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

REPLY TO ATTENTION OF

WW-16J

July 9, 2020

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency completed its review of the final Total Maximum Daily Loads (TMDL) for segments within the Winnebago River Watershed (WRW), including supporting documentation. The WRW encompasses parts of Faribault and Freeborn counties in southern Minnesota. The WRW TMDLs address impaired aquatic recreation due to excessive nutrients and bacteria and impaired aquatic life use due to excessive nutrients.

The WRW 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 one bacteria TMDL and three phosphorus TMDLs. EPA describes Minnesota's compliance with the statutory and regulatory requirements in the enclosed decision document.

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

Sincerely,

Tera L. Fong

Digitally signed by Tera L. Fong
Date: 2020.07.09 16:08:12 -05'00'

Tera L. Fong
Division Director, Water Division

wq-iw9-25g

TMDL: Winnebago River Watershed bacteria and nutrient TMDLs in portions of Faribault and Freeborn counties in southern Minnesota
Date: July 9, 2020

**DECISION DOCUMENT
FOR THE WINNEBAGO RIVER WATERSHED TMDLS, IN PORTIONS OF FARIBAULT AND FREEBORN COUNTIES IN SOUTHERN, 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 Winnebago River Watershed (WRW) (HUC-8, 07080202) in southern Minnesota and northern Iowa drains approximately 688 square miles (440,320 acres). The WRW headwaters are in Minnesota and water generally flows in a southern direction into Iowa where approximately 90% of the total WRW area lies. The Minnesota portion of the WRW is 71 square miles in area (45,649 acres) which is approximately 10% of the total watershed and lies in Faribault and Freeborn counties. Lime Creek, which spans both Minnesota and Iowa, is a headwater tributary of the Cedar River in Iowa.

The Minnesota Pollution Control Agency (MPCA) developed Total Maximum Daily Load (TMDLs) for two impaired stream segments and two impaired lakes in the headwater areas of the WRW. The WRW TMDLs address one (1) segment impaired due to excessive bacteria, two (2) impaired lakes due to excessive nutrients and one impaired stream segment due to excessive nutrient inputs (Table 1 of this Decision Document). TMDLs in this project address impaired segments in the State of Minnesota only.

Table 1: Winnebago River Watershed impaired waters addressed by this TMDL

Water body name	Assessment Unit ID	Affected Use	Pollutant or stressor	TMDL
Bear Lake	24-0028-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	Nutrient - Lake TMDL
State Line Lake	24-0030-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	Nutrient - Lake TMDL
Lime Creek	07080203-501	Aquatic Life	Excess Nutrients (total phosphorus)	Nutrient - stream TMDL
			TOTAL nutrient TMDLs	**3**
Lime Creek	07080203-501	Aquatic Recreation	Bacteria (*E. coli*)	Bacteria
			TOTAL bacteria TMDLs	**1**

Land Use:

Land use in the WRW is mostly agricultural land (i.e., cultivated crop lands) with a mix of developed land, grassland, wetlands, forested land and open water (Table 2 of this Decision Document).

Table 2: Land Use in the Winnebago River Watershed based on the National Land Cover Dataset (NLCD - 2011)

Land Use	Open Water	Developed	Forest	Grassland	Pasture/Hay	Cultivated Crops	Wetlands	Total
Subwatershed	**Percentage of Total Drainage Area Land Cover**							
Lime Creek (07080203-501)	4%	6%	1%	3%	2%	81%	3%	**100%**
Bear Lake (24-0028-00)	4%	6%	1%	2%	3%	80%	4%	**100%**
State Line Lake (24-0030-00)	17%	9%	2%	5%	3%	56%	8%	**100%**
Watershed	3%	6%	1%	3%	2%	82%	3%	**100%**

Problem Identification:

Bacteria TMDLs: The bacteria impairment for the Lime Creek (07080203-501) segment identified in Table 1 of this Decision Document was included on the final 2018 Minnesota 303(d) list due to excessive bacteria. Water quality monitoring within the WRW indicated that this segment was not attaining its designated aquatic recreation use due to exceedances of the bacteria criteria. Excessive bacteria can negatively impact recreational uses (e.g., swimming, wading, boating, fishing etc.) and public health. At elevated levels, bacteria may cause illness within humans who have contact with or ingest bacteria laden water. Recreation-based contact can lead to ear, nose, and throat infections, and stomach illness.

Phosphorus lake and stream TMDLs : The nutrient impairments for Bear Lake (24-0028-00), State Line Lake (24-0030-00) and Lime Creek (07080203-501) identified in Table 1 of this Decision Document were included on the final 2018 Minnesota 303(d) list due to excessive nutrients (phosphorus). For the lake segments, total phosphorus (TP), chlorophyll-*a* (chl-*a*) and Secchi depth (SD) measurements in the WRW indicated that these waters were not attaining their designated aquatic recreation uses due to exceedances of nutrient criteria. For the stream segment, TP and at least one response variable (e.g., chl-*a* (sestonic), dissolved oxygen flux (DO_{FLUX}), 5-day biochemical oxygen demand (BOD_5) and pH) demonstrated exceedances of river eutrophication water quality standards. Water quality monitoring was completed at select locations in the WRW and that data formed the foundation for TP TMDL modeling efforts.

