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

REPLY TO THE ATTENTION OF:
W-16J

June 29, 2022

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency completed its review of the final Total Maximum Daily Loads (TMDL) for the Wild Rice River Watershed (WRRW), including supporting documentation. The WRRW is located in western Minnesota. The WRRW TMDLs were calculated for bacteria, total suspended solids (TSS), and phosphorus to address the impaired aquatic recreation and aquatic life uses.

The WRRW 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 ten (10) bacteria, five (5) TSS, and one (1) phosphorus TMDLs for a total of sixteen (16) TMDLs. EPA describes Minnesota's compliance with the statutory and regulatory requirements in the enclosed decision document.

EPA acknowledges Minnesota's efforts in submitting this TMDL and look forward to future submissions by the State of Minnesota. If you have any questions, please contact Mr. David Werbach of the Watersheds and Wetlands Branch at Werbach.david@epa.gov or 312-886-4242.

Sincerely,

6/29/2022

X

Signed by: TERA FONG
Tera L. Fong
Division Director, Water Division

Cc: Danielle Kvasager, MPCA

wq-iw5-23g

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

REPLY TO THE ATTENTION OF
WW-16

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

Re: Corrections to Wild Rice River TMDL Decision Document

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has reviewed the approval (original approval June 29, 2022) of the final Total Maximum Daily Loads (TMDL) for segments within the Wild Rice River Watershed (WRRW) and has determined that corrections are needed in the Decision Document. These corrections involve changes to the land cover totals in Table 3; changes to the headings in Tables 3, 4 and 5; correction to the allocations in Table 5; and a clarification regarding sewer overflows in Section 1. EPA has made these corrections in a revised WRRW Decision Document. I am enclosing a copy of the revised Decision Document for your records.

If you have any questions, please contact Mr. David Werbach, TMDL Coordinator at 312-866-4242.

Sincerely,

8/23/2022

X David Pfeifer

David Pfeifer
Manager, Watersheds and Wetlands Branch
Signed by: DAVID PFEIFER

Enclosure

cc: Danielle Kvasager, MPCA

TMDL: Wild Rice River Watershed bacteria, nutrient and sediment TMDLs in portions of Mahnomen, Norman, Becker, Clay, Clearwater, and Polk Counties in western Minnesota
Date: 6/29/2022 (corrected 08/23/2022)

DECISION DOCUMENT FOR THE WILD RICE RIVER WATERSHED TMDLS IN WESTERN MINNESOTA

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

1. Identification of Water body, Pollutant of Concern, Pollutant Sources, and Priority Ranking

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

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

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

(1) the spatial extent of the watershed in which the impaired water body is located;
(2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;

(4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and
(5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyll a and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comment:
Location Description/Spatial Extent:
The Wild Rice River Watershed (WRRW) in western Minnesota is part of the Red River basin and covers parts of Mahnomen, Norman, Becker, Clay, Clearwater, and Polk counties. The WRRW is approximately 1,636 square miles in size and originates in the Northern Lakes and Forests (NLF) ecoregion, flows through the North Central Hardwood Forest (NCHF) ecoregion, and then through the Lake Agassiz Plain (LAP) when it enters the Red River of the North. Surface water in the WRRW generally flows in an east to west direction from the headwaters areas, in the eastern portion of the watershed (Figures 2 and 3 of the final TMDL document) toward the western areas of the WRRW.

The WRRW TMDLs address ten segments impaired due to excessive bacteria, five impaired river segments due to excessive sediment, and one impaired lake due to excessive nutrients (Tables 1 and 2 of this Decision Document). The Minnesota Pollution Control Agency (MPCA) also explained that one segment (-501) had a TMDL approved in 2009. MPCA noted that the original TMDL was based upon the turbidity water quality standard, and that the State is replacing the previous TMDL with a new TMDL based upon the current total suspended solids (TSS) criteria (Section 1.2 of the final TMDL document).

MPCA also noted that several waterbody impairments are not being addressed by TMDLs at this time. MPCA explained that for several segments, there were insufficient data to determine the pollutant responsible for the impairment, or that the impairments are due to non-pollutant causes. Table 1 and Section 1.2 of the final TMDL document provide additional information on those segments.

Table 1. WRRW river TMDLs or with a replacement TMDL

AUID (09020108 -###)	Waterbody name (description)	Designated use class [a]	Pollutant	Affected use [b]	Listing year	TMDL target completion year	Addressed in this TMDL report?
-501	Wild Rice River (S Br Wild Rice R to Red R)	2Bg	TSS	AQL	2006	NA, Category 4A [c]	Yes: Replacement of MPCA's 2009 TSS TMDL (PRJ07750-001)
-504 [d]	Wild Rice River (White Earth R to Marsh Cr)	2Bg	TSS	AQL	2018	2028	Yes: TSS TMDL
-544	Coon Creek (Unnamed cr to Wild Rice R)	2Bg	*E. coli*	AQR	2018	2028	Yes: *E. coli* TMDL

-546	Unnamed creek (Unnamed cr to Wild Rice R)	2Bg	*E. coli*	AQR	2018	2028	Yes: *E. coli* TMDL
-553	County Ditch 45 (Unnamed ditch to Unnamed ditch)	2Bg	*E. coli*	AQR	2018	2028	Yes: *E. coli* TMDL
-577	Coon Creek (Unnamed cr to Unnamed cr)	2Bg	*E. coli*	AQR	2018	2028	Yes: *E. coli* TMDL
-643	Wild Rice River (Marsh Cr to Unnamed cr)	2Bg	TSS	AQL	2010	2028	Yes: TSS TMDL
			E. coli	AQR	2018	2028	Yes: *E. coli* TMDL
-644	Wild Rice River (Unnamed cr to S Br Wild Rice R)	2Bg	TSS	AQL	2010	2028	Yes: TSS TMDL
			E. coli	AQR	2018	2028	Yes: *E. coli* TMDL
-648 [d]	Spring Creek (140th Ave to Wild Rice R)	2Bg	*E. coli*	AQR	2018	2028	Yes: *E. coli* TMDL
-650	Mashaug Creek (T-92 to Wild Rice R)	2Bg	*E. coli*	AQR	2018	2028	Yes: *E. coli* TMDL
-652 [d]	Marsh Creek (-95.9973 47.4054 to Wild Rice R)	2Bg	TSS	AQL	2008	2028	Yes: TSS TMDL
-659	South Branch Wild Rice River (T-246 to Wild Rice R)	2Bg	*E. coli*	AQR	2018	2028	Yes: *E. coli* TMDL
-662	South Branch Wild Rice River (Unnamed cr to Unnamed cr)	2Bg	*E. coli*	AQR	2018	2028	Yes: *E. coli* TMDL

[a] g = general tiered aquatic life use (TALU) designation. The other possible TALU designations are m (modified) and e (exceptional).
[b] AQL = aquatic life, AQR = aquatic recreation
[c] NA = not applicable, impairment is categorized as 4A. A TMDL study was approved for this impairment (MPCA, 2009), but a replacement TMDL study is provided in the report.
[d] AUID is located partially within White Earth Nation.

