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

REPLY TO THE ATTENTION OF:

AUG 18 2015

WW-16J

Rebecca Flood, Assistant Commissioner
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Dear Ms. Flood:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDLs) for five streams in the Mississippi River-Lake Pepin Tributaries watershed, including supporting documentation and follow up information. The Mississippi River-Lake Pepin Tributaries watershed is located in eastern Minnesota in Goodhue and Wabasha Counties. The TMDLs were calculated for *E. coli*. The TMDLs address the impairment of aquatic recreational uses.

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

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

Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Celine Lyman, MPCA
Justin Watkins, MPCA

wq-iw9-15g

TMDL: Lake Pepin Tributary TMDLs, Goodhue and Wabasha Counties, MN
Date:

DECISION DOCUMENT FOR THE MISSISSIPPI RIVER- LAKE PEPIN TRIBUTARY TMDLS, GOODHUE AND WABASHA COUNTIES, MN

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 Waterbody, Pollutant of Concern, Pollutant Sources, and Priority Ranking

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

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

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

(1) the spatial extent of the watershed in which the impaired waterbody is located;
(2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;
(4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and

(5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyll *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comment:

Location Description/Spatial Extent:

The Mississippi River-Lake Pepin (MRLP) watershed is located in Goodhue and Wabasha Counties, Minnesota, just southeast of Minneapolis. The watershed directly drains to Lake Pepin and contains several small, cold-water creeks that are tributaries to Lake Pepin. The watershed drains an area of 205, 747 acres into Lake Pepin. The creeks were placed on the MPCA 303(d) list of impaired waters in 2012 due to exceedences of the *E. coli* criteria. The creeks are located on the west bank of the Mississippi River. Table 1 below lists the waterbodies addressed by this TMDL.

Table 1 Waterbodies Addressed by the MRLP Watershed TMDL

Waterbody	AUID #	Pollutant	Impairment
Hay Creek	07040001-518	*E. coli*	pathogens
Bullard Creek	07040001-526	*E. coli*	pathogens
Gilbert Creek	07040001-530	*E. coli*	pathogens
Miller Creek	07040001-534	*E. coli*	pathogens
Wells Creek	07040001-708	*E. coli*	pathogens

Land Use:

The MRLP watershed is a primarily mixed agricultural watershed, with cropland, pasture and forest the predominant land uses. The overall land use for the MRLP watershed is in Table 2 below. The cities of Red Wing and Lake City are in the watershed. MPCA does not anticipate changes in bacteria loading due to changes in land use within the UMC watershed. MPCA does not expect significant growth in the watershed.

Table 2 Land Use in the UMC Watershed

2006 Land Use	Percent
Agricultural-croplands	36.3
Forest	28.2
Pasture/Rangeland	26.7
Developed	7.2
Open Water	0.5
Other	1.2
Total	100

Problem Identification:

The creeks were added to the 2012 303(d) list for being impaired due to excessive bacteria. MPCA utilized data from sample stations on the creeks to determine that the monthly *E. coli* concentrations in the creek exceeded the *E. coli* criteria. Monthly geometric mean values were exceeded at almost all sites (Table 3.2 of the TMDL). MPCA also analyzed bacteria values in comparison to turbidity values to determine if high flow rain events (which are more likely to have high turbidity values) had higher bacteria counts. The data showed that while *E. coli* counts were somewhat higher during higher turbidity rain events, there were a significant

number of high bacteria counts during low flow, clear-water conditions (Figure 3.4 of the TMDL).

Pollutants:
Bacteria exceedances can negatively impact recreational uses (fishing, swimming, wading, boating, 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.

Priority Ranking:
The MRLP watershed was given priority 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 and 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.

Pollutants of Concern:
The pollutant of concern is *E. coli*.

Source Identification (point and nonpoint sources):
Point Source Identification: The potential point sources for the MRLP bacteria TMDLs are Municipal Separate Storm Sewer System (MS4) communities. There is one regulated MS4 permittees within the watershed (Table 3 of this Decision Document). Stormwater from MS4s can transport bacteria to surface water bodies during or shortly after storm events.