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

Priority Ranking:

MPCA's schedule for TMDL completions, as indicated on the 303(d) impaired waters list, reflects Minnesota's priority ranking of this TMDL. MPCA has aligned TMDL priorities with the watershed approach and Watershed Restoration and Protection Strategy (WRAPS) cycle. The schedule for TMDL completion corresponds to the WRAPS report completion on the 10-year cycle. Mainstem river TMDLs, which are not contained in major watersheds and thus not addressed in WRAPS, must also be completed. The MPCA developed a state plan, Minnesota's TMDL Priority Framework Report, to meet the needs of EPA's national measure (WQ-27) under EPA's Long-Term Vision for Assessment, Restoration and Protection under the CWA section 303(d) program. As part of these efforts, the MPCA identified water quality-impaired segments that will be addressed by TMDLs by 2022. The waters of the WRW addressed by this TMDL are part of the MPCA prioritization plan to meet EPA's national measure.

Pollutants of Concern:
The pollutants of concern are bacteria and TP (nutrients).

Source Identification (point and nonpoint sources):

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

WRW bacteria TMDL:
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 is one wastewater treatment facility/plant (WWTF or WWTP) in the WRW which contributes bacteria from treated wastewater releases. This facility is the Emmons WWTP (MN0023311) and MPCA assigned the Emmons WWTP a portion of the bacteria wasteload allocation (WLA) for the Lime Creek bacteria TMDL.

Municipal Separate Storm Sewer System (MS4) communities: Stormwater from MS4s can transport bacteria to surface water bodies during or shortly after storm events. MPCA did not identify any MS4 contributors for the WRW bacteria TMDL, therefore the WLA = 0.

Concentrated Animal Feedlot Operations (CAFOs): MPCA recognized the presence of CAFOs in the WRW (Section 3.6.1.4 and Table 3-12 of the final TMDL document). CAFO facilities must be designed to contain all surface water runoff (i.e., have zero discharge from their facilities) and have a current manure management plan. MPCA explained that these facilities do not discharge effluent and therefore were not assigned a portion of the WLA (WLA = 0).

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

WRW phosphorus TMDLs:
NPDES permitted facilities: NPDES permitted facilities may contribute phosphorus loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA determined that there are two wastewater treatment facilities/plants in the WRW which contribute phosphorus from treated wastewater releases. They are the Emmons WWTP (MN0023311) and the Conger WWTF (MN0068519). MPCA assigned a portion of the phosphorus WLA to the Conger WWTF for the Bear Lake nutrient TMDL and to the Emmons WWTP for the Lime Creek nutrient TMDL.

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

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

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

Stormwater from agricultural land use practices and feedlots near surface waters: Animal Feeding Operations (AFOs) in close proximity to surface waters can be a source of bacteria to water bodies in the WRW. 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 WRW. Feedlots generate manure which may be spread onto fields. Runoff from fields with spread manure can be exacerbated by tile drainage lines, which channelize the stormwater flows and reduce the time available for bacteria to die-off.

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

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

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

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

WRW phosphorus TMDLs:

Internal loading: The release of phosphorus from lake sediments, the release of phosphorus from lake sediments via physical disturbance from benthic fish (i.e., rough fish (e.g., carp)), the release of phosphorus from wind mixing the water column, and the release of phosphorus from decaying curly-leaf pondweed, may all contribute internal phosphorus loading to the lakes of the WRW. Phosphorus may build up in the bottom waters of the lake and may be resuspended or mixed into the water column when the thermocline decreases, and the lake water mixes.

Urban/residential sources: Nutrients, organic material and organic-rich sediment may be added via runoff from urban/developed areas near the impaired lakes in the WRW. Runoff from urban/developed areas can include phosphorus derived from fertilizers, leaf and grass litter, pet wastes, and other sources of anthropogenic derived nutrients.

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

Unrestricted livestock access to streams: Livestock with access to stream environments may add nutrients 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 nutrient concentrations and may contribute to downstream impairments. Smaller animal facilities may add nutrients to surface waters via wastewater from these facilities or stormwater runoff from near-stream pastures.

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

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

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

Wetland and Forest Sources: Phosphorus, organic material and organic-rich sediment may be added to surface waters by stormwater flows through wetland and forested areas in the WRW. Storm events may mobilize phosphorus through the transport of suspended solids and other organic debris.

Wildlife: Wildlife is a known source of nutrients 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 nutrients via contaminated runoff from animal habitats, such as urban park areas, forest, and rural areas.

Future Growth:
MPCA does not anticipate there to be imminent growth in the WRW. MPCA explained in Section 5 of the final TMDL document that most of the agricultural areas in the WRW are unlikely to be changing in the near future. The WLA and load allocations (LA) for the WRW 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 WRW 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 WRW TMDLs are designated as Class 2 waters for aquatic recreation use (e.g., fishing, swimming, boating, etc.) and aquatic life use (phosphorus). 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 TMDL: The bacteria water quality standards which apply to WRW TMDLs are:

Table 3: Bacteria Water Quality Standards Applicable to the WRW 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 WRW bacteria TMDLs are the *E. coli* standards as stated in Table 3 of this Decision Document. The focus of this TMDL is on the 126 organisms (orgs) per 100 mL (126 orgs/100 mL) portion of the standard. 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 WRW 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.