Table 2. WRRW lake TMDL

AUID/DNR Lake ID #	Waterbody name	Pollutant	Designated use class (ecoregion) [a]	Affected use [b]	Listing year	TMDL target completion year	Addressed in this report?
15-0075-00	Rockstad	Nutrients	2B (NLF)	AQR	2018	2028	Yes: TP TMDL

[a] NLF = Northern Lakes and Forests Ecoregion
[b] AQR = Aquatic Recreation

The WRRW includes lands within the White Earth Nation's Reservation (Figure 2 of the final TMDL document), but MPCA did not calculate loads or assign loadings to sources within the White Earth Reservation.

MPCA explained that a significant portion of these White Earth Nation reservation lands, in the eastern portion of the WRRW, are part of the subwatersheds draining to three impaired segments. As part of its WRRW TMDLs, MPCA did not calculate bacteria or TSS TMDL loads for these portions of the contributing watersheds and did not assign any bacteria or TSS loadings to those sources on lands within the White Earth Nation's Reservation (Section 3 of the final TMDL document). Therefore, the WRRW TMDL only includes the calculation and assignment of loads on the Minnesota portion of the WRRW watershed.

MPCA included the White Earth Nation in its communications regarding the development, status, and results of the WRRW TMDLs and the Watershed Restoration and Protection Strategy (WRAPS) (Section 3 of the final TMDL document).

Land Use:
Land use in the WRRW varies across the watershed. The eastern portion of the watershed is comprised of forests and wetlands, with limited cropland; while the western portion is highly agricultural, with up to 90% of the subwatersheds being cropland (Table 8 and Figure 7 of the final TMDL document).

The overall land use in the WRRW is forest/shrub (19.8%), cropland (57.6%), rangeland (3.5%), open water (3.1%), wetlands (13.0%), developed lands (2.9%) and mining lands (0.15%) (Section 3.4 and Table 8 of the final TMDL document and Table 3 of this Decision Document).

Table 3: Land cover in the Wild Rice River Watershed

Drainage Area (Sq. Miles)	Cropland (%)	Rangeland (%)	Developed (%)	Wetlands (%)	Water (%)	Forest/Shrubland (%)	Barren/Mining (%)
1636	57.6	3.5	2.9	13	3.1	19.8	0.15

Problem Identification:
<u>Bacteria TMDLs:</u> Bacteria impaired segments identified in Table 1 of this Decision Document were included on the final 2020 Minnesota 303(d) list due to excessive bacteria. Water quality monitoring within the WRRW indicated that these segments were not attaining their designated aquatic recreation uses due to exceedances of the bacteria criteria. Excessive bacteria can negatively impact recreational uses (e.g., swimming, wading, boating, fishing etc.) and public health. At elevated levels, bacteria may cause illness within humans who have contact with or ingest bacteria-laden water. Recreation-based contact can lead to ear, nose, and throat infections, and stomach illness.

<u>Phosphorus TMDLs:</u> The lake identified in Table 2 of this Decision Document was included on the final 2020 Minnesota 303(d) list due to excessive nutrients (phosphorus). Total phosphorus, chlorophyll-*a* (chl-*a*) and Secchi depth (SD) measurements in the WRRW indicated that these waters were not attaining their designated aquatic recreation uses due to exceedances of nutrient criteria. Water quality monitoring was completed throughout the WRRW and those data formed the foundation for phosphorus TMDL modeling efforts.

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

Total Suspended Solids (TSS) TMDL: The segments identified in Table 1 of this Decision Document were included on the final 2020 Minnesota 303(d) list due to excessive TSS/sediment within the water column[1]. Water quality monitoring within the WRRW indicated that these segments were not attaining their designated aquatic life uses due to high sediment measurements and the negative impact of those conditions on aquatic life (i.e., fish and macroinvertebrate communities).

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

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

Excessive amounts of 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 (e.g., 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.

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

[1] A TMDL study was approved TSS for Segment -501 of the Wild Rice River (MPCA, 2009), but a replacement TMDL is provided in the report

303(d) program. As part of these efforts, the MPCA identified water quality-impaired segments that will be addressed by TMDLs by 2022. The waters of the WRRW addressed by this TMDL report are part of the MPCA prioritization plan to meet EPA's national measure.

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

Source Identification (point and nonpoint sources):

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

WRRW bacteria TMDLs:
National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: NPDES permitted facilities may contribute bacteria loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA determined that there are four wastewater treatment plants (WWTPs) in the Minnesota portion of the WRRW which contribute bacteria from treated wastewater releases (Table 4 of this Decision Document) to the segments impaired by bacteria. MPCA noted that these four facilities were assigned a WLA in the TMDL. MPCA explained that there are eight other WWTP facilities within the watershed that can contribute bacteria in the WRRW, but these are located within the White Earth Reservation. Of the eight, four of these facilities are tribally owned and operated facilities that are permitted by the EPA, while the other four are permitted by both the EPA and Minnesota (Section 3.6.1.1 of the final TMDL document). As discussed in Section 5 of this Decision Document, wasteload allocations are only approved for the four facilities within the Minnesota portion of the WRRW (Table 4 of this Decision Document).

Table 4: Minnesota NPDES facilities which contribute bacteria to impaired segments in the Wild Rice River Watershed

Facility Name	Permit #	Nearest *E. coli* Impaired Reach	WLA
Facilities assigned bacteria (*E. coli*) WLA (billions bacteria/day)			
Borup WWTP	MN0022853	-659	0.6450
Gary WWTP	MNG585175	-650	1.1656
Twin Valley WWTP	MNG585137	-643	4.2740
Ulen WWTP	MNG585088	-662	4.0797

Municipal Separate Storm Sewer System (MS4) communities: MPCA noted that there are no MS4 facilities in the WRRW (Section 3.6.2.1 of the final TMDL document).

Concentrated Animal Feedlot Operations (CAFOs): MPCA has identified CAFOs in the WRRW (Section 3.6.1.1, Table 12, and Figure 24 of the final TMDL document). As explained by MPCA, CAFO production areas must be designed to contain all manure, and direct precipitation and manure-contaminated runoff from precipitation events up to the 25-year, 24-hour storm event, and even in the event of a discharge, the discharge cannot cause or contribute to a violation of a WQS. MPCA noted that any precipitation-caused runoff from the land application of manure at agronomic rates is not considered a point source discharge and is accounted for in the LA section of the TMDL.

Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs): MPCA determined that the WRRW does not have CSOs which contribute bacteria to waters of the WRRW. MPCA noted that SSOs have occurred in the watershed, but were not assigned an allocation (Section 3.6.1.1 of the TMDL).

Stormwater runoff from permitted construction and industrial areas: MPCA determined that stormwater discharges from permitted construction and industrial dischargers do not contribute bacteria to the WRRW.