Table 3: Regulated MS4 Permittees in the MRLP watershed

Permittee	NPDES Permit ID	Hay Creek Watershed	Bullard Creek Watershed
Red Wing MS4	MS400235	4.89 square miles (10.2%)	0.37 square miles (2.3%)

There are no NPDES individually permitted wastewater facilities, within the MRLP watershed which discharge bacteria. There are no Combined Sewer Overflows within the watershed. MPCA identified two Concentrated Animal Feedlot Operations (CAFOs) in the watershed, which are subject to the NPDES discharge regulations. By rule, CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota Rule 7020.2003). CAFOs generate manure which may be spread onto fields. Runoff from fields with spread manure from CAFOs can be exacerbated by tile drainage lines, which channelize the stormwater flows and reduce the time available for bacteria to die-off. Tile-lined fields and channelized ditches enable pollutants to move into surface waters. Runoff from manure spread onto fields in accordance with federal and state requirements is unregulated as a nonpoint source, and is included as a portion of the load allocation (LA) for the MRLP watershed TMDLs.

Nonpoint Source Identification: The potential nonpoint sources for the MRLP bacteria TMDLs are:

Non-regulated stormwater runoff: Non-regulated stormwater runoff can add bacteria to the creeks. The sources of bacteria in stormwater include livestock wastes from small farms along the creeks. MPCA performed a survey of the watershed to determine the potential for livestock waste to enter the creeks (Appendix B of the TMDL). This survey indicated that numerous

feedlots are present in the watershed, and many have livestock grazing alongside the creeks. MPCA noted that the manure from these animals is very likely washing off the land surface during rain events, and contributing to the impairment of the creeks.

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 park areas, forest, and rural areas.

Failing septic systems: MPCA noted that failing septic systems, where waste material can pond at the surface and eventually flow into the creek or be washed in during precipitation events, are potential sources of *E. coli*. MPCA contacted the local county health departments, who provided data on septic systems in the watershed. MPCA determined that while there are numerous septic systems in use in the watershed, there is little to correlate the density of systems to the water quality impairments. Based upon this information, MPCA demonstrated that failing septic systems are a possible source for localized impairments, but have limited impact on a watershed scale (Section 3.2 of the TMDL).

Future Growth:
MPCA expects little change in the allocations between point and nonpoint sources. There may be changes in allocations as land is annexed. These changes will be addressed in the MS4 permit, and any changes in allocations will need to comply with the respective WLA and LA values calculated in the MRLP watershed TMDLs.

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

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

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

The TMDL submittal must identify a numeric water quality target(s) – a quantitative value used to measure whether or not the applicable water quality standard is attained. Generally, the pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical (e.g., chromium) contained in the water quality standard. The TMDL expresses the relationship between any necessary reduction of the pollutant of concern and the attainment of the numeric water quality target. Occasionally, the pollutant of concern is different from the pollutant that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorus and the numeric water quality target is expressed as Dissolved Oxygen (DO) criteria). In such cases, the TMDL submittal should explain the linkage between the pollutant of concern and the chosen numeric water quality target.

Comment:

Designated Uses:

Minnesota Rule Chapter 7050 designates uses for waters of the state. The MRLP creeks are all designated as Class 2A water for aquatic life and recreation use (boating, swimming, fishing, etc.). The Class 2 aquatic life and recreation 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."*

Numeric bacteria criteria:

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. The bacteria water quality standards which apply to the MRLP creeks are:

Table 4: Bacteria Water Quality Standards Applicable in the MRLP TMDLs

Parameter	Units	Water Quality Standard
E. coli [1]	# / 100 mL	1,260 in < 10% of samples [2]
		Geometric Mean < 126 [3]

[1] = *E. coli* standards 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

Target:

The target is the standard as stated above, for both the geometric mean portion and the daily maximum portion, which is applicable from April 1st through October 31st. However, the focus of this TMDL is on the "chronic" geometric mean standard of 126 cfu/100ml. MPCA determined that utilizing the 126 cfu/100 mL portion of the water quality standard will result in the greatest bacteria reductions within the MRLP watershed, and that the geometric mean is the more relevant value in determining water quality. MPCA stated that while the TMDL will focus on the geometric mean portion of the water quality standard, both parts of the water quality standard must be met.

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). If the TMDL is 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:
The approach utilized by the MPCA to calculate the loading capacity for the MRLP creeks for bacteria are described in Section 4 of the final TMDL document.

