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

JUL 15 2016

REPLY TO THE ATTENTION OF
WW-16J

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDL) for the Mississippi River-Winona Watershed (MRWW), including support documentation and follow up information. The MRWW is in southeastern Minnesota in parts of Wabasha, Winona and Olmsted Counties. The MRWW TMDLs address impaired aquatic recreation due to excessive nutrients and bacteria, impaired aquatic life use due to excessive sediment (turbidity) and impaired drinking water use due to excessive nitrate.

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

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

Sincerely,

Thomas Poy

for Tinka G. Hyde
Director, Water Division

Enclosure

cc: Celine Lyman, MPCA

wq-iw9-18g

TMDL: Mississippi River-Winona watershed bacteria, phosphorus, TSS & nitrate TMDLs, Olmsted, Wabasha and Winona Counties, MN
Date: July 15, 2016

DECISION DOCUMENT
FOR THE MISSISSIPPI RIVER-WINONA WATERSHED TMDLS, OLMSTED, WABASHA & WINONA COUNTIES, MN

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

1. Identification of 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 Mississippi River-Winona Watershed (MRWW) (HUC-8 #07040003) is located in the Mississippi River Basin in southeastern Minnesota in the North Central Hardwood Forest (NCHF) ecoregion. The MRWW is approximately 655 square miles (419,200 acres) and spans portions of Olmsted, Wabasha and Winona counties. Surface waters in the MRWW generally flow from west to east where they empty into the main stem of the Mississippi River. The MRWW TMDLs address seven (7) impaired segments due to excessive bacteria, two (2) impaired lakes due to excessive nutrients, twelve (12) impaired segments due to excessive sediment inputs and four (4) impaired segments due to excessive nitrate (Table 1 of this Decision Document).

Table 1: Mississippi River-Winona Watershed impaired waters addressed by this TMDL

Water body name	Assessment Unit ID	Affected Use	Pollutant or stressor	TMDL
Whitewater River, South Fork	07040003-515	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Peterson Creek	07040003-529	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Rollingstone Creek	07040003-533	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Whitewater River	07040003-539	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Logan Branch	07040003-552	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Gavin Brook	07040003-595	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Crow Spring River	07040003-611	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Lake Winona (Northwest)	85-0011-02	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Lake Winona (Southeast)	85-0011-01	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Whitewater River, South Fork	07040003-512	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Whitewater River, South Fork	07040003-F17	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Whitewater River, Middle Fork	07040003-F19	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Whitewater River, North Fork	07040003-523	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Rollingstone Creek	07040003-533	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Logan Creek	07040003-536	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Whitewater River	07040003-537	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Whitewater River	07040003-539	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Whitewater River, North Fork	07040003-553	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Whitewater River, North Fork	07040003-554	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Stockton Valley Creek	07040003-559	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Gavin Brook	07040003-595	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Whitewater River, South Fork	07040003-512	Drinking Water	Nitrate	Nitrate TMDL
Whitewater River, South Fork	07040003-F17	Aquatic Life (Macros)	Nitrate	Nitrate TMDL
Whitewater River, Middle Fork	07040003-F19	Drinking Water	Nitrate	Nitrate TMDL
Crow Spring River	07040003-611	Aquatic Life (Macros)	Nitrate	Nitrate TMDL

To adhere with its eutrophication standard the Minnesota Pollution Control Agency (MPCA) classifies lakes as either shallow or deep lakes. MPCA explained that a lake is considered shallow if its maximum depth is less than 15 feet, or if the littoral area (area where depth is less than 15 feet) covers at least 80% of the lake's surface area (Section 2.1.1 of the final TMDL document). MPCA explained that the Lake Winona (SE) basin was characterized as a deep lake in the NCHF ecoregion. The Lake Winona (NW) basin was characterized as a shallow lake in the NCHF ecoregion.

Table 2: Morphometric and watershed characteristics of lakes addressed in the Mississippi River-Winona Watershed TMDLs

Parameter	Lake Winona (NW) (AUID: 85-0011-02)	Lake Winona (SE) (AUID: 85-0011-01)
Surface Area (acres)	84	223
Littoral Area (% of total area)	89%	59%
Volume (acre-feet)	456	3,425
Mean depth (feet)	5	15
Maximum Depth (feet)	30	40
Watershed area (including lake area) (acres)	9,380	10,382
Watershed area (surface area)	47 : 1	112 : 1

Land Use:

Land use in the MRWW is predominantly agricultural cropland (29%) and grassland/pasture land (27%) (Table 3 of this Decision Document). The MRWW also is comprised of woodlands (29%), open water/wetlands (8%), developed lands (7%), and barren land (1%). In Section 5 of the final TMDL document (page 129), MPCA explained that the MRWW is east Rochester, Minnesota and that the City of Rochester saw growth in population (24.4 %) and municipal area (36.5 %) between 2000 and 2010. MPCA explained that the City of Rochester is expected to continue to grow in the future and that this growth may infringe on the western subwatersheds of the MRWW. This growth may influence land use in these subwatersheds and also the registration of animal facilities. MPCA described how the number of animal units in the MRWW has remained constant yet the number of facilities has decreased. Thus, the number of animals per facility has also fluctuated in some cases resulting in that facility meeting the animal thresholds for being considered as a NPDES permitted facility.

Table 3: Subwatershed Land Cover (NLCD 2011) for the Mississippi River-Winona Watershed

Water body Name / Segment	Developed	Cropland	Grassland / Pasture	Woodland	Open Water / Wetlands	Barren Land
Mississippi River-Winona Watershed	**7%**	**29%**	**27%**	**29%**	**8%**	**1%**
Lake Winona (NW)	24%	3%	22%	48%	3%	1%
Lake Winona (SE)	70%	1%	1%	11%	18%	0%
07040003-F16	12%	57%	24%	7%	1%	1%
07040003-F17	8%	34%	14%	44%	1%	0%
07040003-F19	5%	50%	27%	18%	1%	1%
07040003-512	5%	38%	31%	26%	1%	1%
07040003-515	4%	58%	34%	4%	1%	1%
07040003-523	9%	16%	23%	48%	1%	0%
07040003-529	8%	43%	31%	18%	1%	0%

07040003-533	4%	19%	38%	39%	1%	1%
07040003-536	3%	47%	35%	15%	1%	0%
07040003-537	3%	17%	25%	49%	6%	1%
07040003-539	3%	18%	26%	45%	8%	1%
07040003-552	3%	49%	21%	27%	1%	0%
07040003-553	5%	64%	26%	5%	1%	1%
07040003-554	6%	36%	28%	29%	1%	1%
07040003-559	3%	22%	42%	33%	1%	0%
07040003-581	5%	20%	48%	27%	1%	0%
07040003-595	6%	17%	35%	42%	1%	0%
07040003-611	4%	70%	21%	5%	1%	0%

Problem Identification:

Bacteria TMDLs: Bacteria impaired segments identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive bacteria. Water quality monitoring within the MRWW indicated that these segments were not attaining their designated aquatic recreation uses due to exceedances of the bacteria criteria. Excessive bacteria can negatively impact recreational uses (swimming, wading, boating, fishing etc.) and public health. At elevated levels, bacteria may cause illness within humans who have contact with or ingest bacteria laden water. Recreation-based contact can lead to ear, nose, and throat infections, and stomach illness.

Phosphorus TMDLs: Lakes identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive nutrients (phosphorus). Total phosphorus (TP), chlorophyll-*a* (chl-*a*) and Secchi depth (SD) measurements in the MRWW indicated that Lake Winona (NW) (85-0011-02) and Lake Winona (SE) (85-0011-01) were not attaining their designated aquatic recreation uses due to exceedances of nutrient criteria. Water quality monitoring within the MRWW was completed at several locations and the data collected during these efforts served as the foundation for modeling efforts completed in this TMDL study.

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 (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.

Sediment (Total Suspended Solids) TMDLs: Sediment (turbidity) impaired segments identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive sediment within the water column. Water quality monitoring within the MRWW indicated that these segments were not attaining their designated aquatic life uses due to high turbidity measurements and the negative impact of those conditions on aquatic life (i.e., fish and macroinvertebrate communities).

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

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

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

Nitrate TMDLs: Nitrate impaired segments identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list. Water quality monitoring within the MRWW indicated that these segments were not attaining their designated aquatic life (macroinvertebrates) use and their drinking water designated use due to elevated nitrate measurements. Agricultural areas in southeastern Minnesota use nitrogen based fertilizers which allow bacteria present in the soil to convert fertilizer based nitrogen species to the nitrate (NO_3) species of nitrogen. MPCA explained that the nitrate species of nitrogen is easily dissolvable and very mobile when mixed into groundwater.

Nitrate and nitrite (NO_2) are two of the forms of nitrogen which can be harmful to humans. Nitrite is toxic to humans while nitrate, if ingested, can transform to nitrite. Nitrite has been linked to methemoglobinemia (i.e., blue baby syndrome) in infants. Areas of southeastern Minnesota are particularly susceptible to nitrogen impacting drinking water resources due to the area's karst geology and use of nitrogen based fertilizers in agricultural areas.

MPCA explained that some species of macroinvertebrates and fish are sensitive to nitrate levels in coldwater stream environments (page 10 of the final TMDL document). Certain macroinvertebrate and fish species may experience stress due to high dissolved nitrate levels within their aquatic environments. MPCA does not currently have a nitrate water quality standard to protect aquatic life and instead uses the drinking water standard of 10 mg/L.

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

Pollutants of Concern:
The pollutants of concern are bacteria, nutrients (TP), TSS and nitrate (NO_3).

Source Identification (point and nonpoint sources):

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

MRWW bacteria TMDLs:
National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: NPDES permitted facilities may contribute bacteria loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge treated wastewater according to their NPDES permit. MPCA determined that there are seven wastewater treatment facilities/plants (WWTFs/WWTPs) in the bacteria impaired assessment units of the MRWW which contribute bacteria from treated wastewater releases (Table 4 of this Decision Document). MPCA assigned each of these facilities a portion of the bacteria wasteload allocation (WLA).

Table 4: NPDES facilities which contribute bacteria loading in the Mississippi River - Winona Watershed

Facility Name	Permit #	Impaired Reach	WLA
Bacteria (*E. coli*) Load (billions of bacteria/day)			
Utica WWTP	MN0022055	07070003-539	1.09
Whitewater Region WWTP	MN0046868		5.34
DNR Crystal Springs State Fish Hatchery	MN0004421		15.26
Altura WWTP	MN0021831		1.71
Plainview Elgin WWTP	MN0055361		12.74
Stockton WWTP	MNG580079	07090003-595	2.9
Minnesota City WWTP	MN0069817		0.1
Rollingstone WWTP	MNG580078	07030004-533	3.8

Concentrated Animal Feedlot Operations (CAFOs): MPCA recognized the presence of six CAFOs in the MRWW (Table 5 of this Decision 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).

Table 5: Permitted CAFOs in the Mississippi River - Winona Watershed

Facility Name	NPDES Permit #	Animal Units
Whitewater River (07040003-539)		
Daley Farms of Lewiston LLP	MN0067652	1996 (Cows)
Diamond K Dairy Inc.	MN0064629	1498 (Cows)
Gar-Lin Dairy Site 1	MNG440496	2852 (Cows)
Holden Farms Inc., St. Charles	MNG440331	960 (Pigs)
Schell's Pine Grove Farm	MNG440040	605 (Cows)
Shea Dairy Inc.	MN0070181	1255 (Cows)

CSOs and SSOs: MPCA determined that the MRWW does not have CSOs nor SSOs which contribute bacteria to waters of the MRWW.

