural Resources (MDNR), the Minnesota Department of Agriculture (MDA), the Minnesota Department of Health (MDH) and the Minnesota Board of Water and Soil Resources (BWSR).

In Section 6.3 of the final TMDL document, MPCA includes a list of available watershed district, watershed management organization, and county water plans for major counties in the MRWMSB TMDL project focus area. The number of planning documents and existing efforts of local SWCDs (e.g., MPCA provides a snapshot of efforts made and ongoing projects of the Big Stone SWCD on p. 55 of the final TMDL document) demonstrate the commitment of stakeholders to improving water quality and reducing pollutant load to surface waters in Minnesota River basin. While measurable progress may

[2] Minnesota River E. coli Total Maximum Daily Load and Implementation Strategies, May 2019, Table 32, p. 56.

be slow to develop, actions from these groups and other stakeholders in the Minnesota River basin should ultimately result in improvements to water quality for bacteria in the main stem of the Minnesota River.

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 *E. coli* loading into the surface waters of the watershed. Local watershed managers would be able to reflect on the progress of the various pollutant removal strategies and would have the opportunity to change course if observed progress is unsatisfactory.

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

Reasonable assurance that the WLA set forth will be implemented is provided by regulatory actions. According to 40 CFR 122.44(d)(1)(vii)(B), NPDES permit effluent limits must be consistent with assumptions and requirements of all WLAs in an approved TMDL. MPCA's stormwater program and the NPDES permit program are the implementing programs for ensuring WLA are consistent with the TMDL. MPCA oversees all regulated MS4 entities (e.g., Montevideo City) in stormwater management accounting activities. MS4 permits require permittees to implement BMPs to reduce pollutants in stormwater runoff to the Maximum Extent Practicable (MEP).

All regulated MS4 communities are required to satisfy the requirements of the MS4 general permit which requires the permittee to develop a Stormwater Pollution Prevention Plan (SWPPP) which addresses all permit requirements, including the following six minimum control measures:

- Public education and outreach;
- Public participation;
- Illicit Discharge Detection and Elimination (IDDE) Program;
- Construction-site runoff controls;
- Post-construction runoff controls; and
- Pollution prevention and municipal good housekeeping measures.

The MS4 General Permit, which became effective August 1, 2013, requires permittees to develop compliance schedules for any TMDL that received U.S. EPA-approval prior to the effective date of the General Permit. This schedule must identify BMPs that will be implemented over the five-year permit term, timelines for their implementation, an assessment of progress, and a long term strategy for continued progress toward ultimately achieving those WLAs. Because this TMDL will be approved after the effective date of the General Permit, MS4s will not be required to report on WLAs contained in this TMDL until the effective date of the next General Permit.

MPCA requires MS4 applicants to submit their application materials and SWPPP documentation to MPCA for review. Prior to extension of coverage under the general permit, all application materials are placed on 30-day public notice by the MPCA, to ensure adequate opportunity for the public to comment

on each permittee's stormwater management program. Upon extension of coverage by the MPCA, the permittees are to implement the activities described within their SWPPP and submit annual reports to MPCA by June 30 of each year. These reports document the implementation activities which have been completed within the previous year, analyze implementation activities already undertaken, and outline any changes within the SWPPP from the previous year.

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). MPCA has completed WRAPS efforts for the upper subwatersheds of the Minnesota River basin but has yet to develop WRAPS for the middle and lower subwatersheds of the basin. The middle and lower subwatershed WRAPS reports are anticipated to be developed alongside TMDL efforts for these subwatersheds.

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:
Section 7 of the final TMDL document outlines the water monitoring efforts in the Minnesota River basin. Progress of TMDL implementation will be measured through regular monitoring efforts of water quality and total BMPs completed. MPCA anticipates that monitoring will be completed by local groups (e.g., water quality monitoring staff of county SWCDs, or BWSR) as long as there is sufficient funding to support the efforts of these local entities. Subwatersheds in the Minnesota River basin will be monitored at various times 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 MRWMSB TMDL. 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 the main stem of the Minnesota River. 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.

River and stream monitoring in the main stem of the Minnesota River and the tributaries which feed into the main stem, 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 subwatersheds which contribute to the main stem of the Minnesota River should continue in order to build on the current water quality dataset and track changes based on implementation progress.

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 MRWMSB TMDLs will be used to inform the selection of implementation activities in the subwatersheds which are contributing source loading to the impaired segments of this TMDL effort. The final MRWMSB TMDL document outlined implementation strategies in Sections 6 and 8 of the final report. MPCA outlined the importance of point source controls coupled with

reductions in nonpoint source bacteria loading. Permitted sources will be expected to attain or maintain compliance with their respective NPDES permit programs. MPCA anticipates reductions to nonpoint bacteria sources will be assisted by existing watershed management planning (e.g., WRAPS efforts and 1W1P plans), various nonpoint source reduction programs and will largely be carried out via local organizations (e.g., partner organizations affiliated with SWCDs, agricultural groups, etc.). Reduction goals for the bacteria TMDLs may be met via components of the following strategies:

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 Minnesota River basin.