Load Duration Curves for bacteria:
For the MRLP TMDLs, a geometric mean of 126 cfu/100 ml *E. coli* for five samples equally spaced over a 30-day period was used to calculate the loading capacity of the TMDLs. MPCA determined that the geometric mean portion of the WQS provides the best overall characterization of the status of the watershed. The EPA agrees with this assertion, as stated in the preamble of *The Water Quality Standards for Coastal and Great Lakes Recreation Waters Final Rule* (69 FR 67218-67243, November 16, 2004) on page 67224, "...the geometric mean is the more relevant value for ensuring that appropriate actions are taken to protect and improve water quality because it is a more reliable measure, being less subject to random variation, and more directly linked to the underlying studies on which the 1986 bacteria criteria were based."

MPCA stated that while the bacteria TMDLs will focus on the geometric mean portion of the water quality standard (i.e., the chronic WQS of 126 cfu/100mL), attainment of the WQS involves the water body meeting both the chronic (126 cfu/100 mL) and acute (1,260 cfu/100 mL) portions of the water quality standard. 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 MRLP bacteria TMDLs, MPCA used Minnesota's water quality standards for *E. coli* (126 cfu/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.

A flow duration curve (FDC) was created for the five creeks in the watershed (Hay, Bullard, Gilbert, Miller, and Wells creeks) (Appendix A of the TMDL). The FDC was developed from flow data from a sampling site on Wells Creek (H3800602). Daily stream flows were necessary to implement the load duration curve (LDC) approach. Flow data from the recreational season (April 1 to October 31) from 2008 to 2012 were used.

The FDC was transformed into a LDC by multiplying individual flow values by the WQS (126 cfu/100 mL) and then multiplying that value by a conversion factor. The resulting points are plotted onto a load duration curve graph. The LDC graphs for the MRLP 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 LDC used *E. coli* measurements in billions of bacteria per day. The curved line on a LDC graph represents the TMDL for the respective flow conditions observed at that location.

E. coli values from the monitoring site were converted to individual sampling loads by multiplying the sample concentration by the instantaneous flow measurement observed/estimated at the time of sample collection. The individual sampling loads were plotted on the same figure with the LDC (Appendix A of the TMDL).

The LDC plots were subdivided into five flow regimes; high flows (exceeded 0–10% of the time), moist conditions (exceeded 10–40% of the time), mid-range flows (exceeded 40–60% of the time), dry conditions (exceeded 60–90% of the time), and low flows (exceeded 90–100% of the time). LDC plots can be organized to display individual sampling loads and the calculated LDC. Watershed managers can interpret these plots (individual sampling points plotted with 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.

TMDLs for the five creeks were calculated and WLAs were assigned to MS4 communities as appropriate. There is one regulated MS4 permittee within the MRLP watershed (Table 4 of this Decision Document). The MS4 permittee received an individual WLA under the bacteria TMDLs. The load allocation was calculated after the determination of the WLA, and the Margin of Safety (10% of the loading capacity). Other load allocations (ex. non-regulated stormwater runoff , wildlife inputs etc.) were not split amongst individual nonpoint contributors. Instead, load allocations were combined together into a non-MS4 stormwater source. Review of the LDCs indicates that exceedences are occurring under all flow conditions, and therefore control of several source types will be needed. The LDCs demonstrate that reductions ranging from 50%-88% are needed to attain standards.

Tables 5-9 of this Decision Document report 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 load duration curve 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. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Table 5: Hay Creek bacteria TMDL

	Load Duration Curve Zone				
	High	*Moist*	*Mid*	*Dry*	*Low*
WLA	*(billion - organisms per day)*				
Red Wing MS4 (MS400235) 10.2%	9.3	7.3	6.7	5.9	4.8
WLA TOTAL	9.3	7.3	6.7	5.9	4.8
LA					
LA TOTAL	82.5	64.7	59	52.6	42.9
MOS *(explicit 10%)*	10.2	8	7.3	6.5	5.3
TMDL	**102**	**80**	**73**	**65**	**53**

Table 6: Bullard Creek bacteria TMDL

	Load Duration Curve Zone				
	High	*Moist*	*Mid*	*Dry*	*Low*
WLA	*(billion - organisms per day)*				
Red Wing MS4 (MS400235) 2.3%	0.7	0.5	0.4	0.4	0.3
WLA TOTAL	0.7	0.5	0.4	0.4	0.3
LA					
LA TOTAL	29.9	22.9	21.2	18.5	15
MOS *(explicit 10%)*	3.4	2.6	2.4	2.1	1.7
TMDL	**34**	**26**	**24**	**21**	**17**