MRWW phosphorus TMDLs:

Municipal Separate Storm Sewer System (MS4) communities: Stormwater from MS4s can transport nutrients to surface water bodies during or shortly after storm events. MPCA identified one MS4 permittee (City of Winona (MS400247)) which was assigned a portion of the WLA for the phosphorus TMDLs in Lake Winona (NW) and Lake Winona (SE) (Tables 12 & 13 of this Decision Document).

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 MRWW must comply with the requirements of MPCA's NPDES Stormwater Program and create a Stormwater Pollution Prevention Plan (SWPPP) that summarizes how stormwater will be minimized from the site.

CSOs and SSOs: MPCA determined that the MRWW does not have CSOs nor SSOs which contribute nutrients to waters of the MRWW.

MRWW TSS TMDLs:

NPDES permitted facilities: NPDES permitted facilities may contribute sediment loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge treated wastewater according to their NPDES permit. MPCA determined that there are nine facilities in the TSS-impaired assessment units of the MRWW which contribute sediment from treated wastewater releases (Table 6 of this Decision Document). MPCA assigned each of these facilities a portion of the sediment WLA.

Table 6: NPDES facilities which contribute sediment loading in the Mississippi River - Winona Watershed

Facility Name	Permit #	Impaired Reach	WLA
Total Suspended Solids Load (kilogram (kg) of sediment/day)			
Whitewater Region WWTP	MN0046868	07040003-F16	127.2
Utica WWTP	MN0022055	07040003-512	17.3
DNR Crystal Springs State Fish Hatchery	MN0004421		242.3
Altura WWTP	MN0021831		27.2
Plainview Elgin WWTP	MN0055361	07040003-554	151.6
Plainview Milk Products Coop	MN0000311		25.6
Stockton WWTP	MNG580079	07090003-595	104.6
Minnesota City WWTP	MN0069817		3.5
Rollingstone WWTP	MNG580078	07030004-533	135.7

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

MRWW nitrate TMDLs:

NPDES permitted facilities: NPDES permitted facilities may contribute nitrate loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge treated wastewater according to their NPDES permit. MPCA determined that there are four facilities in the nitrate-impaired assessment units of the MRWW which contribute nitrate from treated wastewater releases (Table 7 of this Decision Document). MPCA assigned each of these facilities a portion of the nitrate WLA.

Table 7: NPDES facilities which contribute nitrate loading in the Mississippi River - Winona Watershed

Facility Name	Permit #	Impaired Reach	WLA
Nitrate Load (kg of nitrate/day)			
Whitewater Region WWTP	MN0046868	07040003-F17	42.4
Utica WWTP	MN0022055	07040003-512	8.63
DNR Crystal Springs State Fish Hatchery	MN0004421		121.13
Altura WWTP	MN0021831		13.59

Stormwater runoff from permitted construction and industrial areas: Construction and industrial sites may contribute nitrate via stormwater runoff during precipitation events. These areas within the MRWW must comply with the requirements of MPCA's NPDES Stormwater Program and create a SWPPP that summarizes how stormwater will be minimized from the site.

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

<u>MRWW bacteria TMDLs:</u>

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

Stormwater from agricultural land use practices and feedlots near surface waters: Animal Feeding Operations (AFOs) in close proximity to surface waters can be a source of bacteria to water bodies in the MRWW. 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 MRWW. 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 MRWW. 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. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and rural areas.

MRWW phosphorus TMDLs:

Internal loading: The release of phosphorus from lake sediments, the release of phosphorus from lake sediments via physical disturbance from benthic fish (rough fish, ex. carp), the release of phosphorus from wind mixing the water column, and the release of phosphorus from decaying curly-leaf pondweeds, may all contribute internal phosphorus loading to the lakes of the MRWW. 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 Lake Winona. 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 MRWW. 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 MRWW. Phosphorus can be bound to these particles which may add to the phosphorus inputs to surface water environments.

Groundwater discharge: Phosphorus can be added to the lake's water column through groundwater discharge. Phosphorus concentrations in groundwater are usually below the water quality standards for phosphorus. In those instances where significant groundwater discharge into lake environments is occurring, phosphorus inputs can impact the phosphorus budgeting of the water body.

Contributions from upstream lake subwatersheds: Upstream lakes may contribute nutrient, organic material and organic-rich sediment loads via water flow between hydrologically connected upstream and downstream lake systems. Upstream lakes may contribute nutrient loads to downstream lakes via non-regulated stormwater runoff into the upstream lakes, nutrient contributions from wetland areas and forested areas into the upstream lakes, internal loading in upstream lakes, etc. These nutrient sources can all add nutrients to hydrologically connected downstream lake waters.

Discharges from Subsurface Sewage Treatment Systems (SSTS) or unsewered communities: Failing septic systems are a potential source of nutrients within the MRWW. 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 MRWW. 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. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and rural areas.

MRWW TSS TMDLs:

Stream channelization and streambank erosion: Eroding streambanks and channelization efforts may add sediment to local surface waters. Eroding riparian areas may be linked to soil inputs within the water column and potentially to changes in flow patterns. Changes in flow patterns may also encourage down-cutting of the streambed and streambanks. Stream channelization efforts can increase the velocity of flow (via the removal of the sinuosity of a natural channel) and disturb the natural sedimentation processes of the streambed. Unrestricted livestock access to streams and streambank areas may lead to streambank degradation and sediment additions to stream environments.

Stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of sediment which may lead to impairments in the MRWW. Sediment inputs to surface waters can be exacerbated by tile drainage lines, which channelize the stormwater flows. Tile lined fields and channelized ditches enable particles to move more efficiently into surface waters.

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

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

MRWW nitrate TMDLs:
Leaching loss from manure and nitrogen based fertilizer application in agricultural areas: MPCA identified nitrogen based fertilizer and manure usage in agricultural areas as nonpoint sources of nitrogen leaching into shallow groundwater (Section 3.6.3.2 and Figure 17 of the final TMDL document). Nitrate and nitrite can easily mix into groundwater and move through the subsurface soils via interflow and karst pathways which are a part of the geology in southeastern Minnesota. Surface waters in the MRWW are fed by groundwater sources and that groundwater source water can carry with it source contributions (such as dissolved nitrate) from up-watershed areas. Nonpoint sources from up-watershed areas, can impact surface waters which then contribute to groundwater/underground karst flows which then re-surface as an above ground stream or river. The geologic conditions of a karst system are characterized by unique surface water and groundwater interactions (Section 2.2.2 of the final TMDL document).

Farm nutrient management evaluations conducted by the Minnesota Department of Agriculture show that farmers often apply more nitrogen fertilizer than necessary in the Lower Mississippi River Basin. Usually this is because they don't give enough credit to nitrogen provided by applied manure and previous legume crops such as soybeans and alfalfa. This overapplication of nitrogen fertilizer can result in the increased potential for nitrate leaching and runoff.[1]

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

Future Growth:
MPCA outlined its expectations for potential growth in the MRWW in Section 5 of the final TMDL document (page 129). The proximity of the MRWW to the City of Rochester may result in land use change in the western portion of the MRWW. The City of Rochester saw growth in population (24.4 %) and municipal area (36.5 %) between 2000 and 2010. MPCA explained that the City of Rochester is expected to continue to grow in the future and that this growth may infringe on the western subwatersheds of the MRWW. The WLA and load allocations for the MRWW 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 MRWW TMDLs.

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

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[1] Lower Mississippi River Basin Plan Scoping Document (2001), pages 54-55.

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 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 MRWW TMDLs are designated as Class 1 waters (1B and 1C) for drinking water use and Class 2 waters for aquatic recreation use (fishing, swimming, boating, etc.) and aquatic life use. The Class 2 designated use is described in Minnesota Rule 7050.0140 (3):

> *"Aquatic life and recreation includes all waters of the state that support or may support fish, other aquatic life, bathing, boating, or other recreational purposes and for which quality control is or may be necessary to protect aquatic or terrestrial life or their habitats or the public health, safety, or welfare."*

Standards:

Narrative Criteria:

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

> *"Class 1B waters - The quality of Class 1B waters of the state shall be such that with approved disinfection, such as simple chlorination or its equivalent, the treated water will meet both the primary (maximum contaminant levels) and secondary drinking water standards issued by the*

United States Environmental Protection Agency as referenced in subpart 1. The Environmental Protection Agency drinking water standards are adopted and incorporated by reference, except as noted in subpart 1.

These standards will ordinarily be restricted to surface and underground waters with a moderately high degree of natural protection and apply to these waters in the untreated state.

Class 1C waters - The quality of Class 1C waters of the state shall be such that with treatment consisting of coagulation, sedimentation, filtration, storage, and chlorination, or other equivalent treatment processes, the treated water will meet both the primary (maximum contaminant levels) and secondary drinking water standards issued by the United States Environmental Protection Agency as referenced in subpart 1. The Environmental Protection Agency drinking water standards are adopted and incorporated by reference, except as noted in subpart 1.

These standards will ordinarily be restricted to surface waters, and groundwaters in aquifers not considered to afford adequate protection against contamination from surface or other sources of pollution. Such aquifers normally would include fractured and channeled limestone, unprotected impervious hard rock where water is obtained from mechanical fractures or joints with surface connections, and coarse gravels subjected to surface water infiltration. These standards shall also apply to these waters in the untreated state."

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

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

Numeric criteria:

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

Table 8: Bacteria Water Quality Standards Applicable to the MRWW 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 MRWW bacteria TMDLs are the *E. coli* standards as stated in Table 8 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 MRWW 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.

Phosphorus TMDLs: Numeric criteria for TP, chlorophyll-*a*, and Secchi Disk depth are set forth in Minnesota Rules 7050.0222. These three parameters form MPCA eutrophication standard that must be achieved to attain the aquatic recreation designated use. The numeric eutrophication standards which are applicable to the MRWW lake TMDLs are found in Table 9 of this Decision Document.

Table 9: Minnesota Eutrophication Standards for Deep and Shallow lakes within the North Central Hardwood Forest (NCHF) ecoregion

Parameter	NCHF Eutrophication Standard (general lakes)	NCHF Eutrophication Standard (shallow lakes)[1]
	Lake Winona (SE)	*Lake Winona (NW)*
Total Phosphorus (µg/L)	TP < 40	TP < 60
Chlorophyll-a (µg/L)	chl-a < 14	chl-a < 20
Secchi Depth (m)	SD > 1.4	SD > 1.0

[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 of 40 µg/L and 60 µg/L the response variables chl-*a* and SD will be attained and Lake Winona (SE) and Lake Winona (NW) will achieve their designated beneficial uses. For lakes to achieve their designated beneficial use, the lake may not demonstrate characteristics of eutrophic conditions 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.

Phosphorus TMDL criteria: MPCA employed TP criteria of 40 µg/L and 60 µg/L to address eutrophication problems because of the interrelationship 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 criteria employed for the Lake Winona (SE) and Lake Winona (NW) TMDLs to be reasonable.

TSS TMDLs: On January 23, 2015, EPA approved MPCA's regionally-based TSS criteria for rivers and streams. The TSS criteria replaced Minnesota's statewide turbidity criterion (measured in Nephelometric Turbidity Units (NTU)). The TSS criteria provide water clarity targets for measuring suspended particles in rivers and streams.

TSS TMDL Targets: MPCA employed two TSS targets applicable to streams in the MRWW. Criterion from streams classified as 2A (coldwater streams) and 2B (coldwater or warmwater, Southern River

Nutrient Region (SRNR)) were applied to the TSS TMDLs of the MRWW (Table 10 of this Decision Document).

Table 10: Total Suspended Solids Water Quality Standards Applicable in the Mississippi River-Winona Watershed TMDL

Parameter	Units	Water Quality Standard	Segments which WQS apply to
TSS - Class 2A Waters	mg/L	10	-F17, -F19, -512, -523, - 533, -537, -553, -554 & -559
TSS - Class 2B Waters (South River Nutrient Region)	mg/L	65	-536, -539 & -595

Nitrate TMDLs: Nitrate impaired waters in the MRWW are designated as drinking water sources as well as trout streams (page 15 of the final TMDL document). The Minnesota nitrate drinking water quality standard is a maximum concentration of 10 mg/L.