<u>WRRW TSS TMDLs:</u>
National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: NPDES permitted facilities may contribute TSS loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA determined that there are six wastewater treatment plants (WWTPs) in the Minnesota portion of the WRRW which contribute TSS from treated wastewater releases (Table 5 of this Decision Document) to the segments impaired by TSS. MPCA noted that these facilities were assigned a WLA in the TMDL. MPCA explained that there are eight other WWTP facilities within the watershed that can contribute TSS in the WRRW. These WWTP facilities are described above (Section 3.6.2.1 of the final TMDL document). As discussed in Section 5 of this Decision Document, EPA is approving only those wasteload allocations for the six facilities within the Minnesota portion of the WRRW (Table 5 of this Decision Document).

Table 5: Minnesota NPDES facilities which contribute TSS to impaired segments in the Wild Rice River Watershed

Facility Name	Permit #	Nearest TSS Impaired Reach	WLA
Facilities assigned TSS WLAs (tons/day)			
Borup WWTP	MN0022853	-501	0.0254
Felton WWTP	MNG585149	-501	0.1022
Gary WWTP	MNG585175	-643	0.0459
Hendrum WWTP	MNG585176	-501	0.1429
Twin Valley WWTP	MNG585137	-643	0.1683
Ulen WWTP	MNG585088	-501	0.1606

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

Concentrated Animal Feedlot Operations (CAFOs): MPCA recognized the presence of CAFOs in the WRRW (Section 3.6.2.1, Table 12, and Figure 24 of the final TMDL document). As explained by MPCA, CAFO production areas must be designed to contain all manure and other pollutants, and direct precipitation and manure-contaminated runoff from precipitation events up to the 25-year, 24-hour storm event, and even in the event of a discharge, the discharge cannot cause or contribute to a violation of a WQS. MPCA noted that any precipitation-caused runoff from the land application of manure at agronomic rates is not considered a point source discharge and is accounted for in the LA section of the TMDL.

WRRW phosphorus TMDL (Rockstad Lake):

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 Rockstad Lake watershed must comply with the requirements of the 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 WRRW include:

WRRW bacteria TMDLs:

MPCA utilized data from several sources to develop an overall bacteria loading estimate for the WRRW (Section 3.6.1 and Appendix A of the final TMDL document). Results of this analysis are displayed in a diagram (Figure 23 of the final TMDL document) which indicates the greatest source of bacteria throughout the watershed is from crop runoff -surface applied manure (43%), followed by wildlife (17%) and pastures (17%).

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 WRRW. 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 WRRW. Feedlots generate manure which may be spread onto fields. Runoff from fields with spread manure can be exacerbated by tile drainage lines that channelize the stormwater flows and reduce the time available for bacteria to die-off.

Unrestricted livestock access to streams: Livestock with access to streams 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 WRRW. Septic systems generally do not discharge directly into a water body, but effluents from SSTS may leach into groundwater or pond at the surface where they can be washed into surface waters via stormwater runoff events. Age, construction and use of SSTS can vary throughout a watershed and influence the bacteria contribution from these systems.

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

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

WRRW TSS TMDLs:
MPCA identified several nonpoint sources of TSS within the WRRW. Figure 25 of the final TMDL document provides a chart showing the predominant source of TSS in the watershed is from cropland runoff (70%), with a smaller amount of streambed/bank erosion (20%).

Stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of sediment which may lead to impairments in the WRRW. MPCA estimated the runoff to be approximately 184 lbs per acre per year (Section 3.6.2.2 of the final TMDL document). MPCA noted that rainfall on unprotected soils, especially in the spring when vegetation has not significantly grown, can dislodge soil particles. 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.

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. MPCA explained that significant portion of the watershed, particularly in the western portion, have been channelized or otherwise highly altered, contributing to higher peak flows and increased streambank erosion. Unrestricted livestock access to streams and streambank areas may lead to streambank degradation and sediment additions to stream environments.

Wetland and Forest Sources: Sediment may be added to surface waters by stormwater flows through wetland or forested areas in the WRRW. Storm events may mobilize decomposing vegetation, organic soil particles through the transport of suspended solids and other organic debris. MPCA explained that these sources likely contribute limited amounts of TSS (Section 3.6.2.2 of the final TMDL document).

Atmospheric deposition: MPCA also noted that sediment may be added via particulate deposition due to wind action. Particles from the atmosphere may fall onto surface waters within the WRRW.

WRRW phosphorus TMDLs:
Internal loading: The release of phosphorus from lake sediments, the release of phosphorus from lake sediments via physical disturbance from benthic fish (i.e., rough fish (e.g., carp)), the release of phosphorus from wind mixing the water column, and the release of phosphorus from

decaying curly-leaf pondweed, may all contribute internal phosphorus loading to the lakes of the WRRW. Phosphorus may build up in the bottom waters of lakes and may be resuspended or mixed into the water column when the thermocline decreases, and the lake water mixes.

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 WRRW. 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.

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 WRRW. Phosphorus can be bound to these particles which may add to the phosphorus inputs to surface water environments.

Discharges from SSTS or unsewered communities: Failing septic systems are a potential source of nutrients within the Rockstad Lake watershed. 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 WRRW. Storm events may mobilize phosphorus through the transport of suspended solids and other organic debris.

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

Future Growth:
MPCA noted that the TMDL watershed is relatively sparsely populated, with approximately 13,500 people living in the watershed. MPCA expects only limited growth within the watershed. The WLA and load allocations (LA) for the WRRW 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 WRRW TMDLs.

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

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

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

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

Comment:
Designated Uses:
WQS are the fundamental benchmarks by which the quality of surface waters are measured. Within the State of Minnesota, WQS are developed pursuant to the Minnesota Statutes Chapter 115, Sections 03 and 44. Authority to adopt rules, regulations, and standards as are necessary and feasible to protect the environment and health of the citizens of the State is vested with the MPCA. Through adoption of WQS into Minnesota's administrative rules (principally Minnesota R. 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 R. 7050 designates uses for waters of the state. The segments addressed by the WRRW TMDLs are designated as Class 2 waters for aquatic recreation use (fishing, swimming, boating, etc.) and aquatic life use (phosphorus and TSS). The Class 2 designated use is described in Minnesota R. 7050.0140 (3):

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

Water use classifications for individual water bodies are provided in Minnesota R. 7050.0470, 7050.0425, and 7050.0430. The WRRW TMDL report addresses the water bodies that do not meet the standards for Class 2 waters. The impaired streams and lake in this report are classified as Class 2B (Tables 1 and 2 of the final TMDL document).

Standards:
<u>Narrative Criteria:</u>
Minnesota R. 7050.0150 (3) sets forth narrative criteria for Class 2 waters of the State:

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

<u>Numeric criteria:</u>
<u>Bacteria TMDLs:</u> The bacteria water quality standards which apply to WRRW TMDLs are:

Table 6: Bacteria Water Quality Standards Applicable to the WRRW 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

<u>Bacteria TMDL Targets:</u> The bacteria TMDL targets employed for the WRRW bacteria TMDLs are the *E. coli* standards as stated in Table 6 of this Decision Document. The focus of the WRRW 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 WRRW 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.