Table 7: Gilbert Creek bacteria TMDL

	Load Duration Curve Zone				
	High	*Moist*	*Mid*	*Dry*	*Low*
WLA	*(billion - organisms per day)*				
WLA TOTAL	-	-	-	-	-
LA					
LA TOTAL	29.9	22.9	21.2	18.5	15
MOS *(explicit 10%)*	3.4	2.6	2.4	2.1	1.7
TMDL	**53**	**41**	**38**	**33**	**27**

Table 8: Miller Creek bacteria TMDL

	Load Duration Curve Zone				
	High	*Moist*	*Mid*	*Dry*	*Low*
WLA	*(billion - organisms per day)*				
WLA TOTAL	-	-	-	-	-
LA					
LA TOTAL	33.3	26.1	23.4	20.7	17.1
MOS *(explicit 10%)*	3.7	2.9	2.6	2.3	1.9
TMDL	**37**	**29**	**26**	**23**	**19**

Table 9: Wells Creek bacteria TMDL

	Load Duration Curve Zone				
	High	*Moist*	*Mid*	*Dry*	*Low*
WLA	*(billion - organisms per day)*				
WLA TOTAL	-	-	-	-	-
LA					
LA TOTAL	129.6	102.6	93.6	62.8	67.5
MOS *(explicit 10%)*	14.4	11.4	10.4	9.2	7.5
TMDL	**144**	**114**	**104**	**92**	**75**

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 MRLP bacteria 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 the 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.

[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.

§130.2(g)). Where possible, load allocations should be described separately for natural background and nonpoint sources.

Comment:
Load allocations are addressed in Section 4 of the final TMDL document. The *E. coli* LAs for the five creeks are in Tables 5-9 of this Decision Document. Review of the LDCs shows that the exceedences occur under all flow conditions, indicating there are both wet and dry-weather sources contributing to the impairment.

The EPA finds that the TMDL document submitted by the 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:
MPCA determined individual WLAs for the one MS4 permittee in the Hay Creek and Bullard Creek watersheds (Tables 5-9 of this Decision Document). The MS4 WLAs were based upon the land area under the jurisdiction of the MS4 permit as discussed in Section 3.3.1 of the TMDL. There are no CSOs within the MRLP watershed, therefore, CSOs were not given an allocation (WLA = 0). Two CAFOs are located in the watershed and were given a WLA of 0 cfu per 100 mL. CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota Rule 7020.2003). Runoff due to field application of manure is considered a nonpoint source by the EPA and is considered as a load allocation, as long as the field application is in accordance with federal and state requirements. Feedlots that do not require an NPDES permit because they are below the threshold number of animals per operation are included in the load allocation (Section 4.0 of the TMDL).

The EPA finds that the TMDL document submitted by the 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 MRLP bacteria TMDLs incorporated an explicit MOS of 10% of the total loading capacity. The MOS reserved 10% of the loading capacity and allocated the remaining loads to point (WLA) and nonpoint sources (LA) (Tables 5-9 of this Decision Document). The use of the LDC approach minimized variability associated with the development of the bacteria TMDLs because the calculation of the loading capacity was a function of flow multiplied by the target value. The MOS was set at 10% to account for uncertainty due to field sampling error and assumptions made during the TMDL development process.

The MOS for the MRLP 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 cfu/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 enough to meet the WQS of 126 cfu/100 mL. Thus, it is more conservative to apply the State's WQS as the MOS, because this standard must be met at all times under all environmental conditions.

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

7. Seasonal Variation

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

Comment:
Bacterial loads vary by season, typically reaching higher numbers in the dry summer months when low flows and warm water contribute to their abundance, and reaching relatively lower values in colder months when bacterial growth rates attenuate. Bacterial WQS need to be met between April 1st to October 31st, regardless of the flow condition. The development of the LDC utilized flow measurements from local flow gages. These flow measurements were collected over a variety of flow conditions observed during the recreation season. The LDC developed from these flow records represents a range of flow conditions within the MRLP watershed and thereby accounted for seasonal variability over the recreation season. TMDL loads were based on sampling that occurred during the recreational season in 2008-2012.

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

8. Reasonable Assurance

When a TMDL is developed for waters impaired by point sources only, the issuance of a NPDES permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R. 122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with, "the assumptions and requirements of any available wasteload allocation" in an approved TMDL.