Nitrate TMDL Targets: MPCA employed the nitrate drinking water quality standard of 10 mg/L.

The TMDL targets employed in the MRWW bacteria, phosphorus, TSS and nitrate TMDLs meet the Class 1B, Class 1C and Class 2 designated uses.

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:

MRWW bacteria TMDLs:

MPCA used the geometric mean (**126 orgs/100 mL**) of the *E. coli* water quality standard to calculate loading capacity values for the bacteria TMDLs. MPCA believes the geometric mean of the WQS provides the best overall characterization of the status of the watershed. EPA agrees with this assertion, as stated in the preamble of, *"The Water Quality Standards for Coastal and Great Lakes Recreation Waters Final Rule"* (69 FR 67218-67243, November 16, 2004) on page 67224, "…the geometric mean is the more relevant value for ensuring that appropriate actions are taken to protect and improve water quality because it is a more reliable measure, being less subject to random variation, and more directly linked to the underlying studies on which the 1986 bacteria criteria were based." MPCA stated that the bacteria TMDLs will focus on the geometric mean portion of the water quality standard (126 orgs/100 mL) and that it expects that by attaining the 126 orgs/100 mL portion of the *E. coli* WQS the 1,260 orgs/100 mL portion of the *E. coli* WQS will also be attained. EPA finds these assumption 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 MRWW bacteria TMDLs, MPCA used Minnesota's WQS for *E. coli* (126 orgs/100 mL). A loading capacity is, "the greatest amount of loading that a water can receive without violating water quality standards." (40 CFR §130.2). Therefore, a loading capacity set at the WQS will assure that the water does not violate WQS. MPCA's *E. coli* TMDL approach is based upon the premise that all discharges (point and nonpoint) must meet the WQS when entering the water body. If all sources meet the WQS at discharge, then the water body should meet the WQS and the designated use.

Separate flow duration curves (FDCs) were created for the each of the bacteria TMDLs in the MRWW. The MRWW FDCs were developed using simulated flows generated from Soil and Water Assessment Tool (SWAT) hydrologic model runs. SWAT hydrologic models were developed to simulate flow characteristics within the MRWW from 2001-2010. Flow data focused on dates within the recreation season (April 1 to October 31). Daily stream flows were necessary to implement the load duration curve approach.

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

Water quality monitoring was completed in the MRWW and measured *E. coli* concentrations were converted to individual sampling loads by multiplying the sample concentration by the instantaneous flow measurement observed/estimated at the time of sample collection. The individual sampling loads were plotted on the same figure with the created LDC. Individual LDCs are found in Section 4.2.6 of the final TMDL document.

The LDC plots were subdivided into five flow regimes; very high flow conditions (exceeded 0–10% of the time), high flow conditions (exceeded 10–40% of the time), mid-range flow conditions (exceeded 40–60% of the time), low flow conditions (exceeded 60–90% of the time), and very low flow conditions (exceeded 90–100% of the time). LDC plots can be organized to display individual sampling loads with the calculated LDC. Watershed managers can interpret LDC graphs with individual sampling points plotted alongside the LDC to understand the relationship between flow conditions and water quality exceedances within the watershed. Individual sampling loads which plot above the LDC represent violations of the WQS and the allowable load under those flow conditions at those locations. The difference between individual sampling loads plotting above the LDC and the LDC, measured at the same flow, is the amount of reduction necessary to meet WQS.

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

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

Bacteria TMDLs for the MRWW were calculated and those results are found in Table 11 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 (ex. 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 11 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 11 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 11: Bacteria (*E. coli*) TMDLs for the Mississippi River-Winona Watershed is located at the end of this Decision Document

Table 11 of the Decision Document presents MPCA's loading reduction estimates for each TMDL. These loading reductions (i.e., the percent reduction row at the bottom of each TMDL table) were calculated from field sampling data collected in the MRWW. MPCA explained that its load reduction estimates are likely more conservative since they are based on a limited water quality data set.

EPA concurs with the data analysis and LDC approach utilized by MPCA in its calculation of loading capacities, wasteload allocations, load allocations and the margin of safety for the MRWW bacteria TMDLs. The methods used for determining the TMDL are consistent with U.S. EPA technical memos.[2]

MRWW phosphorus TMDLs: MPCA used the U.S. Army Corps of Engineers (USACE) BATHTUB model to calculate the loading capacities for Lake Winona (NW) and Lake Winona (SE). 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.

[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.

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 9 of this Decision Document). Loading capacities on the annual scale (kilograms per year (kg/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 MRWW 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 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 (Tables 12 and 13 of this Decision Document). These calculations were based on the critical condition, the summer growing season, which is 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 MRWW 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 12: Phosphorus TMDL for Lake Winona (NW) (85-0011-02) in the Mississippi River-Winona watershed

Allocation	Source	Existing TP Load	TP TMDL		Load Reduction	
		(kg/yr)	*(kg/yr)*	*(kg/day)*	*(kg/yr)*	*(%)*
Wasteload Allocation	Construction Stormwater (MNR100001)	0.08	0.08	0.0002	0.0	0%
	Industrial Stormwater (MNR50000)	0.08	0.08	0.0002	0.0	0%
	MS4-City of Winona (MS400247)	180.70	112.80	0.309	67.9	38%
	WLA Totals	***180.86***	***112.96***	***0.309***	***67.9***	***38%***
Load Allocation	Total Watershed - Direct Drainage	95.70	79.60	0.218	16.1	17%
	Total Watershed - Boller's Lake	475.00	361.40	0.990	113.6	24%
	Internal Load	180.70	10.10	0.028	170.6	94%
	Atmospheric Deposition	14.70	14.70	0.040	0.0	0%
	LA Totals	***766.10***	***465.80***	***1.276***	***300.3***	***39%***
Margin Of Safety (10%)		--	64.30	0.176	--	--
Loading Capacity (TMDL)		**946.96**	**643.06**	**1.762**	**368.2**	**39%**

Table 13: Phosphorus TMDL for Lake Winona (SE) (85-0011-01) in the Mississippi River-Winona watershed

Allocation	Source	Existing TP Load	TP TMDL		Load Reduction	
		(kg/yr)	*(kg/yr)*	*(kg/day)*	*(kg/yr)*	*(%)*
Wasteload Allocation	Construction Stormwater (MNR100001)	0.04	0.04	0.000	0.0	0%
	Industrial Stormwater (MNR50000)	0.04	0.04	0.000	0.0	0%
	MS4-City of Winona (MS400247)	89.40	52.30	0.143	37.1	41%
	WLA Totals	***89.48***	***52.38***	***0.144***	***37.100***	***41%***
Load Allocation	Direct Drainage Runoff	38.70	26.20	0.072	12.5	32%
	Internal Load	19.70	0.00	0.000	19.7	100%
	Atmospheric Deposition	38.70	38.70	0.106	0.0	0%
	LA Totals	***97.10***	***64.90***	***0.178***	***32.2***	***33%***
Boundary Condition: Lake Winona (NW)		714.80	505.20	1.384	209.6	29%
Margin Of Safety (10%)		--	13.00	0.036	--	--
Loading Capacity (TMDL)		**901.38**	**635.48**	**1.741**	**278.9**	**31%**

Tables 12 and 13 of this Decision Document communicate MPCA's estimates of the reductions required for Lake Winona (NW) and Lake Winona (SE) 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.

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 MRWW phosphorus TMDLs. Additionally, EPA concurs with the loading capacities calculated by MPCA in these two phosphorus TMDLs. EPA finds MPCA's approach for calculating the loading capacity to be reasonable and consistent with EPA guidance.

MRWW TSS TMDLs: MPCA developed LDCs to calculate sediment TMDLs for the twelve impaired segments of the MRWW. The same LDC development strategies were employed for the sediment and bacteria TMDLs (ex. the incorporation of SWAT model simulated flows to develop FDCs, water quality monitoring information collected within the MRWW informing the LDC, etc.). The FDC were transformed into LDC by multiplying individual flow values by the Class 2A target (10 mg/L) or the Class 2B target (65 mg/L) and then multiplying that value by a conversion factor.

TSS TMDLs were calculated (Table 14 of this Decision Document). The load allocation was calculated after the determination of the WLA, and the MOS. Load allocations (ex. stormwater runoff from agricultural land use practices) was not split among individual nonpoint contributors. Instead, load allocations were combined together into one value to cover all nonpoint source contributions. Table 14 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 sediment monitoring data and allows for the estimation of load reductions necessary for attainment of the Class 2A or 2B TSS water quality standard. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for each segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 14 of this Decision Document identifies the loading capacity for each segment at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Table 14: Total Suspended Solids (TSS) TMDLs for the Mississippi River-Winona Watershed is located at the end of this Decision Document

Table 14 of the Decision Document presents MPCA's loading reduction estimates for each TMDL. These loading reductions (i.e., the percent reduction row at the bottom of each TMDL table) were calculated from field sampling data collected in the MRWW. MPCA explained that its load reduction estimates are likely more conservative since they are based on a limited water quality data set.

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

MRWW nitrate TMDLs: MPCA developed LDCs to calculate nitrate TMDLs for the four impaired segments of the MRWW. The same LDC development strategies were employed for the nitrate TMDLs as they were for the sediment and bacteria TMDLs (ex. the incorporation of SWAT model simulated flows to develop FDCs, water quality monitoring information collected within the MRWW informing the LDC, etc.). The FDC were transformed into LDC by multiplying individual flow values by the nitrate target of 10 mg/L and then multiplying that value by a conversion factor.

Nitrate TMDLs were calculated (Table 15 of this Decision Document). MPCA calculated the WLAs, the load allocations applicable to impaired subwatersheds upstream of TMDL reaches, atmospheric deposition, nonpoint source leaching contributions to the impaired subwatershed and a MOS value set at 10% of the loading capacity. Table 15 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 nitrate monitoring data and allows for the estimation of load reductions necessary for attainment of the nitrate target. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for each segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 15 of this Decision Document identifies the loading capacity for each segment at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Table 15: Nitrate TMDLs for the Mississippi River-Winona Watershed is located at the end of this Decision Document

Table 15 of the Decision Document presents MPCA's loading reduction estimates for each TMDL. These loading reductions (i.e., the percent reduction row at the bottom of each TMDL table) were calculated from field sampling data collected in the MRWW. MPCA explained that its load reduction estimates are likely more conservative since they are based on a limited water quality data set.

EPA supports the data analysis and modeling approach utilized by MPCA in its calculation of wasteload allocations, load allocations and the margin of safety for the nitrate TMDLs. Additionally, EPA concurs with the loading capacities calculated by MPCA in the nitrate TMDLs. EPA finds MPCA's approach for calculating the loading capacity for the nitrate TMDLs 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 MRWW TMDLs can be attributed to different nonpoint sources.

MRWW bacteria TMDLs: The calculated LA values for the bacteria TMDLs are applicable across all flow conditions in the MRWW (Table 11 of this Decision Document). MPCA identified several nonpoint sources which contribute bacteria loads to the surface waters of the MRWW, including; non-regulated urban stormwater runoff, stormwater from agricultural and feedlot areas, failing septic systems, wildlife (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 a categorical LA value.

MRWW phosphorus TMDLs: MPCA identified several nonpoint sources which contribute nutrient loading to the lakes of the MRWW (Tables 12 and 13 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 calculated individual load allocation values for each of these potential nonpoint source considerations where appropriate. MPCA estimated nonpoint source loading reductions necessary for Lake Winona (NW) and Lake Winona (SE) to meet their respective phosphorus TMDL targets would require reductions from nonpoint sources to be 17% to 100% (Tables 12 and 13 of this Decision Document).