<u>TSS TMDLs:</u> In January 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 explained that the TSS-impaired waters lie within two regions (Section 2.4.1.2 of the final TMDL document). Table 7 of this Decision Document identifies the TSS targets for the impaired streams.

Table 7: TSS criteria for the Wild Rice River Watershed TMDLs

AUID (09020108- ###)	Stream Name	Nutrient Region	TSS target
-501	Wild Rice River (S Br Wild Rice R to Red R)	South	65
-504	Wild Rice River (White Earth R to Marsh Cr)	Central	30
-643	Wild Rice River (Marsh Cr to Unnamed cr)	Central	30
-644	Wild Rice River (Unnamed cr to S Br Wild Rice R)	Central	30
-652	Marsh Creek (-95.9973 47.4054 to Wild Rice R)	Central	30

As noted in Section 1 of this Decision Document, MPCA is also revoking and reissuing the TMDL for the Wild Rice River (-501) which was approved by the EPA in 2009. The original TMDL was based upon the turbidity water quality standard, and that the State is replacing the previous TMDL with a new TMDL based upon the current TSS criteria as noted in Table 7 of this Decision Document (Section 1.2 of the final TMDL document).

Phosphorus TMDL: Numeric criteria for phosphorus, chlorophyll-*a*, and Secchi Disk depth (SD) are set forth in Minnesota R. 7050.0222. These three parameters form the MPCA eutrophication standard that must be achieved to attain the aquatic recreation designated use. The numeric eutrophication standards which are applicable to the Rockstad Lake TMDL are found in Table 8 of this Decision Document.

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, phosphorus, and the response variables, chl-*a* and SD depth. MPCA anticipates that by meeting the phosphorus concentrations of NLF WQS the response variables chl-*a* and SD will be attained and Rockstad Lake will achieve the designated beneficial uses. For lakes to achieve their designated beneficial use, the lake must not exhibit signs of eutrophication and must allow water-related recreation, fishing and aesthetic enjoyment. MPCA views the control of eutrophication as the lake enduring minimal nuisance algal blooms and exhibiting desirable water clarity.

Table 8: **Minnesota Eutrophication Standards for lakes within the NLF ecoregion (Rockstad Lake)**

Parameter	NCHF Eutrophication Standard*
Total Phosphorus (µg/L)	TP < 30
Chlorophyll-a (µg/L)	chl-*a* < 9
Secchi Depth (m)	SD > 2.0

* - Summer average of all samples; applies from June 1-September 30

Nutrient TMDL Target: MPCA selected a phosphorus target of **30 µg/L** for Rockstad Lake. MPCA selected phosphorus as the appropriate target parameter to address eutrophication problem because of the interrelationships between phosphorus and chl-*a*, and phosphorus and SD depth. Algal abundance is measured by chl-*a*, which is a pigment found in algal cells. As more phosphorus becomes available, algae growth can increase. Increased algae in the water column will decrease water clarity that is measured by SD depth. EPA finds the nutrient targets employed for the Rockstad Lake phosphorus TMDL to be reasonable.

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

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

Comment:

WRRW 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, which is consistent with EPA's guidance: "…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."[2] MPCA stated that the bacteria TMDLs will focus on the geometric mean

[2] U.S. EPA, *The Water Quality Standards for Coastal and Great Lakes Recreation Waters Final Rule,"* 69 *Fed. Reg*. 67218-67243, at 67224.

portion of the water quality standard (126 orgs/100 mL) and that it expects that by attaining the 126 orgs/100 mL portion of the *E. coli* WQS the 1,260 orgs/100 mL portion of the *E. coli* WQS will also be attained. EPA finds these assumptions to be reasonable.

Typically loading capacities are expressed as a mass per time (e.g., pounds per day). However, for *E. coli* loading capacity calculations, mass is not always an appropriate measure because *E. coli* is expressed in terms of organism counts. This approach is consistent with the EPA's regulations which define "load" as "an amount of matter that is introduced into a receiving water" (40 C.F.R. § 130.2). To establish the loading capacities for the WRRW 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 C.F.R. § 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 WRRW. The WRRW FDCs were developed using flow data generated from Hydrologic Simulation Program-Fortran (HSPF) modeling efforts at the outlet/pour point of each impaired reach as well as flow gages on several of the waterbodies (Section 4.1.1.2 of the final TMDL document). MPCA focused on daily recorded flow measurements and HSPF modeled flows from approximately 1996 to 2016 and bacteria (*E. coli*) water quality data from 2007 to 2016. HSPF hydrologic models were developed to simulate flow characteristics within the WRRW and flow data focused on dates within the recreation season (April 1 to October 31). Daily stream flows were necessary to implement the load duration curve approach.

HSPF is a comprehensive modeling package used to simulate watershed hydrology and water quality on a basin scale. The package includes both an Agricultural Runoff Model and a more general nonpoint source model. HSPF parametrizes numerous hydrologic and hydrodynamic processes to determine flow rate, sediment, and nutrient loads. HSPF uses continuous meteorological records to create hydrographs and to estimate time series pollution concentrations.[3,4] The output of the HSPF process is a model of multiple hydrologic response units (HRUs), or subwatersheds of the overall WRRW. The flow from these HRUs were transferred from nearby U.S. Geological Service (USGS) gages (Table 14 of the final TMDL document).

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 WRRW bacteria TMDLs, have flow duration interval (percentage of time flow exceeded) on the X-axis and *E. coli* loads (number of bacteria per unit time) on the Y-axis. The WRRW 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.

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

Water quality monitoring was completed in the WRRW and measured *E. coli* concentrations were converted to individual sampling loads by multiplying the sample concentration by the instantaneous flow measurement observed/estimated at the time of sample collection and then by a conversion factor which allows the individual samples to be plotted on the same figure as the LDCs (e.g., Figure 28 of the final TMDL document). Individual LDCs are found in Section 4.1.3.9 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.

MPCA calculated bacteria TMDLs for the WRRW and those results are found in Tables 9-18 of this Decision Document. The load allocations were calculated after the determination of the WLA, and the Margin of Safety (MOS) (10% of the loading capacity). Load allocations (e.g., stormwater runoff from agricultural land use practices and feedlots, SSTS, wildlife inputs etc.) were not split among individual nonpoint contributors. Instead, load allocations were combined together into a categorical LA ('Watershed Load') to cover all nonpoint source contributions.

MPCA employed boundary conditions for the several segments based upon the presence of White Earth Nation Reservation lands within the specific TMDL watershed (Section 4.1.3.1 of the final TMDL document and Tables 1 and 9-18 of this Decision Document). MPCA set a boundary condition in each of these bacteria TMDLs and assumed that bacteria loads from those areas upstream of the boundary condition point meet bacteria water quality standards at that boundary point. MPCA utilized only the areal extant of the Minnesota portion of the WRRW where determining the pollutant loading (i.e., if 30% of the TMDL watershed was within Reservation lands, then 30% of the overall loading was subtracted from the TMDL loading capacity). MPCA did not assign pollutant loadings for White Earth Reservation lands.