Since the WRW covers lands in both Minnesota and Iowa, MPCA considered Iowa's bacteria water quality standards and targets in the development of the bacteria TMDL for Lime Creek. Iowa's bacteria (*E. coli*) water quality standard for primary contact recreation (Class A1 waters in Iowa) is 126 orgs/100 mL as a geometric mean and 235 orgs/100 mL as a single sample maximum applicable to all samples collected between March 15 and November 15. Minnesota and Iowa share the same bacteria water quality standard value for the geometric mean of *E. coli* but Iowa's bacteria (*E. coli*) single sample maximum criteria (235 orgs/100 mL) is more restrictive than Minnesota's single sample maximum (1,260 orgs/100 mL) (Table 3 of this Decision Document and Section 2.2.4 of the final TMDL document). However, as noted in Section 3 of this Decision Document, MPCA used the 126 orgs/100 mL geometric mean portion of the WQS to develop the TMDL loadings, so the TMDL will be consistent with downstream WQS.

The downstream segment of Lime Creek on the Iowa side of the border is named the Winnebago River (IA 02-WIN-831) and this Iowa segment had a bacteria TMDL completed as part of the Cedar River Watershed *E. coli* TMDL (2010). MPCA believes that the ongoing implementation activities in the Iowa Cedar River Watershed *E. coli* TMDL, which includes the Winnebago River, and future implementation efforts to address the bacteria impairment for Lime Creek on the Minnesota side of the border are complimentary and that implementation efforts in Minnesota will be protective of primary contact recreation for downstream reaches in Iowa (Section 2.2.4 of the final TMDL document).

Phosphorus TMDLs (lakes impaired due to excessive nutrients): Numeric criteria for TP, chlorophyll-*a*, and Secchi Disk depth are set forth in Minnesota Rules 7050.0222. These three parameters form the MPCA eutrophication standard that must be achieved to attain the aquatic recreation designated use. The numeric eutrophication standards which are applicable to the WRW lake TMDLs are found in Table 4 of this Decision Document.

Table 4: Minnesota Eutrophication Standards for shallow lakes within the Western Corn Belt Plains (WCBP) and Northern Glaciated Plains (NGP) ecoregions

Parameter	WCBP & NGP Eutrophication Standard (shallow lakes)[1]
Total Phosphorus (µg/L)	TP < 90
Chlorophyll-a (µg/L)	chl-a < 30
Secchi Depth (m)	SD > 0.7

[1] = Shallow lakes are defined as lakes with a maximum depth less than 15-feet, or with more than 80% of the lake area shallow enough to support emergent and submerged rooted aquatic plants (littoral zone).

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

Nutrient TMDL Targets (for lakes impaired due to excessive nutrients): MPCA selected a TP target of 90 µg/L for Bear Lake and State Line Lake. MPCA selected TP as the appropriate target parameter to address eutrophication problems because of the interrelationships between TP and chl-*a*, and TP and SD depth. Algal abundance is measured by chl-*a*, which is a pigment found in algal cells. As more phosphorus becomes available, algae growth can increase. Increased algae in the water column will decrease water clarity that is measured by SD depth. EPA finds the nutrient targets employed for the WRW TP TMDLs to be reasonable.

Phosphorus TMDL (streams impaired due to excessive nutrients): The total phosphorus and response variable (i.e., chl-*a* (sestonic), DO_{FLUX}, BOD_5 and pH) values in Table 5 are the EPA approved water quality standards for the South River Nutrient Region. These standards apply June 1 to September 30.

Table 5: River Eutrophication Water Quality Standards Applicable in the Winnebago River Watershed TMDL

Parameter	Units	Water Quality Standard
TP	µg/L	≤ 150
chl-*a* (sestonic chl-*a*)	µg/L	≤ 35
DO_{FLUX}	mg/L	≤ 4.5
BOD_5	mg/L	≤ 3.0
pH	pH units	6.5 ≤ [ ] ≤ 9.0

Nutrient TMDL Targets (streams impaired due to excessive nutrients): MPCA employed the TP target of **150 µg/L** for the Lime Creek segment. MPCA assumed that if the causal variable (TP) meets its target (i.e., 150 µg/L) then it is reasonable to presume that the response variables (i.e., chl-*a* (sestonic), DO_{FLUX}, BOD_5 and pH) will also meet their targeted values.

Lime Creek, known as the Winnebago River on the Iowa side of the border, is recognized as impaired for aquatic life by Iowa Department of Natural Resources (IA-DNR). Iowa has not developed a TMDL to address this impairment nor does Iowa have a nutrient criteria for TP. MPCA explained that implementation activities in response to the stream phosphorus TMDL for Lime Creek in Minnesota are expected to improve water quality within the Lime Creek segment on the Minnesota side of the border.

TMDLs are being calculated to Minnesota state WQS and the MPCA's TMDL process calculates TMDL endpoints to attain WQS at the most downstream endpoint of the impaired reach. For a segment which crosses a state border, this downstream endpoint is typically the state border. MPCA assumes that compliance with their cross-border segments means that Minnesota WQS will be met at the Minnesota-Iowa state border, and that water originating within Minnesota will not cause or contribute to impairments downstream (Section 1.2 of the final TMDL document). EPA believes that MPCA's consideration of Iowa water quality standards was reasonable.