MPCA recommended that stakeholders prioritize their efforts for decreasing nonpoint phosphorus inputs to Lake Winona. MPCA explained that its strategy for assigning nonpoint source reductions to each individual lake was based on targeting external (or direct) watershed nonpoint sources first. After fully investigating the nonpoint source load which could reasonably be expected to be reduced from external watershed sources, MPCA then focused its reduction efforts on internal load. MPCA believes that reducing watershed load contributions should be prioritized over internal load reduction efforts because loading from external watershed sources oftentimes contributes to phosphorus available in the lake bottom sediments. Without mitigating one of the main sources to internal load, MPCA explained that stakeholders may be presented with a continual internal load problem.

MPCA estimated that Lake Winona has a fairly significant contribution from internal loading. MPCA recognizes that its load reductions goals for internal load are aggressive, but these goals are based on the best available information for the MRWW TMDLs, and the reduction targets are within the range of reductions required for other lakes in Minnesota. Once implementation actions are conducted to address both internal loads (e.g. alum treatment) and watershed loads (e.g. stormwater treatment) and additional water quality monitoring is completed to assess the progress, MPCA and local partners plan to revisit the reduction goals of the MRWW phosphorus TMDLs. Through this adaptive management approach, MPCA and local partners will be able to decide whether further implementation actions are needed or if MPCA should consider a site-specific water quality standard.

MRWW TSS TMDLs: The calculated LA values for the TSS TMDLs are applicable across all flow conditions. MPCA identified several nonpoint sources which contribute sediment loads to the surface waters in the MRWW. Load allocations were recognized as originating from many diverse nonpoint sources including; stormwater contributions from agricultural lands, stream channelization and streambank erosion, wetland and forest sources, and atmospheric deposition. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations, but aggregated the nonpoint sources into one LA value ('Watershed Runoff').

MRWW Nitrate TMDLs: The calculated LA values for the nitrate TMDLs are applicable across all flow conditions. MPCA identified several nonpoint sources which contribute nitrate loads to the surface waters in the MRWW. Load allocations were recognized as originating from; nonpoint source leaching loss, nitrate contributions from upstream watersheds, and atmospheric deposition.

EPA finds MPCA's approach for calculating the LA to be reasonable and consistent with EPA guidance.

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:

MRWW bacteria TMDLs: MPCA identified NPDES permitted facilities within the MRWW and assigned those facilities a portion of the WLA (Table 4 of this Decision Document). The WLAs for each of these individual facilities were calculated based on the facility's wet weather design flow and the *E. coli* WQS (126 orgs /100 mL). MPCA explained that the WLA for each individual WWTP was calculated based on the *E. coli* WQS but WWTF permits are regulated for the fecal coliform WQS (200 orgs /100 mL). MPCA explained that if a facility is meeting its fecal coliform limits, which are set in the facility's discharge permit, MPCA assumes the facility is also meeting the calculated *E. coli* WLA from the MRWW TMDLs. The WLA was therefore calculated using the assumption that the *E. coli* standard of 126 orgs/100 mL provides equivalent protection from illness due to primary contact recreation as the fecal coliform WQS of 200 orgs/100 mL.

MPCA acknowledged the presence of CAFOs in the MRWW in Section 3.6.2.1 of the final TMDL document. CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota Rule 7020.2003). CAFOs were assigned a WLA of zero (WLA = 0) for the MRWW bacteria TMDLs.

MRWW phosphorus TMDLs: MPCA identified the City of Winona's MS4 (MS400247) flow/stormwater contribution as a NPDES permitted entity which contributes nutrient loads to Lake Winona (NW) and Lake Winona (SE) (Figure 23 of the final TMDL document). MPCA determined the percentage of areal coverage for the City of Winona MS4 (determined from GIS areal coverages) within the larger MRWW and then multiplied that value by the total watershed loading capacity (from BATHTUB) after the MOS and other NPDES point source dischargers were subtracted. This calculation determined the WLA assigned to the City of Winona's MS4 for the Lake Winona (NW) and Lake Winona (SE) phosphorus TMDLs (Tables 12 & 13 of this Decision Document).

MPCA also calculated a portion of the WLA for construction and industrial stormwater. This WLA was represented as a categorical WLA for construction stormwater and a categorical WLA for industrial stormwater. Overall, the construction and industrial stormwater WLA make up a very small portion of the overall loading capacity but MPCA wanted to recognize their contributions. MPCA's calculation for the construction stormwater WLA was based on the average annual fraction of the impaired subwatershed under construction activity over the previous 5-year period, based on MPCA Construction

Stormwater Permit data from January 2007 to October 2012 (Section 4 of the final TMDL). This percentage was area weighted based on the fraction of the subwatershed located in Winona County (0.04%) and then multiplied by the watershed runoff load component to determine the construction stormwater WLA. The watershed runoff load component is equal to the total TMDL (loading capacity) minus the sum of the non-watershed runoff load components (upstream loads and MOS). MPCA set the industrial WLA equal to the calculation of the construction WLA.

Attaining the construction stormwater and industrial stormwater loads described in the Lake Winona (NW) and Lake Winona (SE) phosphorus TMDLs is the responsibility of construction and industrial site managers. The City of Winona's MS4 program is responsible for overseeing construction stormwater loads which impact water quality in Lake Winona. The City of Winona is 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 MNR1000001 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.

MPCA is responsible for overseeing industrial stormwater loads which impact water quality in Lake Winona (NW) and Lake Winona (SE). Industrial sites within these lake subwatersheds are expected to comply with the requirements of the State's NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) or NPDES/SDS General Permit for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production facilities (MNG490000). MPCA explained that if a facility owner/operator obtains coverage under the appropriate NPDES/SDS General Stormwater Permit and properly selects, installs and maintains all BMPs required under the permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL. BMPs and other stormwater control measures which act to limit the discharge of the pollutant of concern (phosphorus) are defined in MNR050000 and MNG490000.

The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under 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 Lake Winona (NW) and Lake Winona (SE) 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, MNR050000 and MNG490000.

EPA finds MPCA's approach for calculating the WLA for the Lake Winona (NW) and Lake Winona (SE) phosphorus TMDLs to be reasonable and consistent with EPA guidance.

MRWW TSS TMDLs: MPCA identified NPDES permitted facilities within the MRWW and assigned those facilities a portion of the WLA (Table 14 of this Decision Document). The WLAs for each of these individual facilities were calculated based on the facility's wet weather design flow and the Class 2A target (10 mg/L) or the Class 2B target (65 mg/L).

Similar to the phosphorus TMDLs, MPCA calculated a portion of the WLA for construction and industrial stormwater. This WLA was represented as a categorical WLA for construction stormwater and a categorical WLA for industrial stormwater. Overall, the construction and industrial stormwater WLA make up a very small portion of the overall loading capacity but MPCA wanted to recognize their contributions. MPCA's calculation for the construction stormwater WLA was based on the average annual fraction of the impaired subwatershed under construction activity over the previous 5-year period, based on MPCA Construction Stormwater Permit data from January 2007 to October 2012 (Section 4 of the final TMDL). This percentage was area weighted based on the fraction of the subwatershed located in Olmsted County (0.13%), Wabasha County (0.03%) and Winona County (0.04%), then multiplied by the watershed runoff load component to determine the construction stormwater WLA. The watershed runoff load component is equal to the total TMDL (loading capacity) minus the sum of the non-watershed runoff load components (upstream loads and MOS). MPCA set the industrial WLA equal to the calculation of the construction WLA.

MPCA's expectations and responsibilities for overseeing construction and industrial stormwater loads for the phosphorus TMDLs are the same for the sediment TMDLs. Construction and industrial sites are expected to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under 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 TSS TMDLs for MRWW. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18-months of the approval of the TMDL by the U.S. EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

EPA finds MPCA's approach for calculating the WLA for the MRWW TSS TMDLs to be reasonable and consistent with EPA guidance.

MRWW nitrate TMDLs: MPCA identified NPDES permitted facilities within the MRWW and assigned those facilities a portion of the WLA (Table 15 of this Decision Document). The WLAs for each of these individual facilities were calculated based on the facility's design flow and the nitrate target (10 mg/L). MPCA also calculated a nitrate WLA for the Crystal Springs State Fish Hatchery (MN0004421) because this facility is covered by a NPDES permit. MPCA's calculation for the Crystal Springs State Fish Hatchery's WLA was set equal to the permitted discharge volume multiplied by the nitrate target (10 mg/L) (Table 54 of the final TMDL document).

Similar to the nutrient and sediment TMDLs, MPCA calculated a portion of the WLA for construction and industrial stormwater. This WLA was represented as a categorical WLA for construction stormwater and a categorical WLA for industrial stormwater. Overall, the construction and industrial stormwater WLA make up a very small portion of the overall loading capacity but MPCA wanted to recognize their contributions. MPCA's calculation for the construction stormwater WLA was based on the average annual fraction of the impaired subwatershed under construction activity over the previous 5-year period, based on MPCA Construction Stormwater Permit data from January 2007 to October 2012 (Section 4 of the final TMDL). This percentage was area weighted based on the fraction of the subwatershed located in Olmsted County (0.13%), Wabasha County (0.03%) and Winona County (0.04%), then multiplied by the watershed runoff load component to determine the construction stormwater WLA. The watershed runoff load component is equal to the total TMDL (loading capacity) minus the sum of the non-watershed runoff load components (upstream loads and MOS). MPCA set the industrial WLA equal to the calculation of the construction WLA.

MPCA's expectations and responsibilities for overseeing construction and industrial stormwater loads for the nitrate TMDLs are the same for the nutrient and sediment TMDLs. Construction and industrial sites are expected to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under 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 nitrate TMDLs for MRWW. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18-months of the approval of the TMDL by the U.S. EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

EPA finds MPCA's approach for calculating the WLA for the MRWW nitrate 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, phosphorus, TSS and nitrate TMDLs. All four parameters employed an explicit MOS set at 10% of the loading capacity.

MRWW bacteria, TSS and nitrate TMDLs: The bacteria, TSS and nitrate TMDLs incorporated a 10% explicit MOS applied to the total loading capacity calculation for each flow regime of the LDC.

Ten percent of the total loading capacity was reserved for MOS with the remaining load allocated to point and nonpoint sources (Tables 11, 14 and 15 of this Decision Document). MPCA explained that the explicit MOS was set at 10% due to the following factors discovered during TMDL development for these three pollutants:

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

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 MRWW 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.

MRWW phosphorus TMDLs: The phosphorus TMDLs employed an explicit MOS set at 10% of the loading capacity. The explicit MOS was applied by reserving 10% of the total loading capacity, and then allocating the remaining loads to point and nonpoint sources (Tables 12 and 13 of this Decision Document). MPCA explained that the explicit MOS was set at 10% due to the following factors:

- Environmental variability in pollutant loading;
- Variability in water quality data (i.e., collected water quality monitoring data);
- The agreement between water quality models' predicted and observed values;
- Conservative assumptions made during the modeling efforts; and
- MPCA's confidence in the BATHTUB model's performance during the development of phosphorus TMDLs.

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:

MRWW 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 MRWW 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).

MRWW phosphorus TMDLs: Seasonal variation was considered for the MRWW phosphorus TMDLs as described in Section 4.1.5 of the final TMDL document. The nutrient targets employed in the Lake Winona (NW) and (SE) phosphorus 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 NCHF eutrophication WQS during the period of the year where the frequency and severity of algal growth is the greatest.

The Minnesota eutrophication standards state that total phosphorus WQS are defined as the mean concentration of phosphorus values measured during the growing season. In the MRWW phosphorus 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 MRWW 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).