Tables 9-18 of this Decision Document reports five points (the midpoints of the designated flow regime) on the loading capacity curve. However, 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. Tables 9-18 of this Decision Document identify the loading capacity for the water bodies at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Tables 9-18: Bacteria (*E. coli*) TMDLs for the Wild Rice River Watershed are located at the end of this Decision Document in Attachment 1.

Tables 9-18 of this Decision Document show MPCA's estimates of reductions required for streams impaired due to excessive bacteria. Attaining these reduction percentage estimates under the flow conditions which the reductions are prescribed to will allow the impaired segment to meet their water quality targets. These loading reductions (i.e., the percentage row) 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 stream segment's water quality will return to a level where the designated uses are no longer considered impaired.

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 WRRW bacteria TMDLs. The methods used for determining the TMDLs are consistent with EPA technical memos.[5]

<u>WRRW TSS TMDLs:</u> MPCA used the same LDC development strategies as it did for the WRRW bacteria TMDLs to calculate the loading capacities for the sediment TMDLs in the WRRW. These strategies included incorporating HSPF model simulated flows to develop FDCs and water quality monitoring information collected within the WRRW informing the LDC. The FDC were transformed into LDC by multiplying individual flow values by the TSS target (30 or 65 mg/L) and then multiplying that value by a conversion factor.

MPCA calculated TSS TMDLs (Tables 19-23 of this Decision Document). The load allocations were calculated after the determination of the WLA and the MOS. Load allocations (e.g., stormwater runoff from agricultural land use practices) were not split among individual nonpoint

[5] U.S. Environmental Protection Agency, Office of Water,., *An Approach for Using Load Duration Curves in the Development of TMDLs,* EPA-841-B-07-006, (Washington, D.C., August 2007).

contributors. Instead, load allocations were combined together into one value to cover all nonpoint source contributions. Tables 19-23 of this Decision Document reports five points (i.e., the midpoints of the designated flow regime) on the loading capacity curve. However, the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve.

The LDC method can be used to display collected sediment monitoring data and allows for the estimation of load reductions necessary for attainment of the TSS water quality standard. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for each segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Tables 19-23 of this Decision Document identify the loading capacity for each segment at each flow regime. Although there are numeric loads for each flow regime, EPA is approving the LDC for this TMDL.

MPCA estimated load reductions needed for the TSS TMDLs to attain the sediment water quality target of 30 mg/L or 65 mg/L. These loading reductions (i.e., the percentage row) were estimated from existing and TMDL load calculations. MPCA expects that these reductions will result in the attainment of the water quality targets and that water quality will return to a level where the designated uses are no longer considered impaired.

As was done for the bacteria TMDLs, MPCA employed boundary conditions for TSS for several segments based upon the presence of White Earth Nation Reservation lands within the specific TMDL watershed (Section 4.1.4.1 of the final TMDL document and Tables 1 and 19-23 of this Decision Document). MPCA set a boundary condition in each of these TSS TMDLs and assumed that TSS loads from those areas upstream of the boundary condition point meet TSS water quality standards at that boundary point. MPCA utilized only the areal extant of the Minnesota portion of the WRRW when determining the pollutant loading (i.e., if 30% of the TMDL watershed was Tribal lands, then 30% of the overall loading was subtracted from the TMDL loading capacity). MPCA did not assign pollutant loadings for White Earth Nation Reservation lands.

Tables 19-23: TSS TMDLs in the Wild Rice River Watershed are located at the end of this Decision Document in Attachment 2.

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 the 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.

Rockstad Lake phosphorus TMDL: MPCA used the U.S. Army Corps of Engineers (USACE) BATHTUB model to calculate the loading capacities for the Rockstad Lake TMDL (Section 4.2.1.1 of the final TMDL document). 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 phosphorus 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 phosphorus model that accounts for water and phosphorus 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 phosphorus 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 phosphorus models for estimating loading capacity.

MPCA used the BATHTUB model to calculate the loading capacity for the Lake. The loading capacity is the maximum phosphorus load which the lake can receive over an annual period and still meet the lake nutrient WQS (Table 8 of this Decision Document). Loading capacities on the annual scale (pounds per year (lbs/year)) were calculated to meet the WQS during the growing season (June 1 through September 30). The time period of June to September was chosen by MPCA as the growing season because it corresponds to the eutrophication criteria, contains the months that the general public typically uses the lake 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.

MPCA subdivided the loading capacity among the WLA, LA, and MOS components of the TMDL (Table 24 of this Decision Document). These calculations were based on the critical condition, the summer growing season, which is typically when the water quality in each lake is typically degraded and phosphorus loading inputs are the greatest. TMDL allocations assigned during the summer growing season will protect Rockstad Lake 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 24 of this Decision Document communicate MPCA's estimates of the reductions required for Rockstad Lake to meet the 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.

Table 24: Phosphorus TMDL for Rockstad Lake in the Wild Rice River Watershed is located at the end of this Decision Document in Attachment 3.

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 WRRW TMDLs can be attributed to different nonpoint sources.

WRRW bacteria TMDLs: The calculated LA values for the bacteria TMDLs are applicable across all flow conditions in the WRRW (Tables 9-18 of this Decision Document). MPCA identified several nonpoint sources which contribute bacteria loads to the surface waters of the WRRW, including; stormwater from agricultural and feedlot areas, failing septic systems, wildlife (e.g., deer, geese, ducks, raccoons, turkeys, and other animals) and bacteria contributions from upstream subwatersheds. MPCA did not determine load allocation values for each of these potential nonpoint source considerations but aggregated the nonpoint sources into one 'watershed load' LA calculation (Tables 9-18 of this Decision Document).

WRRW 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 impaired segments in the WRRW (Table 19-23 of this Decision Document). Load allocations were recognized as originating from many diverse nonpoint sources including; stormwater contributions from agricultural lands, stream channelization and streambank erosion, wetland and forest sources, and atmospheric deposition. MPCA did not determine load allocation values for each of these potential nonpoint source considerations but aggregated the nonpoint sources into one "watershed load" LA calculation (Tables 19-23 of this Decision Document).

WRRW phosphorus TMDLs: MPCA identified several nonpoint sources which contribute nutrient loading to Rockstad Lake (Table 24 of this Decision Document). These nonpoint sources included: watershed contributions from the lake's direct watershed (i.e., lakeshed loading), internal loading, contributions from SSTS and atmospheric deposition. MPCA calculated load allocation values for each of these potential nonpoint source considerations (Table 24 of this Decision Document).

EPA finds MPCA's approach for calculating the LA for bacteria, phosphorus and TSS to be reasonable. The EPA finds that the TMDL document submitted by MPCA satisfies the requirements of the fourth criterion.