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

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

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

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

A flow duration curve (FDC) was created for the Lime Creek segment using flow data from Hydrologic Simulation Program-Fortran (HSPF) modeling efforts. MPCA used HSPF daily modeled flows from 1996 to 2012 to simulate flow characteristics within the Lime Creek subwatershed. Modeled flow data focused on dates within the recreation season (April 1 to October 31). Daily stream flows were necessary to implement the load duration curve approach.

HSPF is a comprehensive modeling package used to simulate watershed hydrology and water quality on a basin scale. The package includes both an Agricultural Runoff Model and a more general nonpoint source model. HSPF parametrizes numerous hydrologic and hydrodynamic processes to determine flow rate, sediment, and nutrient loads. HSPF uses continuous meteorological records to create hydrographs and to estimate time series pollution concentrations.[1] The output of the HSPF process is a model of multiple hydrologic response units (HRUs), or subwatersheds of the overall WRW.

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. The LDC graph for the Lime Creek bacteria TMDL, has 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 bacteria 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.

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.

[1] HSPF User's Manual - https://water.usgs.gov/software/HSPF/code/doc/hspfhelp.zip; EPA TMDL Models Webpage - https://www.epa.gov/exposure-assessment-models/tmdl-models-and-tools

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.

The Lime Creek bacteria TMDL results are found in Table 6 of this Decision Document. The load allocations were calculated after the determination of the WLA, and the Margin of Safety (MOS) (10% of the loading capacity). Load allocations (e.g., stormwater runoff from agricultural land use practices and feedlots, SSTS, wildlife inputs etc.) were not split among individual nonpoint contributors. Instead, load allocations were combined together into a categorical LA ('Watershed Load') to cover all nonpoint source contributions.

Table 6 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 6 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 6: Bacteria (*E. coli*) TMDL for Lime Creek in the Winnebago River Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		E. coli (billions of bacteria/day)				
TMDL for Lime Creek (07080203-501)						
Wasteload Allocation	WLA - Emmons WWTP (MN0023311)	1.00	1.00	1.00	1.00	1.00
	WLA Totals	1.00	1.00	1.00	1.00	1.00
Load Allocation	Watershed Runoff contribution	616.00	203.00	93.00	35.00	5.00
	LA Totals	616.00	203.00	93.00	35.00	5.00
Margin Of Safety (10%)		69.00	23.00	11.00	4.00	1.00
Loading Capacity (TMDL)		**686.00**	**227.00**	**105.00**	**40.00**	**7.00**

Monthly bacteria water quality monitoring was collected in the Lime Creek segment from 2008 to 2017. MPCA compiled monthly geometric mean bacteria concentration data in Table 3-11 from 2015 and 2016 and found that on average, bacteria loading in June would need to be reduced by 52% and loading in July would need to be reduced by 14% to meet the E. coli water quality target of 126 cfu/100 mL (Section 3.5.5 of the final TMDL document).

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 Lime Creek bacteria TMDL. The methods used for determining the TMDL are consistent with U.S. EPA technical memos.[2]

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

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

The loading capacity of the lake was determined through the use of BATHTUB and the Canfield-Bachmann subroutine and then allocated to the WLA, LA, and MOS. To simulate the load reductions needed to achieve the WQS, a series of model simulations were performed. Each simulation reduced the total amount of TP entering each of the water bodies during the growing season (or summer season, June 1 through September 30) and computed the anticipated water quality response within the lake. The goal of the modeling simulations was to identify the loading capacity appropriate (i.e., the maximum allowable load to the system, while allowing it to meet WQS) from June 1 to September 30. The modeling simulations focused on reducing the TP to the system.

The BATHTUB modeling efforts were used to calculate the loading capacity for each lake. The loading capacity is the maximum phosphorus load which each of these water bodies can receive over an annual period and still meet the shallow and general lake nutrient WQS (Table 4 of this Decision Document). Loading capacities on the annual scale (pounds per year (lbs/year)) were calculated to meet the WQS during the growing season (June 1 through September 30). The time period of June to September was chosen by MPCA as the growing season because it corresponds to the eutrophication criteria, contains the months that the general public typically uses lakes in the WRW for aquatic recreation, and is the time of the year when water quality is likely to be impaired by excessive nutrient loading. Loading capacities were divided by 365 to calculate the daily loading capacities.

Loading capacities were determined using Canfield-Bachmann equations from BATHTUB. The model equations were originally developed from data taken from over 704 lakes. The model estimates in-lake phosphorus concentration by calculating net phosphorus loss (phosphorus sedimentation) from annual

[2] 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.

phosphorus loads as functions of inflows to the lake, lake depth, and hydraulic flushing rate. To estimate loading capacity, the model is rerun, each time reducing current loads to the lake until the model result shows that in-lake total phosphorus would meet the applicable water quality standards.

MPCA subdivided the loading capacity among the WLA, LA, and MOS components of the TMDL (Table 7 of this Decision Document). These calculations were based on the critical condition, the summer growing season, which is typically when the water quality in each lake is typically degraded and phosphorus loading inputs are the greatest. TMDL allocations assigned during the summer growing season will protect the WRW lakes during the worst water quality conditions of the year. MPCA assumed that the loading capacities established by the TMDL will be protective of water quality during the remainder of the calendar year (October through May).