MRWW TSS TMDLs: The TSS WQS applies from April to September which is also the time period when high concentrations of sediment are expected in the surface waters of the MRWW (Section 4.4.5 of the final TMDL document). Sediment loading to surface waters in the MRWW varies depending on surface water flow, land cover and climate/season. Typically, in the MRWW, sediment is being moved from terrestrial source locations into surface waters during or shortly after wet weather events. Spring is typically associated with large flows from snowmelt, the summer is associated with the growing season as well as periodic storm events and receding streamflows, and the fall brings increasing precipitation and rapidly changing agricultural landscapes.

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

MRWW nitrate TMDLs: Critical conditions which may impact nitrate's introduction to surface water are likely very similar to sediment in that these conditions are influenced by precipitation events. Nitrate and manure fertilizer application to agricultural areas in the MRWW can introduce nitrate concentrations to local surface waters during precipitation events. Critical conditions that impact loading, or the rate that nitrate is delivered to the water body, were identified as those periods where large precipitation events coincide with periods of minimal vegetative cover on fields. Large precipitation events and minimally covered land surfaces can lead to large runoff volumes, especially to those areas which drain agricultural fields. The conditions generally occur in the spring and early summer seasons.

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

8. Reasonable Assurance

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

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

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

Comment:
The MRWW bacteria, phosphorus, TSS and nitrate 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 MRWW. 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 MRWW. Implementation practices will be implemented over the next several years. The following groups are expected to work closely with one another to ensure that pollutant reduction efforts via BMPs are being implemented within the MRWW: the Olmsted, Wabasha and Winona Soil and Water Conservation Districts (SWCDs), the Whitewater River Watershed Project, Healthy Lake Winona, City of Winona, Winona State University, and the Minnesota Department of Natural Resources (DNR).

In the late 1990s MPCA worked with an alliance of federal, state and local partners to form the Basin Alliance for the Lower Mississippi in Minnesota (BALMM). One of the BALMM's goals was to focus on water quality restoration and protection, and to coordinate efforts among local partner organizations in southeastern Minnesota.[3] One of the BALMM's early priorities was targeting and mitigating bacteria inputs to rivers in the Lower Mississippi River basin, which included areas of the MRWW. The BALMM partnered with the Southeast Minnesota Water Resources Board and the Southeast Minnesota Wastewater Initiative to secure funding and begin to implement BMPs aimed at reducing bacteria inputs from small feedlots and unsewered communities in the basin.[4] Pollutant management efforts on a basin-wide scale, employing the assistance of multiple partners, has resulted in improved bacteria water quality in the Cannon River watershed (i.e., Cannon River and Straight River).

The BALMM is still currently active in southeastern Minnesota and meets monthly in Rochester, Minnesota. Recent topics at monthly BALMM meetings include: an upcoming forum on contaminants in drinking water (nitrogen species) by the Minnesota Department of Health, stream restoration workshops held by staff of Minnesota DNR, results of groundwater testing in southeastern Minnesota, and workshops on how to secure funding for nonpoint source mitigation projects. Efforts underway by the BALMM and its partners demonstrate that there is an active, diverse, and committed stakeholder presence in southeastern Minnesota. Partners in the MRWW who are charged with improving water quality can take advantage of the resources, success stories and lessons learned of the BALMM community.

The Whitewater River Watershed Project (WRWP) is a stakeholder group which is actively engaged in water quality improvement activities in MRWW. The Whitewater River Watershed was selected in 2013 to be a pilot area for practices supported by the Minnesota Agricultural Water Quality Certification Program (MAWQCP). The MAWQCP focuses on voluntary implementation efforts aimed at enhancing and improving local water quality, while maintaining a productive agricultural economy.[5] Also, the WRWP assists local agricultural stakeholders with nutrient and manure management planning, forest stewardship planning, soil health and amendment guidance, GIS mapping assistance and one-on-one

[3] MPCA webpage, https://www.pca.state.mn.us/water/lower-mississippi-river-basin

[4] MPCA webpage, https://www.pca.state.mn.us/water/water-story-feedlot-fixes-sewage-solutions-and-healthier-rivers

[5] Whitewater River Watershed Project webpage, http://www.whitewaterwatershed.org/programs.htm

educational and outreach. Efforts of the WRWP have enabled local stakeholders to take a more active role in pollutant mitigation efforts.

The Winona County SWCD is another active partner whose objectives include improving water quality in the MRWW. The Winona County SWCD recently re-adopted the Winona County Comprehensive Local Water Management Plan.[6] The Comprehensive Local Water Management Plan is designed to link land use activities with the protection and improvement of surface and groundwater resources.[7] The plan serves as a guide for policy and capital considerations for local governmental units in Winona County. The plan also allows local units of government to receive Natural Resource Block Grant allocations and apply for additional grant funding to implement water resource management activities in Winona County. A plan for 2011-2015 is available online and provides recommendations for managing sensitive areas in Winona County where agricultural areas abut surface waters and unique geologic features (i.e., karst areas).

The ongoing efforts in the MRWW of the BALMM, the WRWP and the Winona County SWCD, demonstrate the commitment of stakeholders to improving water quality in southeastern Minnesota. While measureable progress may be slow to develop, actions from these groups and other stakeholders in the MRWW will ultimately result in improvements to water quality for all of the pollutants address in the MRWW TMDLs.

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, phosphorus, TSS and nitrate 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.

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 some of 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 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 MRWW TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified. This applies to sites under 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).

MPCA is responsible for applying federal and state regulations to protect and enhance water quality within the TMDL study area. MPCA oversees all regulated MS4 entities (ex. City of Winona) in

[6] Whitewater River Watershed Project webpage, Whitewater Joint Powers Board, January 21, 2016, meeting minutes, http://www.whitewaterwatershed.org/pdf/minutes/January-2016.pdf
[7] Winona County (MN) SWCD webpage, http://www.co.winona.mn.us/page/2851

stormwater management accounting activities. MS4 permits require permittees to implement BMPs to reduce pollutants in stormwater runoff to the Maximum Extent Practicable (MEP).

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

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

The MS4 General Permit, which became effective August 1, 2013, requires permittees to develop compliance schedules for any TMDL that received U.S. EPA-approval prior to the effective date of the General Permit. This schedule must identify BMPs that will be implemented over the five-year permit term, timelines for their implementation, an assessment of progress, and a long term strategy for continued progress toward ultimately achieving those WLAs. Because this TMDL will be approved after the effective date of the General Permit, MS4s will not be required to report on WLAs contained in this TMDL until the effective date of the next General Permit, expected in 2018.

MPCA requires MS4 applicants to submit their application materials and SWPPP documentation to MPCA for review. Prior to extension of coverage under the general permit, all application materials are placed on 30-day public notice by MPCA, to ensure adequate opportunity for the public to comment on each permittee's stormwater management program. Upon extension of coverage by MPCA, the permittees are to implement the activities described within their SWPPP, and submit annual reports to MPCA by June 30 of each year. These reports document the implementation activities which have been completed within the previous year, analyze implementation activities already undertaken, and outline any changes within the SWPPP from the previous year.

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. 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.

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 Watershed Restoration and Protection Strategies (WRAPS). The WRAPS are required to contain such elements as the identification of impaired waters, watershed modeling outputs, point and nonpoint sources, load reductions, etc. (*Chapter 114D.26*; CWLA). The WRAPS also contain an implementation table of strategies and actions that are capable of achieving the needed load reductions, for both point and nonpoint sources (*Chapter 114D.26*, Subd. 1(8); CWLA). Implementation plans developed for the TMDLs are included in the table, and are considered "priority areas" under the WRAPS process (*Watershed Restoration and Protection Strategy Report Template*, MPCA). This table includes not only needed actions but a timeline for achieving water quality targets, the reductions needed from both point and nonpoint sources, the governmental units responsible, and interim milestones for achieving the actions. MPCA has developed guidance on what is required in the WRAPS (*Watershed Restoration and Protection Strategy Report Template*, MPCA). MPCA is developing a WRAPS document for the MRWW and should have the draft version of the MRWW WRAPS available for public comment in the near future.

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 MRWW (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 Olmsted County SWCD, Wabasha County SWCD and Winona County SWCD) and volunteers (i.e., the Southeast Minnesota Volunteer Nitrate Monitoring Network and the Volunteer Nitrate Monitoring Network[8]), as long as there is sufficient funding to support the efforts of these local entities. At a minimum, the MRWW will be monitored once every 10 years as part of MPCA's Intensive Watershed Monitoring cycle.

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[8] http://mrbdc.mnsu.edu/mnnutrients/sites/mrbdc.mnsu.edu.mnnutrients/files/public/watershed/pm_waterplans/untitled%20folder/40_bufww_wp.pdf

Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation efforts utilized in the MRWW. 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 MRWW. 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 MRWW, 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 MRWW 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 MPCA, Minnesota Department of Natural Resources (MN-DNR), or other agencies every five to ten years during the summer season.

Lake Monitoring:
The Lake Winona and other lakes of the MRWW have all been periodically monitored by MPCA 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 MRWW TMDLs will be used to inform the selection of implementation activities as part of the Mississippi River-Winona 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 MRWW, education and outreach efforts with local partners, and partnering with local stakeholders to improve water quality within the watershed. The MRWW WRAPS document includes additional detail regarding specific recommendations from MPCA to aid in the reduction of bacteria, nutrients, TSS and nitrate to surface waters of the MRWW. Additionally, MPCA referenced the Statewide Nutrient Reduction Strategy (https://www.pca.state.mn.us/water/nutrient-reduction-strategy) for focused implementation efforts targeting phosphorus and nitrate nonpoint sources in MRWW. The reduction goals for the bacteria, phosphorus, TSS and nitrate TMDLs may be met via components of the following strategies:

MRWW 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 MRWW.

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

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.

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

MRWW phosphorus TMDLs:

Septic Field Maintenance: Septic systems are believed to be a source of nutrients to waters in the MRWW. 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 MRWW.

Manure management (feedlot and manure stockpile runoff controls): Manure has been identified as a potential source of nutrients in the MRWW. 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 MRWW. 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 MRWW. 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 (ex. 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 MRWW phosphorus 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 (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 (ex. aluminum sulfate) to lakes of the MRWW 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.

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

MRWW TSS TMDLs:

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

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

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

MRWW nitrate TMDLs:
Septic Field Maintenance: Septic systems are believed to be a source of nitrate to waters in the MRWW. 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 nitrates inputs into the MRWW.

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

Pasture management and agricultural reduction strategies: These strategies involve reducing nitrate 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 nitrate management planning.

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 MRWW 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 formed various committees and 'teams' (ex. Whitewater Watershed Technical Committee and Citizen Advisory Panel) to discuss goals of the TMDL, strategies and approaches to reducing pollutant inputs to waters in the MRWW and ongoing and future implementation efforts in the MRWW. A full description of civic engagement activities associated with the TMDL process will be available within in the MRWW WRAPS report.

MPCA posted the draft TMDL online at (http://www.pca.state.mn.us/water/tmdl) for a public comment period. The 30-day public comment period was started on August 24, 2015 and ended on September 24, 2015. MPCA received eleven public comments during the public comment period. MPCA submitted all comments received during the public notice period and its responses to each of these comments with the final TMDL submittal packet received by the EPA on March 24, 2016.

Commenters William Richardson, Jeff Bernardy, and Anne Morse, voiced their support for MPCA's efforts in completing the MRWW TMDLs and phosphorus source analyses for Lake Winona. Mr. Richardson and Ms. Morse, communicated that the timing of the TMDL was fortuitous for the Healthy Lake Winona (HLW) group as the HLW assembles funding proposals for phosphorus mitigation efforts in the Lake Winona watershed. Mr. Bernardy, a citizen of Winona County, expressed his hope that phosphorus reduction BMPs in the Lake Winona watershed can be implemented and water quality in Lake Winona restored.