5. Wasteload Allocations (WLAs)

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

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

Comment:

WRRW bacteria TMDLs: MPCA identified four NPDES permitted facilities on State Land (Table 4 of this Decision Document) within the WRRW and assigned those facilities a portion of the WLA (Tables 3 and 9-18 of this Decision Document). All four facilities are controlled systems (ponds) (Table 18 of the final TMDL document), and the maximum daily flow was based on a six-inch per day discharge from the facility's secondary pond (Section 4.2.3 of the final TMDL document). The ponds are limited by permit to discharge between March 1-June 30 and September 1-December 31 (unless ice-covered).

As discussed earlier in this Decision Document, MPCA explained that there are eight other WWTP facilities within the watershed that can contribute bacteria in the WRRW, but these facilities are located within the White Earth Reservation and therefore were not assigned wasteload allocations as part of the WRRW TMDL(Section 3.6.1.1 of the final TMDL document). Accordingly, wasteload allocations are only approved for the four facilities on the Minnesota portion of the WRRW (Tables 4 and 9-18 of this Decision Document).

MPCA also explained that the WLA for each individual WWTP was calculated based on the *E. coli* WQS but WWTP permits are regulated for the fecal coliform WQS (200 orgs /100 mL) and that if a facility is meeting its fecal coliform limits, which are set in the facility's discharge permit, MPCA assumes the facility is also meeting the calculated *E. coli* WLA from the WRRW 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 WRRW in Sections 3.6.1.2 and 4.1.3.3 of the final TMDL document. CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota R. 7020.2003). CAFOs were assigned a WLA of zero (WLA = 0) by MPCA for the WRRW bacteria TMDLs. As explained by MPCA, CAFO production areas must be designed to contain all manure, and direct precipitation and manure-contaminated runoff from precipitation events up to the 25-year, 24-hour storm event, and even in the event of a discharge, the discharge cannot cause or contribute to a violation of a WQS. MPCA noted that any precipitation-caused runoff from the land application of manure at agronomic rates is not considered a point source discharge, and is accounted for in the LA section of the TMDL.

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

<u>WRRW TSS TMDLs:</u> MPCA identified six NPDES permitted facilities on State Land (Table 5 of this Decision Document) within the WRRW and assigned those facilities a portion of the WLA (Tables 5 and 19-23 of this Decision Document). All six facilities are controlled systems (ponds) (Table 32 of the final TMDL document), and the maximum daily flow was based on a six-inch per day discharge from the facility's secondary pond (Section 4.1.4.3 of the final TMDL document). The ponds are limited by permit to discharge between March 1-June 30 and September 1-December 31(unless ice-covered).

As discussed earlier in this Decision Document, MPCA explained that there are eight other WWTP facilities within the watershed that can contribute bacteria in the WRRW, but these facilities are located within the White Earth Reservation and therefore were not assigned wasteload allocations as part of the WRRW TMDL(Section 3.6.1.1 of the final TMDL document). Accordingly, wasteload allocations are only approved for the six facilities on Minnesota portion of the WRRW (Tables 5 and 19-23 of this Decision Document).

MPCA identified construction and industrial stormwater contributions as necessitating a WLA (Tables 19-23 of this Decision Document). Construction and industrial stormwater contributions were combined together to a single line item in the TMDL equations (Tables 19-23 of this Decision Document). The WLA for construction stormwater was calculated based on the average percent area (0.05%) of the WRRW which was covered under a NPDES/SDS Construction Stormwater General Permit during the previous five years. The construction and industrial stormwater WLA was calculated as the percent area (0.1%) multiplied by the loading capacity (Section 4.1.4.3 of the final TMDL document).

Attaining the construction stormwater and industrial stormwater loads described in the WRRW TSS TMDLs is the responsibility of construction and industrial site managers. Local MS4 permittees are required to have a construction stormwater ordinance at least as stringent as the State's NPDES/SDS General Stormwater Permit for Construction Activity (MNR100001). In the final TMDL document MPCA explained that if a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit (MNR100001) and properly selects, installs and maintains all BMPs required under MNR100001 and applicable local construction stormwater ordinances, including those related to impaired waters discharges and any applicable additional requirements found in Appendix A of the Construction General Permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL. BMPs and other stormwater control measures which act to limit the discharge of the pollutant of concern (TSS) are defined in MNR100001.

The MPCA is responsible for overseeing industrial stormwater loads which impact water quality to lakes and stream segments in the WRRW. Industrial sites within 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 (TSS) are defined in MNR050000 and MNG490000.

The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit (MNR100001) and applicable local construction stormwater ordinances, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan complies with the applicable requirements in the State permits and local ordinances. As noted above, MPCA has explained that meeting the terms of the applicable permits will be consistent with the WLAs set in the WRRW TSS 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 EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

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

Rockstad Lake phosphorus TMDL:
Similar to the TSS TMDLs, MPCA calculated a WLA for construction and industrial stormwater for the phosphorus TMDL (Table 24 of this Decision Document). This WLA was represented as a categorical WLA for construction and industrial stormwater. The construction and industrial stormwater allocations for the Rockstad Lake TMDL was calculated in the same manner as the construction and industrial stormwater allocations for the WRRW TSS TMDLs (i.e., see calculative method in Section 5 – WRRW TSS TMDLs, within this Decision Document).

MPCA's expectations and responsibilities for overseeing construction and industrial stormwater loads for the phosphorus TMDL are the same for the TSS 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 the MPCA's Stormwater General Permit (MNR100001) and applicable local construction stormwater ordinances, managers of sites under construction or industrial stormwater permits must review the adequacy of local

SWPPPs to ensure that each plan complies with the applicable requirements in the State permits and local ordinances. As noted above, MPCA has explained that meeting the terms of the applicable permits will be consistent with the WLAs set in the phosphorus TMDL for Rockstad Lake. 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. EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

EPA finds the MPCA's approach for calculating the WLA for the Rockstad Lake phosphorus TMDL 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 and TSS TMDLs.

WRRW bacteria and TSS TMDLs: The WRRW bacteria and TSS 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 9-23 of this Decision Document). MPCA explained that the explicit MOS was set at 10% due to the following factors discovered during TMDL development for these pollutants:

- Uncertainty in simulated flow data from the HSPF model;
- Environmental variability in pollutant loading and water quality data (i.e., collected water quality monitoring data, field sampling error, etc.); and
- Calibration and validation processes of the 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 WRRW 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 discussed 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.

Rockstad Lake phosphorus TMDL: For the Rockstad Lake phosphorus TMDL, MPCA used both an implicit MOS and an explicit MOS (Table 24 of this Decision Document; Section 4.2.1.4 of the final TMDL document). MPCA utilized an explicit MOS of 10% to account for any uncertainties in the HSPF model, uncertainties in the assumptions made for estimating internal loading rates and other assumptions used for calibrating the BATHTUB modeling efforts for the lake. MPCA also explained that the Rockstad Lake watershed conservative as the estimated construction activity in the county is 0.004%, but choose to use the 0.05% value used in determine the WLA for construction stormwater. MPCA also noted that there is very limited industrial activity in the Rockstad Lake watershed, but also used the 0.05% value to determine the WLAs for industrial stormwater. The total WLA for Rockstad Lake is therefore considerably overestimated (Section 4.2.1.4 of the final TMDL document).