Table 7: Total Phosphorus (TP) Lake TMDLs for Bear Lake and State Line Lake in the Winnebago River Watershed

Allocation	Source	Existing TP Load	TMDL TP Load		Estimated Load Reduction	
		lbs/yr	lbs/yr	lbs/day	lbs/yr	%
TP TMDL for Bear Lake (24-0028-00)						
Wasteload Allocation	WLA - Conger WWTF (MN0068519)	158.700	158.700	0.435	0.00	0%
	Construction Stormwater (MNR100001)	4.410	4.410	0.012	0.00	0%
	Industrial Stormwater (MNR050000)	4.410	4.410	0.012	0.00	0%
	WLA Totals	**167.520**	**167.520**	**0.459**	**0.00**	**0%**
Load Allocation	Direct Drainage Runoff contribution	3114.70	1598.000	4.376	1516.70	49%
	Unnamed Creek (-509) contribution	3645.20	2130.100	5.831	1515.10	42%
	Steward Creek (-504) contribution	7624.50	4539.600	12.430	3084.90	40%
	Excess Internal Load	24299.10	0.000	0.000	24299.10	100%
	Atmospheric Deposition	652.70	652.700	1.788	0.00	0%
	LA Totals	**39336.20**	**8920.400**	**24.425**	**30415.80**	**77%**
Margin Of Safety (10%)		--	1009.800	2.765	--	--
Loading Capacity (TMDL)		**39503.72**	**10097.720**	**27.649**	**30415.80**	**77%**
TP TMDL for State Line Lake (24-0030-00)						
Wasteload Allocation	Construction Stormwater (MNR100001)	0.827	0.827	0.0023	0.00	0%
	Industrial Stormwater (MNR050000)	0.827	0.827	0.0023	0.00	0%
	WLA Totals	**1.654**	**1.654**	**0.0045**	**0.0000**	**0%**
Load Allocation	Direct Drainage Runoff contribution	392.90	329.20	0.902	63.70	16%
	Unnamed Creek (-508) contribution	1258.70	983.80	2.694	274.90	22%
	Excess Internal Load	20301.90	0.00	0.000	20301.90	100%
	Atmospheric Deposition	186.20	186.20	0.509	0.00	0%
	LA Totals	**22139.70**	**1499.20**	**4.105**	**20640.50**	**93%**
Margin Of Safety (10%)			166.80	0.456		
Loading Capacity (TMDL)		**22141.35**	**1667.65**	**4.565**	**20640.50**	**93%**

Table 7 of this Decision Document communicate MPCA's estimates of the reductions required for the lakes of the WRW to meet their water quality targets. These loading reductions (i.e., the percentage column) were estimated from existing and TMDL load calculations. MPCA expects that these reductions will result in the attainment of the water quality targets and the lake water quality will return to a level where the designated uses are no longer considered impaired.

WRW stream phosphorus TMDLs (seasonal average): The language of the river eutrophication standard (RES) explains that the RES must be maintained for the long-term summer concentration of TP, when averaged over all flows. MPCA explained that to align with the language of the RES the loading capacity value was based on the seasonal (June 1 to September 30) average of midpoint flows of five equally spaced flow regimes (0% to 20%, 20% to 40%, 40% to 60%, 60% to 80% and 80% to 100%). Selecting the midpoint flow values from these equally spaced flow regimes avoids weighting certain flow regimes more than other flow regimes when calculating the average flow across all flow regimes. The loading capacity was calculated as the average seasonal flow multiplied by the river eutrophication target of 150 µg/L. Upstream water bodies with completed phosphorus TMDLs were factored into certain TMDL calculations as upstream water body contributions (Table 8 of this Decision Document).

MPCA estimated the allocations for each of the permitted facilities, the MOS set at 10% of the loading capacity, the upstream contributions (if appropriate) and the remainder of the load was attributed to the LA. Load allocations (e.g., stormwater runoff from agricultural land use practices and feedlots, SSTS, wildlife inputs etc.) were not split among individual nonpoint contributors. Instead, load allocations were combined together into a categorical LA to cover all nonpoint source contributions.

Table 8: Total Phosphorus (TP) TMDL for Lime Creek in the Winnebago River Watershed

Allocation	Source	Existing TP Load [a]	TMDL TP Load	Estimated Load Reduction [b]	
		lbs/day	lbs/day	lbs/day	%
TP TMDL for Lime Creek (07080203-501)					
Wasteload Allocation	WLA - Emmons WWTP (MN0023311)	2.43	2.43	0.00	0%
	Construction Stormwater (MNR100001)	0.07	0.07	0.00	0%
	Industrial Stormwater (MNR050000)	0.07	0.07	0.00	0%
	WLA Totals	**2.57**	**2.57**	**0.00**	**0%**
Load Allocation	Bear Lake (24-0028-00) contribution	26.98	18.52	8.46	31%
	State Line Lake (24-0030-00) contribution	3.54	2.38	1.16	33%
	Watershed Runoff contribution	31.41	25.34	6.07	19%
	LA Totals	**61.93**	**46.24**	**15.69**	**25%**
Margin Of Safety (10%)		--	5.42	--	--
Loading Capacity (TMDL)		**64.50**	**54.23**	**15.69**	**24%**

a = Existing load is based on the model predicted summer average flow and observed TP concentrations
b = The total reduction from existing loads to the goal were distributed to the LAs based on drainage area

EPA supports the data analysis and modeling approach utilized by MPCA in its calculation of wasteload allocations, load allocations and the margin of safety for the Bear Lake, State Line Lake and Lime Creek TP TMDLs. Additionally, EPA concurs with the loading capacities calculated by the MPCA in these TP TMDLs. EPA finds MPCA's approach for calculating the loading capacity to be reasonable and consistent with EPA guidance.