Laurie Rodgers, of La Crescent, Minnesota, expressed her concern for the current water quality of Lake Winona and the need to better educate and engage other stakeholders in the MRWW regarding ongoing water quality challenges. Additionally, Ms. Rodgers discussed the need for local parties to take measures to clean water entering Lake Winona from up-watershed areas. MPCA cited the ongoing efforts of the HLW stakeholder group and encouraged Ms. Rodgers to continue to communicate future water quality concerns in Lake Winona to MPCA.

Margaret Walsh, a member of the Board of Adjustments for Winona County, encouraged MPCA to discourage additional feedlot and mining developments in Winona County until impairments in existing Winona County waters are addressed. MPCA acknowledged Ms. Walsh's comment and provided informational MPCA websites regarding her requests for silica sand mining operations and groundwater permits.

Cameron Kennedy, of Altura, Minnesota, submitted a comment sharing personal observations of ongoing water quality challenges on his property near Altura, MN. Mr. Kennedy hypothesized that these conditions were being driven by activities up-watershed of his property and requested MPCA assistance in improving the waters in the MRWW. MPCA provided Mr. Kennedy a Google Earth image of areas east of Altura, Minnesota and encouraged Mr. Kennedy to potentially work with local watershed groups (ex. the Winona County Soil and Water Conservation District) in their efforts toward educating stakeholders in the MRWW on different sediment and bacteria best management practices. MPCA referenced existing on the ground sediment management practices east of the City of Altura, but that more measures may be necessary in critical areas in upstream of Mr. Kennedy's property to restore and improve water quality.

Emily Bartusek, a Winona County Feedlot Officer, submitted comments which outlined clarification to certain sections of the public notice draft of the TMDL. Specifically, clarifying available water quality data which was incorporated in the development of the TMDL, the presence and potential impact of non-NPDES permitted feedlots, manure's impact on water quality, manure management activities in the MRWW, animal unit estimates made by MPCA in the MRWW and additional discussion of limitations and/or assumption on a regression analysis cited in Section 3.6.3.2 of the final TMDL document. MPCA answered each of Ms. Bartusek's requests and provided additional explanation for the regression analysis question. MPCA also, where appropriate, updated language within the final TMDL document related to comments raised by Ms. Bartusek.

Heidi Peterson, of the Minnesota Department of Agriculture (MDA), shared comments which requested that MPCA revisit certain areas of the public notice draft and update discussion within this document to better represent the conditions of the MRWW. Ms. Peterson highlighted the following areas and requested MPCA revise these topics; inclusion of information related to MDA's Nitrogen Fertilizer Management Plan, a referenced MDA report which discusses the conversion of nitrogen fertilizers to ammonium and nitrate, updating reference materials within the TMDL document, along with other edits and suggestions. MPCA answered Ms. Peterson's requests and updated the final TMDL appropriately in its response to Ms. Peterson's comment.

Nichole Lehman, of the Minnesota Department of Natural Resources (MDNR), submitted comments related to: MPCA's discussion of the MDNR's operation of the Crystal Springs Fish Hatchery related to source waters which supply the hatchery with its water and stormwater sources impacting the discharge stream from the hatchery, MPCA's approach for impairment determinations in the MRWW, improvements to maps, figures and subwatershed boundaries to clarify these as supporting evidence for the TMDL document, along with other edits and suggestions. MPCA answered Ms. Lehman's comments and made changes within the final draft of the MRWW TMDL. Details related to MPCA's responses to Ms. Lehman are found in MPCA's response to Ms. Lehman's comment of September 24, 2015.

John Lenczewski, of Minnesota Trout Unlimited, shared comments regarding; the appropriateness of using the drinking water nitrate standard (10 mg/L) versus proposed draft nitrate standards for coldwater (3.1 mg/L) or warmwater streams (4.9 mg/L)[9], wastewater treatment plant nitrate allocations, surface water and groundwater contributions for the nitrate load duration curves, dissolved oxygen assessments, ongoing bacteria implementation efforts, reasonable assurance for nitrate reductions and allocations given to CAFOs. MPCA responded to Mr. Lenczewski's comments within its response to comments letter of January 27, 2016.

[9] The proposed draft nitrate class 2 aquatic life WQS for nitrate (coldwater (3.1 mg/L) or warmwater streams (4.9 mg/L)) were included in a MPCA 2008 Technical Support Document but the MPCA has yet to finalize these draft nitrate WQS.

Kris Sigford, of the Minnesota Center for Environmental Advocacy (MCEA), submitted comments to MPCA on the MRWW nitrate and bacteria TMDL developmental efforts. MCEA's nitrate comments focused on: the lack of source identification and critical season analyses, MPCA's calculation of nitrate WLAs assigned to wastewater treatment plants, and reasonable assurances for nonpoint source nitrate implementation efforts. MCEA's bacteria comments focused on: historical bacteria impairments in the watershed and implementation efforts to address those bacterial impacted segments, the calculation of WLAs for CAFOs and LA for septic systems and the concern that these potential sources have not been accurately accounted for in MRWW TMDLs, and reasonable assurance that CAFOs and septic systems will be addressed in future implementation efforts. MCEA also submitted a comment on identified dissolved oxygen (DO) stressors and their ties to existing and future TMDL efforts. MPCA answered each of MCEA's comments in a letter dated January 27, 2016.

Nitrate comments from MCEA:
MPCA explained that the nitrate LDCs were based on observed in-stream concentrations, ambient water quality monitoring data, and SWAT predicted in-stream concentrations. The SWAT modeling efforts incorporated surface and groundwater nitrate inputs. Seasonal analyses were completed for nitrate source inputs and loading patterns investigated.

Nitrate WLAs were based on the 10 mg/L nitrate water quality standard and the facility's design flow. MPCA stated that TMDLs are a calculation of the maximum amount of a pollutant that a waterbody can receive and still attain water quality standards. Nitrate WLAs are calculated to inform the NPDES permitting process. MPCA stated further that WLA values are not always directly transferable to the NPDES permit and do not define the conditions of the permit, the permit limits or compliance schedules of the permit. MPCA NPDES permit writers are expected to translate WLAs to NPDES permit limits which are consistent with the assumptions and requirements of the TMDL (See 40 CFR § 122.44(d)(1)(vii)(B)).

MPCA explained that the NPDES permitted facilities in Table 54 (page 93 of the final TMDL document) do not currently have numeric effluent limits for nitrate or total nitrogen in their permits. MPCA will consider the requirements and assumptions of the TMDL's WLA during the reissuance of those permits. MPCA stated further that reissued NPDES permits for permittees whose discharges are found to have a reasonable potential to contribute to a violation of the nitrate water quality standard (10 mg/L) should include a water quality based effluent limit (WQBEL).

MPCA addressed reasonable assurance topics in Sections 6 and 8 of the final TMDL document. Also, MPCA will include further discussion of nitrate BMPs to target point and nonpoint sources of nitrate in the soon to be released draft WRAPS document. The WRAPS document will summarize current conditions, sources, goals, timelines, milestones, who is responsible for implementation efforts and describe restoration and protection strategies.

MPCA referenced information included within the Minnesota Nutrient Reduction Strategy (September 2014) document. MPCA anticipates that the strategies in this document would be the foundation of the point and nonpoint source discussion in the soon to be public noticed MRWW WRAPS document. Strategies and practices discussed in this document can be used by local partners to develop implementation strategies for nonpoint source nutrient inputs to surface waters in the MRWW. The

Minnesota Nutrient Reduction Strategy discusses nutrient and specifically nitrate management practices for the Mississippi River basin in Section 6 of the document.

Dissolved Oxygen comments from MCEA:
MPCA explained that there are no stream segments in the MRWW currently impaired for low DO and therefore, there are no DO TMDLs included in the MRWW TMDL document. MPCA's conclusion was based on its stressor identification report completed in March 2015.[10] The DO information which MCEA was referencing was characterized by MPCA as one of potentially many stressors which were impacting fish and macroinvertebrate health in selected segments of the MRWW. MPCA stated that DO was not the sole driver of aquatic life stress in the segments cited by MCEA. Additionally, MPCA explained that the available DO data was inconclusive for MPCA to further link DO conditions to phosphorus impairments. MPCA has utilized TP TMDLs as surrogates for DO impairments in previous TMDL efforts. MPCA indicated that restoration activities to address other stressors and pollutants (ex. phosphorus and nitrate) will have a positive impact on improving DO concentrations in areas of the MRWW which have demonstrated lower concentrations of oxygen in the water column.

Bacteria comments from MCEA:
MPCA explained that bacteria impairments addressed in the MRWW and the implementation efforts to address these segments will supplement ongoing implementation efforts for the Lower Mississippi River Basin Regional Fecal Coliform TMDL. MPCA will continue to work with local government units and other stakeholders to mitigate the inputs of bacteria to surface waters of southeastern Minnesota.

MPCA restated its rationale for assigning WLAs to CAFOs and LAs to septic systems in the MRWW. WLAs for CAFOs are based on the premise that CAFOs will adhere to the conditions of their permit and not discharge to surface waters. LAs for failing or imminent threat to public health septic systems (ITPHSS) are based on the premise that these systems will be identified and replaced/repaired by locally led efforts.[11] Properly functioning septic systems will have improved capacity to treat pollutants and reduce their inputs as a potential source to impaired surface waters of the MRWW.

Additional detail on these issues is provided in MPCA's response to MCEA's comments dated January 27, 2016. EPA believes that MPCA adequately addressed the comments received from MCEA during the public notice period and where necessary updated the final TMDL document in response to those comments.

EPA recognizes that MPCA has not provided as much detail in the TMDL document as EPA would typically see in a final Minnesota TMDL submittal. EPA understands that MPCA has a process in place which supplements the reasonable assurance and implementation discussions of the TMDL with an MPCA authored WRAPS document and a Minnesota Board of Water and Soil Resource (BWSR) authored One Watershed, One Plan (1W1P) document. These documents will provide additional detail regarding ongoing and planned implementation efforts within the MRWW. Specifically, the WRAPS document will include a summary of current conditions, sources, goals, timelines, milestones, who is responsible for implementation efforts and describe restoration and protection strategies. EPA

[10] Mississippi River-Winona Watershed Biotic Stressor Identification Report, March 2015, https://www.pca.state.mn.us/sites/default/files/wq-ws5-07040003a.pdf
[11] Details provided in MPCA's response to MCEA, pages 4-6, January 27, 2016.

understands that the 1W1P document will continue to build off of the TMDL and WRAPS documents and provide a focused, comprehensive implementation plan on the watershed scale.[12]

The WRAPS document is typically made available for public review concurrently with the public notice draft of the TMDL. MPCA has not yet made available the MRWW WRAPS document. Therefore, references within the public notice draft TMDL which cited additional discussions (i.e., further detail on implementation, scheduling, funding) within the MRWW WRAPS document were not made available to the public during the public notice period for the TMDL. It is EPA's understanding that MPCA will make available the MRWW WRAPS document for public comment sometime in the summer of 2016.[13]

In a March 1, 2016 letter to EPA, MCEA requested that EPA review MPCA's responses to MCEA inquiries from the public notice period and require MPCA to correct deficiencies identified by MCEA in the final draft of the MRWW TMDL. In this letter, MCEA reiterated some of the same comments it had submitted to MPCA during the public notice period of the TMDL. EPA considered the issues raised in MCEA's letter to EPA during its review of the final MRWW TMDLs. EPA determined that MPCA's assumptions and rationale for calculating TMDLs, especially WLAs and LAs, were consistent with EPA expectations of an approvable TMDL.

EPA believes that MPCA adequately addressed the comments received during the public notice period and where necessary updated the final TMDL document in response to those comments. MPCA submitted all public comments and responses to those comments in its final TMDL submittal packet received by the EPA on March 24, 2016.

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 Mississippi River-Winona watershed TMDL document, submittal letter and accompanying documentation from MPCA on March 24, 2016. 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.