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:

WRRW 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 WRRW 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).

<u>WRRW TSS TMDLs:</u> 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 WRRW. Sediment loading in the WRRW varies depending on surface water flow, land cover and climate/season. Spring is typically associated with large flows from snowmelt, the summer is associated with the growing season as well as periodic storm events and receding streamflows, and the fall brings increasing precipitation and rapidly changing agricultural landscapes. In all seasons, sediment inputs to surface waters typically occur primarily through wet weather events. Critical conditions that impact the response of WRRW water bodies to sediment inputs may typically occur during periods of low flow. During low flow periods, sediment can accumulate within the impacted water bodies, there is less assimilative capacity within the water body, and generally sediment is not transported through the water body at the same rate it is under normal flow conditions.

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

<u>Rockstad Lake phosphorus TMDL:</u> Seasonal variation was considered for the Rockstad Lake TMDL as described in Section 4.2.1.5 of the final TMDL document. The nutrient targets employed in the TMDL were based on the average nutrient values collected during the growing season (June 1 to September 30). The water quality target was designed to meet the NLF 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 WRRW phosphorus TMDL effort, 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 to late summer period is typically when eutrophication standards are exceeded and water quality within the WRRW is deficient. By calibrating the modeling efforts to protect the lake during the worst water quality conditions of the year, it is assumed that the loading capacity established by the TMDL will be protective of water quality during the remainder of the calendar year (October through May).

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

8. Reasonable Assurance

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

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

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

Comment:
The WRRW bacteria, phosphorus and TSS 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 WRRW. 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 WRRW. Implementation practices will be implemented over the next several years. It is anticipated that staff from Soil and Water Conservation District (SWCDs) (e.g., the Norman County SWCD) staff, local Minnesota Board of Soil and Water Resources (BWSR) offices, Wild Rice Watershed District (WRWD) and other local watershed groups, will work together to reduce pollutant inputs to the WRRW. MPCA has authored a Wild Rice River WRAPS document (May 2022) which provides information on the development of scientifically-supported restoration and protection strategies for implementation planning and action. MPCA sees the WRAPS document as a starting point for which MPCA and local partners can develop tools that will help local governments, land owners, and special interest groups determine (1) the best strategies for making improvements and protecting resources that are already in good condition, and (2) focus those strategies in the best places to do work.

County SWCDs, such as the Norman County SWCD and the Clay County SWCD, have a history of implementation efforts in the WRRW. In addition to the SWCDs, the WRWD has been applying conservation practices in areas in the WRRW and providing educational opportunities to local landowners in order to achieve sound management of natural resources since the 1940s (https://www.wildricewatershed.org/). The SWCDs and the WRWD employ various programming, such as shoreline planting programming, native plant, tree and seed planting programming, cost-share opportunities, equipment rentals and other technical services to ensure that efforts are made to improve water quality and conserve water resources in the WRRW. Other county SWCDs in the WRRW has similar programming efforts which locals can utilize.

The WRWD led the effort to develop the "Wild Rice-Marsh Comprehensive Watershed Management Plan", which ws approved by the Minnesota Board of Water and Soil Resources (BWSR) in 2020. This plan, part of the "One Watershed One Plan" (1W1P) program, incorporates information and goals from several local watershed plans int a comprehensive watershed plan for the WRRW (Section 6.3 of the final TMDL document), and can be accessed at https://www.wildricewatershed.org/. Both the 1W1P and WRAPS documents provide a detailed blueprint for improving water quality in the WRRW.

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

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

Reasonable assurance that the WLA set forth will be implemented is provided by regulatory actions. According to 40 C.F.R. § 122.44(d)(1)(vii)(B), NPDES permit effluent limits must be consistent with assumptions and requirements of all WLAs in an approved TMDL. MPCA's stormwater program and the NPDES permit program are the implementing programs for ensuring WLA are consistent with the TMDL. The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan meets WLA set in the WRRW TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified. This applies to sites under the MPCA's General Stormwater Permit for Construction Activity (MNR100001) and its

NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) or NPDES/SDS General Permit for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production facilities (MNG490000).

Various funding mechanisms will be utilized to execute the recommendations made in the implementation section of this TMDL. The Clean Water Legacy Act (CWLA) was passed in Minnesota in 2006 for the purposes of protecting, restoring, and preserving Minnesota water. The CWLA provides the protocols and practices to be followed in order to protect, enhance, and restore water quality in Minnesota. The CWLA outlines how MPCA, public agencies and private entities should coordinate in their efforts toward improving land use management practices and water management. The CWLA anticipates that all agencies (i.e., MPCA, public agencies, local authorities and private entities, etc.) will cooperate regarding planning and restoration efforts. Cooperative efforts would likely include informal and formal agreements to jointly use technical, educational, and financial resources. Figure 45 of the final TMDL document shows the resources spent within the WRRW since 2004. Over $93 million has been spent by Federal, State, local governments, and landowners.

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

The Minnesota Board of Soil and Water Resources administers the Clean Water Fund as well, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (*http://bwsr.state.mn.us/cwf_programs*).

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.

<u>Comment:</u>

The final TMDL document outlines the water monitoring efforts in the WRRW (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 Norman SWCD, Clay County SWCD, and Wild Rice River Watershed District) and volunteers, as long as there is sufficient funding to support the efforts of these local entities. At a minimum, the WRRW will be monitored once every 10 years as part of the MPCA's Intensive Watershed Monitoring cycle.

Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation efforts utilized in the WRRW. 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 WRRW. 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.

<u>Stream Monitoring:</u>

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

<u>Lake Monitoring:</u>

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

The EPA finds that this criterion has been adequately addressed.

10. Implementation

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

Comment:
The findings from the WRRW TMDLs will be used to inform the selection of implementation activities as part of the Wild Rice River 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 WRRW, education and outreach efforts with local partners, and partnering with local stakeholders to improve water quality within the watershed. The WRRW WRAPS document (May 2022) includes additional detail regarding specific recommendations from MPCA to aid in the reduction of bacteria, nutrients and TSS to surface waters of the WRRW. Additionally, MPCA referenced the Statewide Nutrient Reduction Strategy (https://www.pca.state.mn.us/water/nutrient-reduction-strategy) for focused implementation efforts targeting phosphorus nonpoint sources in WRRW. The reduction goals for the bacteria, nutrient and TSS TMDLs may be met via components of the following strategies:

WRRW 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 WRRW.

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

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.