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, 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 MRLP TMDLs discuss reasonable assurance activities in Section 5 and 6 of the final TMDL document. MPCA developed a regional TMDL (*Revised Regional Total Maximum Daily Load Evaluation of Fecal Coliform Bacteria Impairments in the Lower Mississippi River Basin*) in 2006. While it does not cover the specific waters covered by the MRLP TMDL, that TMDL project targeted bacteria exceedences across much of southeastern Minnesota, and the implementation plan developed for the regional TMDL outlines numerous actions and activities that are underway in the basin. MPCA noted that the MRLP TMDLs are considered as an addendum (for planning purposes) to the regional TMDL.

MPCA and MS4 communities in the MRLP watershed:

MPCA is responsible for applying federal and state regulations to protect and enhance water quality within the MRLP TMDL study area. MPCA oversees the City of Redwing stormwater management activities, which is a Phase II MS4 permittee. Phase II MS4 NPDES permits require regulated municipalities 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. The MS4 general permit requires the permittee to develop a 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.

A SWPPP is a management plan that describes the MS4 permittee's activities for managing stormwater within their jurisdiction or regulated area. In the event a TMDL study has been completed, approved by EPA prior to the effective date of the general permit, and assigns a wasteload allocation to an MS4 permittee, that permittee must document the WLA in their application and provide an outline of the best management practices to be implemented in the current permit term to address any needed reduction in loading from the MS4.

MPCA requires 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.

Clean Water Legacy Act - The CWLA was passed in Minnesota in 2006 for the purposes of protecting, restoring, and preserving Minnesota water. The CWLA provides the protocols and practices to be followed in order to develop TMDL implementation plans. TMDL implementation plans are expected to be developed within a year of TMDL approval and are required in order for local entities to apply for funding from the State. 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. The implementation plans are required to contain ranges of cost estimates for point and nonpoint source load reductions, as well as monitoring efforts to determine effectiveness.

MPCA has developed guidance on what is required in the implementation plans (Implementation Plan Review Combined Checklist and Comment, MPCA), which includes cost estimates, general timelines for implementation, and interim milestones and measures. The Minnesota Board of Soil and Water Resources administers the Clean Water Fund as well, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (FY '11 Clean Water Fund Competitive Grants Policy; Minnesota Board of Soil and Water Resources, 2011).

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 MRLP watershed (Section 7 of the TMDL). Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation planning efforts for the MRLP watershed. Adaptive implementation is an iterative implementation process that makes progress toward achieving water quality goals while using any new data and information to reduce uncertainty and adjust implementation activities. This process involves the review of annual progress made toward key milestones and the potential revision of implementation activities to meet the TMDL target loads. By using the adaptive implementation approach, the MPCA can utilize the new information available from water quality monitoring activities following initial TMDL implementation efforts to appropriately target the next suite of implementation activities.

Follow-up monitoring is integral to the adaptive implementation approach. Monitoring addresses uncertainty in the efficacy of implementation actions and can provide assurance that implementation measures are succeeding in attaining water quality standards, as well as inform the ongoing TMDL implementation strategy. To assess progress toward meeting the bacteria TMDL targets, MPCA noted that the watershed is scheduled for an Intensive Watershed Monitoring (IWM) project in 2018. Discussion of the previous IWM effort is in *the Mississippi River Lake Pepin Watershed Monitoring and Assessment Report* (MPCA, 2012)

Within the MRLP watershed, the Minnesota Agricultural Water Resources Center (MAWRC) is sponsoring an edge of field monitoring site known as a Discovery Farm. The edge of field site monitors surface runoff of a 6 acre drainage, 24 hours a day, year round. The monitoring station records field measurements such as soil temps, rainfall, surface runoff volume, temperature etc. Water samples are also collected from the station during rain events to evaluate water chemistry. Total Suspended Solids, Phosphorous and Nitrogen are all assessed and quantified on a water year cycle. Swine manure is used to fertilize the fields, and the State expects that efforts to

reduce runoff will also reduce bacteria loads. The Goodhue Soil and Water District has partnered with MAWRC to help maintain the monitoring site and collect runoff samples (MRLP WRAPS Report, March 2015).

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:
Implementation strategies are outlined in Section 6 of the final TMDL document. The MPCA presented a variety of possible implementation activities which could be undertaken within the MRLP watershed.

Urban/residential stormwater reduction strategies: The land use in the MRLP watershed is composed of mainly agricultural areas with limited levels of impervious cover (ex. roads, sidewalks, roofs etc.). MPCA believes that reducing bacteria sources near the creeks will improve water quality. MPCA noted that controlling MS4 loads will have limited impacts on water quality.