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[12] Minnesota Board of Water & Soil Resources webpage - http://www.bwsr.state.mn.us/planning/1W1P/index.html

[13] EPA (Paul Proto) and MPCA (Shaina Keseley) discussion on May 26, 2016.

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

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

13. Conclusion

After a full and complete review, the EPA finds that the 7 bacteria TMDLs, the 2 phosphorus TMDLs, the 12 TSS TMDLs and the 4 nitrate TMDLs satisfy all elements for approvable TMDLs. This TMDL approval is for **twenty-five TMDLs**, addressing segments for aquatic recreational, aquatic life and drinking water 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.

TMDL Tables for the Mississippi River-Winona Watershed

Table 11: Bacteria (*E. coli*) TMDLs for the Mississippi River-Winona Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		E. coli (billions of bacteria/day)				
TMDL for Whitewater River (07040003-515)						
Existing Load		811.20	1127.30	479.40	143.70	no data
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
	WLA Totals	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	38.70	26.80	20.60	15.60	13.20
Margin Of Safety (10%)		4.30	3.00	2.30	1.70	1.50
	Loading Capacity (TMDL)	**43.00**	**29.80**	**22.90**	**17.30**	**14.70**
Estimated Load Reduction (*E. coli* load)		768.20	1097.50	456.50	126.40	--
Estimated Load Reduction (%)		95%	97%	95%	88%	--
TMDL for Peterson Creek (07040003-529)						
Existing Load		21.60	8.00	no data	no data	no data
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
	WLA Totals	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	8.30	7.00	6.40	5.80	5.00
Margin Of Safety (10%)		0.90	0.80	0.70	0.60	0.60
	Loading Capacity (TMDL)	**9.20**	**7.80**	**7.10**	**6.40**	**5.60**
Estimated Load Reduction (*E. coli* load)		12.40	0.20	--	--	--
Estimated Load Reduction (%)		57%	3%	--	--	--
TMDL for Rollingstone Creek (07040003-533)						
Existing Load		1893.30	2080.50	1829.60	788.40	976.90
Wasteload Allocation	Rollingstone WWTP (MNG580078)	3.80	3.80	3.80	3.80	3.80
	WLA Totals	3.80	3.80	3.80	3.80	3.80
Load Allocation	Watershed load	145.60	122.70	109.50	98.50	87.60
Margin Of Safety (10%)		16.60	14.10	12.60	11.40	10.20
	Loading Capacity (TMDL)	**166.00**	**140.60**	**125.90**	**113.70**	**101.60**
Estimated Load Reduction (*E. coli* load)		1727.30	1939.90	1703.70	674.70	875.30
Estimated Load Reduction (%)		91%	93%	93%	86%	90%
TMDL for Whitewater River (07040003-539)						
Existing Load		27036.10	1621.10	391.60	765.30	no data
Wasteload Allocation	Utica WWTP (MN0022055)	1.09	1.09	1.09	1.09	1.09
	Whitewater Region WWTP (MN0046868)	5.34	5.34	5.34	5.34	5.34

	DNR Crystal Springs State Fish Hatchery (MN0004421)	15.26	15.26	15.26	15.26	15.26
	Altura WWTP (MN0021831)	1.71	1.71	1.71	1.71	1.71
	Plainview Elgin WWTP (MN0055361)	12.74	12.74	12.74	12.74	12.74
	WLA Totals	36.14	36.14	36.14	36.14	36.14
Load Allocation	Whitewater R, Middle (-515)	38.70	26.80	20.60	15.60	13.20
	Logan Branch (-552)	42.00	27.10	21.70	16.20	13.10
	Crow Spring (-611)	18.50	14.10	11.10	9.20	8.10
	Watershed Load	826.50	521.50	408.30	332.60	287.60
	LA Totals	925.70	589.50	461.70	373.60	322.00
Margin Of Safety (10%)		106.90	69.50	55.30	45.50	39.80
Loading Capacity (TMDL)		**1068.74**	**695.14**	**553.14**	**455.24**	**397.94**
Estimated Load Reduction (*E. coli* load)		25967.36	925.96	--	310.06	--
Estimated Load Reduction (%)		96%	57%	--	41%	--
TMDL for Logan Branch (07040003-552)						
Existing Load		49272.10	146.50	55.90	3.80	0.90
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
	WLA Totals	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	42.00	27.10	21.70	16.20	13.10
Margin Of Safety (10%)		4.70	3.00	2.40	1.80	1.50
Loading Capacity (TMDL)		**46.70**	**30.10**	**24.10**	**18.00**	**14.60**
Estimated Load Reduction (*E. coli* load)		49225.40	116.40	31.80	--	--
Estimated Load Reduction (%)		100%	79%	57%	--	--
TMDL for Gavin Brook (07040003-595)						
Existing Load		4596.70	3024.50	no data	no data	no data
Wasteload Allocation	Stockton WWTP (MNG580079)	2.90	2.90	2.90	2.90	2.90
	Minnesota City WWTP (MN0069817)	0.10	0.10	0.10	0.10	0.10
	WLA Totals	3.00	3.00	3.00	3.00	3.00
Load Allocation	Peterson Creek (-529)	8.30	7.00	6.40	5.80	5.00
	Rollingstone Creek (-533)	149.40	126.50	113.30	102.30	91.40
	Watershed load	130.40	109.20	97.20	87.70	74.10
	LA Totals	288.10	242.70	216.90	195.80	170.50
Margin Of Safety (10%)		32.40	27.30	24.40	22.10	19.30
Loading Capacity (TMDL)		**323.50**	**273.00**	**244.30**	**220.90**	**192.80**
Estimated Load Reduction (*E. coli* load)		4273.20	2751.50	--	--	--
Estimated Load Reduction (%)		93%	91%	--	--	--
TMDL for Crow Spring River (07040003-611)						
Existing Load		133.10	11.40	99.90	20.00	no data
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00

	WLA Totals	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	18.50	14.10	11.10	9.00	8.10
Margin Of Safety (10%)		2.10	1.60	1.20	1.00	0.90
Loading Capacity (TMDL)		**20.60**	**15.70**	**12.30**	**10.00**	**9.00**
Estimated Load Reduction (*E. coli* load)		112.50	--	87.60	10.00	--
Estimated Load Reduction (%)		85%	--	88%	50%	--

Table 14: Total Suspended Solids (TSS) TMDLs for the Mississippi River-Winona Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		TSS (kg/day)				
TMDL for Whitewater River (07040003-512)						
Existing Load		21341.00	1941.00	486.00	1886.00	95.00
Wasteload Allocation	Utica WWTP (MN0022055)	17.30	17.30	17.30	17.30	17.30
	DNR Crystal Springs State Fish Hatchery (MN0004421)	242.30	242.30	242.30	242.30	242.30
	Altura WWTP (MN0021831)	27.20	27.20	27.20	27.20	27.20
	Construction Stormwater (MNR100001)	0.10	0.07	0.04	0.02	0.01
	Industrial Stormwater (MNR50000)	0.10	0.07	0.04	0.02	0.01
	WLA Totals	287.00	286.94	286.88	286.84	286.82
Load Allocation	Whitewater River (-F17)	1568.30	890.30	713.70	593.50	519.90
	Watershed Runoff	261.80	163.90	100.30	55.60	29.90
	LA Totals	1830.10	1054.20	814.00	649.10	549.80
Margin Of Safety (10%)		235.20	149.00	122.30	104.00	92.90
Loading Capacity (TMDL)		**2352.30**	**1490.14**	**1223.18**	**1039.94**	**929.52**
Estimated Load Reduction (TSS load)		18988.70	450.86	--	846.06	--
Estimated Load Reduction (%)		89%	23%	--	45%	--
TMDL for Whitewater River (07040003-F17)						
Existing Load		no data	no data	no data	no data	no data
Wasteload Allocation	Construction Stormwater (MNR100001)	<0.01	<0.01	<0.01	<0.01	<0.01
	Industrial Stormwater (MNR50000)	<0.01	<0.01	<0.01	<0.01	<0.01
	WLA Totals	0.00	0.00	0.00	0.00	0.00
Load Allocation	Whitewater River (-F16)	1552.70	877.80	703.80	586.10	512.60
	Watershed Runoff	15.50	12.40	9.90	7.40	7.30
	LA Totals	1568.20	890.20	713.70	593.50	519.90
Margin Of Safety (10%)		174.30	98.90	79.30	65.90	57.80
Loading Capacity (TMDL)		**1742.50**	**989.10**	**793.00**	**659.40**	**577.70**
Estimated Load Reduction (TSS load)		--	--	--	--	--
Estimated Load Reduction (%)		--	--	--	--	--
TMDL for Whitewater River (07040003-F19)						
Existing Load		3239.50	no data	342.50	148.50	no data

Wasteload Allocation	Construction Stormwater (MNR100001)	0.60	0.50	0.40	0.30	0.30
	Industrial Stormwater (MNR50000)	0.60	0.50	0.40	0.30	0.30
	WLA Totals	1.20	1.00	0.80	0.60	0.60
Load Allocation	Whitewater River (-515)	307.00	212.90	163.20	123.70	104.70
	Watershed Runoff	714.10	569.90	454.40	385.20	345.70
	LA Totals	1021.10	782.80	617.60	508.90	450.40
Margin Of Safety (10%)		113.60	87.10	68.70	56.60	50.10
Loading Capacity (TMDL)		**1135.90**	**870.90**	**687.10**	**566.10**	**501.10**
Estimated Load Reduction (TSS load)		2103.60	--	--	--	--
Estimated Load Reduction (%)		65%	--	--	--	--
TMDL for Whitewater River (07040003-523)						
Existing Load		62818.00	no data	4561.00	991.00	no data
Wasteload Allocation	Construction Stormwater (MNR100001)	0.04	0.02	0.02	0.02	0.02
	Industrial Stormwater (MNR50000)	0.04	0.02	0.02	0.02	0.02
	WLA Totals	0.08	0.04	0.04	0.04	0.04
Load Allocation	Whitewater River (-554)	2187.00	1562.80	1237.80	993.50	861.00
	Whitewater River (-F19)	1022.30	783.70	618.40	509.50	451.00
	Watershed Runoff	95.20	60.70	49.20	39.50	44.00
	LA Totals	3304.50	2407.20	1905.40	1542.50	1356.00
Margin Of Safety (10%)		367.20	267.50	211.70	171.40	150.70
Loading Capacity (TMDL)		**3671.78**	**2674.74**	**2117.14**	**1713.94**	**1506.74**
Estimated Load Reduction (TSS load)		59146.22	--	2443.86	--	--
Estimated Load Reduction (%)		94%	--	54%	--	--
TMDL for Rollingstone Creek (07040003-533)						
Existing Load		21318.00	7850.00	9108.00	2082.00	2206.00
Wasteload Allocation	Rollingstone WWTP (MNG580078)	135.70	135.70	135.70	135.70	135.70
	Construction Stormwater (MNR100001)	0.40	0.30	0.30	0.30	0.20
	Industrial Stormwater (MNR50000)	0.40	0.30	0.30	0.30	0.20
	WLA Totals	136.50	136.30	136.30	136.30	136.10
Load Allocation	Watershed Runoff	1049.20	867.40	763.30	675.50	589.00
	LA Totals	1049.20	867.40	763.30	675.50	589.00
Margin Of Safety (10%)		131.70	111.50	100.00	90.20	80.60
Loading Capacity (TMDL)		**1317.40**	**1115.20**	**999.60**	**902.00**	**805.70**
Estimated Load Reduction (TSS load)		20000.60	6734.80	8108.40	1180.00	1400.30
Estimated Load Reduction (%)		94%	86%	89%	57%	63%