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

4. Load Allocations (LA)

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

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

WRW bacteria TMDLs: The calculated LA values for the bacteria TMDLs are applicable across all flow conditions in the WRW (Table 6 of this Decision Document). MPCA identified several nonpoint sources which contribute bacteria loads to the surface waters of the WRW, including; non-regulated urban stormwater runoff, stormwater from agricultural and feedlot areas, failing septic systems, wildlife (e.g., deer, geese, ducks, raccoons, turkeys and other animals) and bacteria contributions from upstream subwatersheds. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations but aggregated the nonpoint sources into one 'watershed load' LA calculation (Table 6 of this Decision Document).

WRW lake and stream phosphorus TMDLs: MPCA identified several nonpoint sources which contribute nutrient loading to Bear Lake, State Line Lake and Lime Creek in the WRW (Tables 7 and 8 of this Decision Document). These nonpoint sources included: watershed contributions from each lake's direct watershed, watershed contributions from upstream watersheds, internal loading and atmospheric deposition. MPCA did not calculate individual load allocation values for each of these potential nonpoint source considerations. Instead MPCA combined the LA sources into one 'watershed load' LA calculation (Tables 7 and 8 of this Decision Document).

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

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

5. Wasteload Allocations (WLAs)

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

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

Comment:

WRW bacteria TMDLs: MPCA identified one permitted facility, the Emmons WWTP (MN0023311) which contributes treated wastewater to Lime Creek. MPCA assigned the Emmons WWTP a portion of the WLA (Table 6 of this Decision Document). The WLA for the Emmons WWTP was based on the design flow (i.e., design discharge) measured in millions of gallons per day (MGD) and the permitted bacteria effluent limit (126 cfu/100 mL for *E. coli* and/or 200 cfu/100 mL for fecal coliform) (Table 4.7 of the final TMDL document). The bacteria effluent limit was set equal to the *E. coli* WQS (126 orgs /100 mL). MPCA explained that the WLA for the Emmons WWTP was calculated based on the *E. coli* WQS but WWTF permits are regulated for the fecal coliform WQS (200 orgs /100 mL) and that if a facility is meeting its fecal coliform limits, which are set in the facility's discharge permit, MPCA assumes the facility is also meeting the calculated *E. coli* WLA for the Lime Creek segment. 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 water quality target of 200 orgs/100 mL.

MPCA acknowledged the presence of CAFOs in the WRW in Section 3.6.1.4 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) by MPCA for the WRW bacteria TMDLs.

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

WRW phosphorus lake and stream TMDLs: Two facilities received nutrient WLAs, the Conger WWTF (MN0068519) in the Bear Lake nutrient TMDL and the Emmons WWTP (MN0023311) for the Lime Creek nutrient TMDL. The WLA assigned to the Conger WWTF was based on the annual average limit of the facility (72 kg/year which equates to 158.7 lbs/year and 0.435 lbs/day). The Emmons WWTP WLA was based on a TP limit of 1.1 kg/day (2.43 lbs/day) (Table 4-3 of the final TMDL document). MPCA anticipates that the 1.1 kg/day WLA for the Emmons WWTP will be added to its permit when it is next renewed (anticipated May 2023). The TP limit for the Emmons WWTP was based on HSPF modeling efforts which built various scenarios of discharge conditions with the aim of meeting river eutrophication TP criterion of 150 µg/L.

MPCA identified construction and industrial stormwater contributions as necessitating a WLA (Tables 7 and 8 of this Decision Document). This WLA was represented as a categorical WLA for construction stormwater and industrial stormwater. The categorical WLA was calculated based on the average annual fraction of the watershed area which was determined to be under construction based on MPCA Construction Permit data culled from January 2014 to January 2019 (Section 4.2.3.2 of the final TMDL document). This fraction was estimated to be 0.25% of the total watershed area and was subsequently multiplied by the watershed runoff load line item to estimate a construction stormwater WLA. MPCA explained that there are no current industrial stormwater permits currently in the WRW, but it choose to still calculate a portion of the WLA and assign it to industrial stormwater in the event that a future facility would be cited in the WRW (Section 4.2.3.3 of the final TMDL document). The WLA attributed to industrial stormwater was set equal to the construction stormwater WLA (Tables 7 and 8 of this Decision Document).

Attaining the construction stormwater and industrial stormwater loads described in the WRW TP TMDLs is the responsibility of construction and industrial site managers. For example, for the Bear Lake (24-0028-00) TP TMDL, local permittees are responsible for overseeing that construction stormwater loads which impact water quality in Bear Lake do not exceed the WLA assigned to those areas. Local permittees are required to have a construction stormwater ordinance at least as stringent as the State's NPDES/SDS General Stormwater Permit for Construction Activity (MNR100001). In the final TMDL document MPCA explained that if a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit (MNR100001) and properly selects, installs and maintains all BMPs required under MNR100001 and applicable local construction stormwater ordinances, including those related to impaired waters discharges and any applicable additional requirements found in Appendix A of the Construction General Permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL. BMPs and other stormwater control measures which act to limit the discharge of the pollutant of concern (phosphorus) are defined in MNR100001.