Stormwater wetland treatment systems: Constructed wetlands with the purpose of treating wastewater or stormwater inputs could be explored in selected areas of the Minnesota River basin. 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 Minnesota River basin.

Education and Outreach Efforts: Increased education and outreach efforts to the general public bring greater awareness to the issues surrounding bacteria contamination and strategies to reducing loading and transport of bacteria. Education efforts targeted to the general public are commonly used to provide information on the status of impacted waterways as well as to address pet waste and wildlife issues. Education efforts may emphasize aspects such as cleaning up pet waste or managing the landscape to discourage nuisance congregations of wildlife and waterfowl. Education can also be targeted to municipalities, wastewater system operators, land managers and other groups who play a key role in the management of bacteria sources.

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 9 of the final TMDL document. MPCA explained that in some cases the contributing subwatersheds to the impaired segments of the MRWMSB TMDLs already had already gone through efforts to encourage local participation and understanding of the TMDL process (i.e., public meetings, coordination with SWCDs and other local agencies) and the public notice process via earlier approved *E. coli*/fecal coliform TMDL efforts. Therefore, MPCA chose to communicate MRWMSB TMDL updates via MPCA electronic newsletters and State Register announcements. MPCA sent emailed newsletters to approximately 5,000 recipients in July and August of 2018 (e.g., MPCA's Watershed Connections newsletter, MPCA's Waterfront Bulletin newsletter and MPCA's Agricultural Stewardship: Land Water, Livestock newsletter) announcing the MRWMSB TMDL project.

MPCA posted the draft TMDL online at (https://www.pca.state.mn.us/water/total-maximum-daily-load-tmdl-projects) for a public comment period. The 30-day public comment period was started on February 4, 2019 and ended on March 6, 2019. MPCA received three public comments during the public comment period from the Minnesota Department of Transportation (MnDOT), the Minnesota Agricultural Water Resource Center (MnAWRC) and the Dodge County Concerned Citizens group (DCCC).

MnDOT requested that MPCA explain how the segments covered by the MRWMSB TMDLs were deemed impaired and to provide clarity on how details of the bacteria water quality standard were used in that assessment determination. MnDOT also asked that MPCA recommend implementation strategies for controlling and/or reducing potential bacteria contributions from wildlife and to provide additional explanation on how MPCA calculated the WLAs assigned to MnDOT via the MRWMSB TMDLs. MPCA provided clarifying details to MnDOT which addressed their concerns and comments in a letter date stamped April 30, 2019.

MnAWRC's comments requested that MPCA provide additional discussion related to the source discussion, especially the potential contributions from urban areas and those areas adjacent to the impaired segments of the Minnesota River main stem. MnAWRC also asked MPCA to clarify certain terminology used in the draft TMDL document which MnAWRC felt were unclear. MPCA responded to comments from MnAWRC in a letter date stamped April 30, 2019 and made changes in the final TMDL document where appropriate.

DCCC's comments centered on the source discussion and farming practices described in the draft TMDL report. More specifically, the information regarding CAFOs and AFOs and the practices and requirements of those facilities imposed by the state agencies and county entities. MPCA responded to comments from DCCC in a letter date stamped April 30, 2019 and made changes in the final TMDL document where appropriate.

The Minnesota River watershed includes tribal lands for two federally recognized tribes, the Lower Sioux Indian Community and the Upper Sioux Community. EPA invited representatives of the Lower and Upper Sioux Communities to consult with EPA regarding EPA's review and decision on the MRWMSB TMDLs via a tribal consultation invitation letter (May 17, 2019). In this letter, EPA requested that the Lower Sioux Indian Community communicate with EPA by May 29, 2019 to express its intentions regarding the consultation request. EPA has not received any communication from the Lower Sioux Indian Community nor the Upper Sioux Community to date. It is EPA's understanding that neither tribe wishes to consult with EPA on its final review of the MRWMSB TMDLs, and therefore, EPA completed its final review of the MRWMSB TMDLs without input from the Lower Sioux Indian Community nor the Upper Sioux Community.

EPA believes that MPCA adequately addressed the comments from the three commenters and updated the final TMDL appropriately. MPCA submitted all public comments received during the public notice period and individual responses to those comments in the final TMDL submittal packet received by the EPA on May 14, 2019.

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 Minnesota River main stem bacteria TMDL document, submittal letter and accompanying documentation from MPCA on May 14, 2019. 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 Minnesota River main stem bacteria TMDLs by MPCA satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the 5 bacteria TMDLs satisfy all elements for approvable TMDLs. This TMDL approval is for **five TMDLs**, addressing water bodies for aquatic recreational 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.