TMDL for Logan Branch (07040003-536)						
Existing Load		2145.00	769.00	49.00	33.00	41.00
Wasteload Allocation	Construction Stormwater (MNR100001)	0.30	0.20	0.20	0.10	0.10
	Industrial Stormwater (MNR50000)	0.30	0.20	0.20	0.10	0.10
	WLA Totals	0.60	0.40	0.40	0.20	0.20
Load Allocation	Watershed Runoff	211.90	134.20	100.60	76.20	62.80
	LA Totals	211.90	134.20	100.60	76.20	62.80
Margin Of Safety (10%)		23.60	14.90	11.20	8.50	7.00
	Loading Capacity (TMDL)	**236.10**	**149.50**	**112.20**	**84.90**	**70.00**
Estimated Load Reduction (TSS load)		1908.90	619.50	--	--	--
Estimated Load Reduction (%)		89%	81%	--	--	--

TMDL for Whitewater River (07040003-537)						
Existing Load		185743.00	14967.00	8142.00	3448.00	1622.00
Wasteload Allocation	Construction Stormwater (MNR100001)	0.30	0.20	0.20	0.10	0.10
	Industrial Stormwater (MNR50000)	0.30	0.20	0.20	0.10	0.10
	WLA Totals	0.60	0.40	0.40	0.20	0.20
Load Allocation	Whitewater River (-523)	3304.50	2407.20	1905.30	1542.60	1356.00
	Whitewater River (-512)	2117.00	1341.00	1100.80	935.80	836.50
	Watershed Runoff	720.40	507.60	397.60	321.20	269.70
	LA Totals	6141.90	4255.80	3403.70	2799.60	2462.20
Margin Of Safety (10%)		682.50	472.90	378.20	311.10	273.60
	Loading Capacity (TMDL)	**6825.00**	**4729.10**	**3782.30**	**3110.90**	**2736.00**
Estimated Load Reduction (TSS load)		178918.00	10237.90	4359.70	337.10	--
Estimated Load Reduction (%)		96%	68%	54%	10%	--

TMDL for Whitewater River (07040003-539)						
Existing Load		1040335.00	128949.00	61936.00	36780.00	26975.00
Wasteload Allocation	Construction Stormwater (MNR100001)	16.60	10.70	8.50	7.00	6.10
	Industrial Stormwater (MNR50000)	16.60	10.70	8.50	7.00	6.10
	WLA Totals	33.20	21.40	17.00	14.00	12.20
Load Allocation	Whitewater River (-537)	6142.50	4256.20	3404.00	2799.90	2462.40
	Watershed Runoff	43444.00	28002.00	22260.60	18326.80	16002.60
	LA Totals	49586.50	32258.20	25664.60	21126.70	18465.00
Margin Of Safety (10%)		5513.30	3586.60	2853.50	2349.00	2053.00
	Loading Capacity (TMDL)	**55133.00**	**35866.20**	**28535.10**	**23489.70**	**20530.20**
Estimated Load Reduction (TSS load)		985202.00	93082.80	33400.90	13290.30	6444.80
Estimated Load Reduction (%)		95%	72%	54%	36%	24%

TMDL for Whitewater River (07040003-553)					
Existing Load		4344.00	3777.00	no data	no data	no data
Wasteload Allocation	Construction Stormwater (MNR100001)	1.30	1.00	0.70	0.60	0.50
	Industrial Stormwater (MNR50000)	1.30	1.00	0.70	0.60	0.50
	WLA Totals	2.60	2.00	1.40	1.20	1.00
	Watershed Runoff	1354.10	1002.20	782.20	628.60	542.90
	LA Totals	1354.10	1002.20	782.20	628.60	542.90
Margin Of Safety (10%)		154.20	111.60	87.10	70.00	60.40
Loading Capacity (TMDL)		**1510.90**	**1115.80**	**870.70**	**699.80**	**604.30**
Estimated Load Reduction (TSS load)		2833.10	2661.20	--	--	--
Estimated Load Reduction (%)		65%	70%	--	--	--
TMDL for Whitewater River (07040003-554)						
Existing Load		29154.00	2389.00	80.00	290.00	no data
Wasteload Allocation	Plainview Milk Products (MN000311)	25.55	25.55	25.55	25.55	25.55
	Plainview Elgin WWTP (MN0055361)	151.61	151.61	151.61	151.61	151.61
	Construction Stormwater (MNR100001)	0.30	0.20	0.10	0.09	0.07
	Industrial Stormwater (MNR50000)	0.30	0.20	0.10	0.09	0.07
	WLA Totals	177.76	177.56	177.36	177.34	177.30
Load Allocation	Whitewater River (-553)	1387.70	1004.10	783.70	629.80	543.90
	Whitewater River (-552)	212.50	134.50	100.90	76.40	63.00
	Watershed Runoff	409.00	246.50	175.70	110.00	76.80
	LA Totals	2009.20	1385.10	1060.30	816.20	683.70
Margin Of Safety (10%)		243.00	173.60	137.50	110.40	95.70
Loading Capacity (TMDL)		**2429.96**	**1736.26**	**1375.16**	**1103.94**	**956.70**
Estimated Load Reduction (TSS load)		26724.04	652.74	--	--	--
Estimated Load Reduction (%)		92%	27%	--	--	--
TMDL for Stockton Valley Creek (07040003-559)						
Existing Load		2982.00	448.00	286.00	235.00	no data
Wasteload Allocation	Construction Stormwater (MNR100001)	0.20	0.20	0.10	0.10	0.10
	Industrial Stormwater (MNR50000)	0.20	0.20	0.10	0.10	0.10
	WLA Totals	0.40	0.40	0.20	0.20	0.20
Load Allocation	Watershed Runoff	483.20	409.50	370.50	334.00	279.00
	LA Totals	483.20	409.50	370.50	334.00	279.00
Margin Of Safety (10%)		53.70	45.50	41.20	37.10	31.00
Loading Capacity (TMDL)		**537.30**	**455.40**	**411.90**	**371.30**	**310.20**

Estimated Load Reduction (TSS load)		2444.70	--	--	--	--
Estimated Load Reduction (%)		82%	--	--	--	--
TMDL for Garvin Brook (07040003-595)						
Existing Load		24441.00	8741.00	no data	no data	no data
Wasteload Allocation	Stockton WWTP (MNG580078)	104.60	104.60	104.60	104.60	104.60
	Minnesota City WWTP (MN0069817)	3.50	3.50	3.50	3.50	3.50
	Construction Stormwater (MNR100001)	5.30	4.50	4.00	3.60	3.10
	Industrial Stormwater (MNR50000)	5.30	4.50	4.00	3.60	3.10
	WLA Totals	118.70	117.10	116.10	115.30	114.30
Load Allocation	Rollingstone Creek (-533)	1185.70	1003.80	899.60	811.70	725.20
	Stockton Valley Creek (-559)	483.60	409.80	370.80	334.30	279.20
	Watershed Load	13205.00	11122.20	9935.20	8986.90	7826.90
	LA Totals	14874.30	12535.80	11205.60	10132.90	8831.30
Margin Of Safety (10%)		1665.90	1405.90	1258.00	1138.70	994.00
Loading Capacity (TMDL)		**16658.90**	**14058.80**	**12579.70**	**11386.90**	**9939.60**
Estimated Load Reduction (TSS load)		7782.10	--	--	--	--
Estimated Load Reduction (%)		32%	--	--	--	--

Table 15: Nitrate TMDLs for the Mississippi River-Winona Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		Nitrate (kg/day)				
TMDL for Whitewater River (07040003-512)						
Existing Load		9265.30	1739.60	1191.10	1038.70	657.30
Wasteload Allocation	Utica WWTP (MN0022055)	8.63	8.63	8.63	8.63	8.63
	DNR Crystal Springs State Fish Hatchery (MN0004421)	121.13	121.13	121.13	121.13	121.13
	Altura WWTP (MN0021831)	13.59	13.59	13.59	13.59	13.59
	Construction Stormwater (MNR100001)	0.20	0.10	0.10	0.10	0.10
	Industrial Stormwater (MNR50000)	0.20	0.10	0.10	0.10	0.10
	WLA Totals	143.75	143.55	143.55	143.55	143.55
Load Allocation	Whitewater River (-F17)	1552.70	877.80	703.80	586.10	512.60
	NPS leaching losses	419.00	318.80	252.00	204.60	179.10
	Atmospheric Deposition	1.40	1.40	1.40	1.40	1.40
	LA Totals	1973.10	1198.00	957.20	792.10	693.10
Margin Of Safety (10%)		235.20	149.10	122.30	104.00	93.00
Loading Capacity (TMDL)		**2352.05**	**1490.65**	**1223.05**	**1039.65**	**929.65**
Estimated Load Reduction (nitrate load)		6913.25	248.95	--	--	--
Estimated Load Reduction (%)		75%	14%	--	--	--
TMDL for Whitewater River (07040003-F17)						
Existing Load		2497.00	1053.20	830.50	803.90	798.30
Wasteload Allocation	Whitewater Region WWTP (MN0046868)	42.40	42.40	42.40	42.40	42.40
	Construction Stormwater (MNR100001)	0.60	0.30	0.30	0.20	0.20
	Industrial Stormwater (MNR50000)	0.60	0.30	0.30	0.20	0.20
	WLA Totals	43.60	43.00	43.00	42.80	42.80
Load Allocation	NPS leaching losses	1509.10	834.70	660.80	543.20	469.80
	Atmospheric Deposition	0.10	0.10	0.10	0.10	0.10
	LA Totals	1509.20	834.80	660.90	543.30	469.90
Margin Of Safety (10%)		172.50	97.50	78.20	65.10	57.00
Loading Capacity (TMDL)		**1725.30**	**975.30**	**782.10**	**651.20**	**569.70**
Estimated Load Reduction (nitrate load)		771.70	77.90	48.40	152.70	228.60
Estimated Load Reduction (%)		31%	7%	6%	19%	29%

TMDL for Whitewater River (07040003-F19)						
Existing Load		1113.70	844.60	627.70	no data	no data
Wasteload Allocation	Construction Stormwater (MNR100001)	0.70	0.50	0.40	0.30	0.30
	Industrial Stormwater (MNR50000)	0.70	0.50	0.40	0.30	0.30
	WLA Totals	1.40	1.00	0.80	0.60	0.60
Load Allocation	Crow Spring River (-611)	211.80	161.00	126.60	105.00	93.00
	NPS leaching losses	808.10	620.70	490.00	402.80	356.30
	Atmospheric Deposition	1.00	1.00	1.00	1.00	1.00
	LA Totals	1020.90	782.70	617.60	508.80	450.30
Margin Of Safety (10%)		113.60	87.10	68.70	56.60	50.10
Loading Capacity (TMDL)		**1135.90**	**870.80**	**687.10**	**566.00**	**501.00**
Estimated Load Reduction (nitrate load)		--	--	--	--	--
Estimated Load Reduction (%)		--	--	--	--	--
TMDL for Crow Spring (07040003-611)						
Existing Load		no data	no data	no data	no data	no data
Wasteload Allocation	Construction Stormwater (MNR100001)	0.30	0.20	0.20	0.10	0.10
	Industrial Stormwater (MNR50000)	0.30	0.20	0.20	0.10	0.10
	WLA Totals	0.60	0.40	0.40	0.20	0.20
Load Allocation	NPS leaching losses	211.20	160.50	126.20	104.70	92.70
	Atmospheric Deposition	0.10	0.10	0.10	0.10	0.10
	LA Totals	211.30	160.60	126.30	104.80	92.80
Margin Of Safety (10%)		23.50	17.90	14.10	11.70	10.30
Loading Capacity (TMDL)		**235.40**	**178.90**	**140.80**	**116.70**	**103.30**
Estimated Load Reduction (nitrate load)		--	--	--	--	--
Estimated Load Reduction (%)		--	--	--	--	--