The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit (MNR100001) and applicable local construction stormwater ordinances, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan complies with the applicable requirements in the State permits and local ordinances. As noted above, MPCA has explained that meeting the terms of the applicable permits will be consistent with the WLAs set in the WRW TP TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18-months of the approval of the TMDL by the U.S. EPA. This applies to sites under permits for MNR100001, NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) or NPDES/SDS General Permit for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production facilities (MNG490000).

EPA finds the MPCA's approach for calculating the WLA for the WRW TP 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:
The final TMDL submittal outlines the determination of the Margin of Safety for the bacteria and nutrient TMDLs. Both parameters employed an explicit MOS set at 10% of the loading capacity.

WRW bacteria and phosphorus TMDLs: The WRW TMDLs incorporated a 10% explicit MOS applied to the total loading capacity calculation. Ten percent of the total loading capacity was reserved for MOS with the remaining load allocated to point and nonpoint sources (Tables 6, 7 and 8 of this Decision Document). MPCA explained that the explicit MOS was set at 10% due to the following factors discovered during bacteria and nutrient TMDL development:

- Environmental variability in pollutant loading;
- Variability in flow data due to extrapolation of flow data from upstream watersheds;
- Variability in water quality data (i.e., collected water quality monitoring data, field sampling error, etc.);
- Calibration and validation processes of LDC modeling efforts, uncertainty in modeling outputs, and conservative assumptions made during the modeling efforts;
- MPCA's confidence in the BATHTUB model's performance during the development of TP TMDLs; and
- BATHTUB calibration efforts using three or more years of water quality data and MPCA's efforts to calibrate both lakes using additional internal loading inputs which are typical of shallow, eutrophic lakes in Minnesota.

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

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

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

7. Seasonal Variation

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

Comment:

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

WRW phosphorus TMDLs: Seasonal variation was considered for the WRW TP TMDLs as described in Section 4.3 of the final TMDL document. The nutrient targets employed in the WRW TP TMDLs were based on the average nutrient values collected during the growing season (June 1 to September 30). The water quality targets were designed to meet the WCBP and NGP eutrophication WQS during the period of the year where the frequency and severity of algal growth is the greatest.

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

The EPA finds that the TMDL document submitted by 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 WRW bacteria and nutrient 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 WRW. 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 WRW. Implementation practices will be implemented over the next several years. It is anticipated that staff from Soil and Water Conservation District (SWCDs) (e.g., the Freeborn County SWCD) staff, local Minnesota Board of Soil and Water Resources (BWSR) offices, and other local watershed groups, will work together to reduce pollutant inputs to the WRW. MPCA has authored a Winnebago River WRAPS document (June 2020) which provides information on the development of scientifically-supported restoration and protection strategies for implementation planning and action. MPCA sees the WRAPS document as a starting point for which MPCA and local partners can develop tools that will help local governments, land owners, and special interest groups determine (1) the best strategies for making improvements and protecting resources that are already in good condition, and (2) focus those strategies in the best places to do work.

Different organizations in Freeborn and Faribault county have been active in the WRW at implementing various programs to improve overall water quality in the watershed. The Freeborn Area Soil Health Team is on such organization whose goals are to facilitate local collaboration that encourages, educates, and demonstrates how to improve area soil health and water quality while improving productivity, profitability and sustainability of natural resources (p. 54 of the final WRW WRAPS document). The Freeborn Area Soil Health Team has led local soil health tours where local landowners can observe and learn more about reduced tillage and cover crop practices.

The Freeborn County SWCD is another organization which is actively engaging with local landowners to determine potential locations for BMP installation work (e.g., wetland restoration sites, two-stage ditches, drainage control structures, nitrogen bioreactors and/or sediment detention basins), working with farmers to better manage nutrient and manure application, expanding the use of soil health practices, restoring wetlands to increase water storage in the WRW, ensuring septic systems and animal feedlots are not contributing bacteria to local surface waters, hosting educational workshops, agricultural technical meetings in the county, field events and demonstration sites to better inform and educate local farmers on BMPs. The Freeborn SWCD has also been involved in updating drainage water management maps in the WRW and well as promoting controlled drainage projects in the local agricultural community. The Freeborn SWCD's efforts have been targeted at reducing phosphorus and algal levels in Bear Lake and State Line Lake as well as focusing on increasing levels of dissolved oxygen concentrations in the WRW to improve conditions for fish and macroinvertebrate species.

Continued water quality monitoring within the basin is supported by MPCA. Additional water quality monitoring results could provide insight into the success or failure of BMP systems designed to reduce bacteria and nutrient 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. The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan meets WLA set in the WRW TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified. This applies to sites under the MPCA's General Stormwater Permit for Construction Activity (MNR100001) and its NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) or NPDES/SDS General Permit for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production facilities (MNG490000).

Various funding mechanisms will be utilized to execute the recommendations made in the implementation section of this TMDL. The Clean Water Legacy Act (CWLA) was passed in Minnesota in 2006 for the purposes of protecting, restoring, and preserving Minnesota water. The CWLA provides the protocols and practices to be followed in order to protect, enhance, and restore water quality in Minnesota. The CWLA outlines how MPCA, public agencies and private entities should coordinate in their efforts toward improving land use management practices and water management. The CWLA anticipates that all agencies (i.e., MPCA, public agencies, local authorities and private entities, etc.) will cooperate regarding planning and restoration efforts. Cooperative efforts would likely include informal and formal agreements to jointly use technical, educational, and financial resources.