Bacteria are a unique pollutant since they are living organisms. There are many challenges for quantifying them and estimating loads and, likewise, there are challenges with respect to reducing excess loads. With our current understanding the best approaches for addressing excess bacteria loads appear to fall into categories of source reduction or volume control practices. These practices include, but are not limited to:

- Pet waste management and disposal ordinances
    - Education
    - Disposal options
    - Enforcement
- Illicit discharge ordinances
    - Banning non-stormwater discharges from storm sewer systems
    - Enforcement
- Illicit discharge detection and elimination program enhancement
    - Incorporate into existing BMP inspection program
    - Municipal staff trained to recognize illicit discharges
    - Reporting system for staff and public

Pasture and Manure Management BMPs: Controlling bacterial sources, especially manure from small farms in the watersheds, was identified as a significant implementation activity by MPCA. Livestock exclusion from streams, alternate watering facilities, adoption of rotational grazing, and manure management are expected to reduce bacteria loads entering the creek.

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 runoff before the runoff enters into the creeks.

Public Education Efforts: Public programs will be developed to provide guidance to the general public on bacteria reduction efforts and their impact on water quality. These educational efforts could also be used to inform the general public on what they can do to protect the overall health of the MRLP creeks.

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 8 of the TMDL document. Throughout the development of the MRLP watershed TMDL the public was given various opportunities to participate in the TMDL process. The MPCA encouraged public participation through public meetings and small group discussions with stakeholders within the watershed.

The MPCA held meetings with representatives from Goodhue and Wabasha Counties, the city of Red Wing, Lake City, and local watershed groups. The goal of these meetings was to discuss the TMDL, examine MS4 requirements, and look ahead to further watershed planning. In addition, these meetings were to follow up on ongoing efforts from the regional bacteria TMDL approved in 2006.

The draft TMDL was posted online by the MPCA at (http://www.pca.state.mn.us/water/tmdl). The 30-day public comment period began on August 11, 2014 and ended on September 10, 2014. The MPCA received two public comments and adequately addressed these comments. Comments were submitted by Trout Unlimited and Midwest Center for Environmental Advocacy (MCEA).

The comments from Trout Unlimited focused on the designated use for Hay Creek, and requested increased compliance with shoreline setback requirements and setbacks from sinkhole features. MPCA responded that while Hay Creek is not formally designated as a trout stream, it is proposed for a use change to protect the coldwater fishery. MPCA explained that the designation as a trout stream did not impact the assessment or TMDL process; MPCA recognizes the sensitivity of the stream to water quality and temperature changes. MPCA also noted that the shoreline setbacks are discussed in the implementation section of the TMDL, and are a key strategy in protecting the creeks. MPCA explained that the effectiveness of setbacks in karst areas is beyond the scope of the TMDL efforts, but that Minn. R. 7020.2225 explains how karst features are to be accounted for in manure and fertilizer applications in sensitive areas. EPA believes that MPCA adequately addressed each of these comments and updated the final TMDL with appropriate language to address these comments.

The comments from the MCEA focused on the Watershed Restoration and Protection Strategy (WRAPS), which are State plans designed to monitor, assess, plan, and restore on a watershed scale. MCEA's comments focused on improvements in identifying threatened waters, identifying nonpoint sources of pollution to better develop current loads and controls, improving water quality monitoring, and setting timelines for completion of restoration and protection actions.

MPCA responded that the monitoring strategy is not designed to monitor every waterbody in a watershed. The strategy is designed to identify upstream conditions using downstream sampling efforts, and that the sampling results do not indicate which waters that are currently meeting standards will not meet standards before the next listing cycle. MPCA also noted that considerable work has gone into identifying local sources of nonpoint source pollutant loads. These local actions are part of the supporting documents for the WRAPS, and are not directly part of the TMDL. EPA agrees that the comments focus on the WRAPS process, and are more appropriately addressed by the State.

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

12. Submittal Letter

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

Comment:
The EPA received the final MRLP TMDL document, submittal letter and accompanying documentation from the MPCA on April 12, 2015. The transmittal letter explicitly stated that the final MRLP TMDLs for bacteria 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 MRLP watershed by the MPCA satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the TMDLs for the MRLP watershed for *E. coli* satisfy all of the elements of approvable TMDLs. This approval is for 5 TMDLs, addressing 5 creeks for aquatic recreational use impairments due to bacteria (Table 1 of this Decision Document).

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