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

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

The EPA finds that this criterion has been adequately addressed.

9. Monitoring Plan to Track TMDL Effectiveness

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

Comment:

The final TMDL document outlines the water monitoring efforts in the WRW (Section 7 of the final TMDL document). Progress of TMDL implementation will be measured through regular monitoring efforts of water quality and total BMPs completed. MPCA anticipates that monitoring will be completed by local groups (e.g., the Faribault County SWCD and/or the Freeborn County SWCD) and volunteers, as long as there is sufficient funding to support the efforts of these local entities. At a minimum, the WRW will be monitored once every 10 years as part of the MPCA's Intensive Watershed Monitoring cycle.

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

Stream Monitoring:

River and stream monitoring in the WRW, 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 WRW should continue in order to build on the current water quality dataset and track changes based on implementation progress. Continuing to monitor water quality and biota scores in the listed segments will determine whether or not stream habitat restoration measures are required to bring the watershed into attainment with water quality standards. At a minimum, fish and macroinvertebrate sampling should be conducted by the MPCA, Minnesota Department of Natural Resources (MDNR), or other agencies every five to ten years during the summer season.

Lake Monitoring:

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

The EPA finds that this criterion has been adequately addressed.

10. Implementation

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

The TMDL outlined some implementation strategies in Section 8 of the final TMDL document. MPCA outlined the importance of prioritizing areas within the WRW, education and outreach efforts with local partners, and partnering with local stakeholders to improve water quality within the watershed. The WRW WRAPS document (June 2020) includes additional detail regarding specific recommendations from MPCA to aid in the reduction of bacteria and nutrients to surface waters of the WRW. Additionally, MPCA referenced the Statewide Nutrient Reduction Strategy (https://www.pca.state.mn.us/water/nutrient-reduction-strategy) for focused implementation efforts targeting phosphorus nonpoint sources in WRW. The reduction goals for the bacteria and nutrient TMDLs may be met via components of the following strategies:

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

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

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

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

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

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

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

WRW phosphorus TMDLs:

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

Manure management (feedlot and manure stockpile runoff controls): Manure has been identified as a potential source of nutrients in the WRW. Nutrients derived from manure can be transported to surface water bodies via stormwater runoff. Nutrient laden water can also leach into groundwater resources. Improved strategies in the collection, storage and management of manure can minimize impacts of nutrients entering the surface and groundwater system. Repairing manure storage facilities or building roofs over manure storage areas may decrease the amount of nutrients in stormwater runoff.

Pasture management and agricultural reduction strategies: These strategies involve reducing nutrient transport from fields and minimizing soil loss. Specific practices would include; erosion control through conservation tillage, reduction of winter spreading of fertilizers, elimination of fertilizer spreading near open inlets and sensitive areas, installation of stream and lake shore buffer strips, streambank stabilization practices (gully stabilization and installation of fencing near streams), and nutrient management planning.

Urban/Residential Nutrient Reduction Strategies: These strategies involve reducing stormwater runoff from lakeshore homes and other residences within the WRW. These practices would include; rain gardens, lawn fertilizer reduction, lake shore buffer strips, vegetation management and replacement of failing septic systems. Water quality educational programs could also be utilized to inform the general public on nutrient reduction efforts and their impact on water quality.

Municipal activities: Municipal programs, such as street sweeping, can also aid in the reduction of nutrients to surface water bodies within the WRW. Municipal partners can team with local watershed groups or water district partners to assess how best to utilize their monetary resources for installing new stormwater BMPs (e.g., vegetated swales) or retro-fitting existing stormwater BMPs.

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

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

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

11. Public Participation

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. Throughout the development of the WRW TMDLs the public was given various opportunities to participate. As part of the strategy to communicate the goals of the TMDL project and to engage with members of the public, MPCA worked with county and SWCD staff from Faribault and Freeborn counties to promote water quality, to gain input from landowners via surveys and interviews and to better understand the social dynamics of stakeholders in the WRW. MPCA's goal was to create civic engagement and discussion which would enhance the content of the TMDL and WRAPS documents. A full description of civic engagement activities associated with the TMDL process is available within in the WRW WRAPS report (June 2020).

MPCA posted the draft TMDL online at (http://www.pca.state.mn.us/water/tmdl) for a public comment period. The public comment period was started on April 20, 2020 and ended on May 20, 2020. MPCA received one public comment, from BWSR, during the public comment period. This comment mostly focused on the public notice WRAPS report and had a few minor editorial comments on the public notice TMDL document. EPA believes that MPCA adequately addressed the comments received during the public notice period and where necessary updated the final TMDL and WRAPS documents in response to those comments. All public comments and MPCA responses to publicly submitted comments were shared with EPA.

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

12. Submittal Letter

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

Comment:
The EPA received the final Winnebago River Watershed TMDL document, submittal letter and accompanying documentation from MPCA on June 22, 2020. The transmittal letter explicitly stated that the final TMDLs referenced in Table 1 of this Decision Document were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval.

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

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

13. Conclusion

After a full and complete review, the EPA finds that the 1 bacteria TMDL and the 3 TP TMDLs satisfy all elements for approvable TMDLs. This TMDL approval is for **four TMDLs**, addressing segments for aquatic recreational and aquatic life use impairments (Table 1 of this Decision Document).

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