WRRW 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 WRRW. 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 WRRW. Implementation actions (e.g., planting deep-rooted vegetation near water bodies to stabilize streambanks) could be prioritized to target areas which are actively eroding. This strategy could prevent additional sediment inputs into surface waters of the WRRW and minimize or eliminate degradation of habitat.

WRRW phosphorus TMDL:

Septic Field Maintenance: Septic systems are believed to be a source of nutrients to Rockstad Lake. 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 the lake. 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 WRRW.

Internal Loading Reduction Strategies: Internal nutrient loads may be addressed to meet the TMDL allocations outlined in the WRRW 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 (e.g., aluminum sulfate) to lakes of the WRRW in order for those reactants to permanently bind phosphorus into the lake bottom sediments. This effort could decrease phosphorus releases from sediment into the lake water column during anoxic conditions.

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

11. Public Participation

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

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

Comment:

The public participation section of the TMDL submittal is found in Section 9 of the final TMDL document. Throughout the development of the WRRW TMDLs the public was given various opportunities to participate. As part of the strategy to communicate the goals of the TMDL project and to engage with members of the public, MPCA worked with county and SWCD staff in the WRRW to promote water quality, to gain input from landowners via surveys and interviews and to better understand the social dynamics of stakeholders in the WRRW. MPCA's goal was to create civic engagement and discussion which would enhance the content of the TMDL, WRAPS and 1W1P documents. An open house style meeting was held on May 30, 2018, to provide the public with the opportunity to learn about and ask question on the WRRW TMDL and WRAPS project.

MPCA posted the draft TMDL online at (http://www.pca.state.mn.us/water/tmdl) for a public comment period. The public comment period was started on March 14, 2022 and ended on April 13, 2022. No comments were received by MPCA.

The Wild Rice River Watershed includes White Earth Nation Reservation lands (Section 3 of the final TMDL document). EPA invited representatives of the White Earth Nation to consult with EPA regarding EPA's review and decision on the WRRW TMDLs, but no consultation was requested.[6]

As stated above, MPCA's WRRW TMDLs do not include the White Earth Nation's reservation lands. EPA notes that MPCA's development of the TMDLs included in the WRRW TMDL submittal is expected to result in needed actions to address those impairments resulting from

[6] EPA Letter from Tera L. Fong, Water Division Director, Region 5, EPA to Michael Fairbanks, Chairman of White Earth Nation, *Invitation for Consultation on EPA's Final Review of the Wild Rice River Watershed Total Maximum Daily Load Study*, May 27, 2022 .

many pollutants of concern within the WRRW. EPA expects that the development and implementation of the WRRW TMDLs, though not directly addressing sources within the White Earth Reservation, will result in the overall improvement of water quality within the WRRW. This is consistent with EPA's policy aims and goals for considering tribal interests in carrying out its programs to protect human health and the environment.

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 Wild Rice River Watershed TMDL document, submittal letter and accompanying documentation from MPCA on June 1, 2022. The transmittal letter explicitly stated that the final TMDLs referenced in Table 1 of this Decision Document were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval.

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

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

13. Conclusion

After a full and complete review, the EPA finds that the ten (10) bacteria TMDLs, the five (5) TSS TMDLs, and the one (1) phosphorus TMDL satisfy all elements for approvable TMDLs. This TMDL approval is for **sixteen TMDLs**, addressing segments for aquatic recreational and aquatic life use impairments (Table 1 of this Decision Document). This Decision also documents the revoke and reissue of the TSS TMDL for Wild Rice River (S. Br. Wild Rice R. to Red R.) segment 09020108-501.

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, and as further discussed in our Decision Document. The EPA is taking no action to approve or disapprove TMDLs for those waters at this time. The EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.

ATTACHMENTS

Attachment #1: Tables 9-18: Bacteria (*E. coli*) TMDLs for the Wild Rice River Watershed TMDL Report

Attachment #2: Tables 19-23: TSS TMDLs for the Wild Rice River Watershed TMDL Report

Attachment #3: Table 24: Phosphorus TMDL for Rockstad Lake in the Wild Rice River Watershed TMDL Report

ATTACHMENT #1

Table 9: *E. coli* TMDL summary for Coon Creek, unnamed creek to Wild Rice River (AUID 09020108-544).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 126 *E. coli* org/100 mL
- TMDL and allocations apply April through October

E. coli		Flow zone				
		Very High	High	Mid-Range	Low	Very Low
		[Billion org/day]				
Total Loading Capacity		**163**	**19**	**4.8**	**0.87**	**0.011**
Wasteload Allocation	**Total WLA**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Load Allocation	**Total LA**	**147**	**17.1**	**4.32**	**0.783**	**0.0099**
Margin of Safety (MOS)		**16**	**1.9**	**0.48**	**0.087**	**0.0011**
Observed Load		-	23	6.5	0.65	0.011
Estimated Percent Reduction		-	17%	26%	0%	0%
Overall Observed Concentration [a]		262 org/100 mL				
Overall Estimated Percent Reduction		52%				

[a] The highest observed monthly geometric mean from the months that the standard applies using *E. coli* data from 2007 through 2016. Five or more samples were needed in a month to be considered the highest observed monthly geometric mean.

Table 10: *E. coli* TMDL summary for Unnamed creek, unnamed creek to Wild Rice River (AUID 09020108-546).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 126 *E. coli* org/100 mL
- TMDL and allocations apply April through October

E. coli		Flow zone				
		Very High	High	Mid-Range	Low	Very Low
		[Billion org/day]				
Total Loading Capacity (LC)		387	50	8.5	0.067	0.0027
Boundary Condition (BC)–White Earth Nation LC [a]		185	24	4.1	0.032	0.0013
Minnesota LC		**202**	**26**	**4.4**	**0.035**	**0.0014**
Wasteload Allocation	**Total WLA**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Load Allocation	**Total LA**	**182**	**23.4**	**3.96**	**0.0315**	**0.00126**
Margin of Safety (MOS)		**20**	**2.6**	**0.44**	**0.0035**	**0.00014**

Observed Load	-	117	38	0.56	-
Observed Load minus BC	-	93	33.9	0.528	-
Estimated Percent Reduction	-	72%	87%	93%	-
Overall Observed Concentration [b]	891 org/100 mL				
Overall Estimated Percent Reduction	86%				

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (47.9%).
[b] The highest observed monthly geometric mean from the months that the standard applies using *E. coli* data from 2007 through 2016. Five or more samples were needed in a month to be considered the highest observed monthly geometric mean.

Table 11: *E. coli* TMDL summary for County Ditch 45, unnamed ditch to unnamed ditch (AUID 09020108-553).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 126 *E. coli* org/100 mL
- TMDL and allocations apply April through October

E. coli		**Flow zone**				
		Very High	**High**	**Mid-Range**	**Low**	**Very Low**
		[Billion org/day]				
Total Loading Capacity		**320**	**26**	**6.1**	**1.3**	**0.19**
Wasteload Allocation	**Total WLA**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Load Allocation	**Total LA**	**288**	**23.4**	**5.49**	**1.17**	**0.171**
Margin of Safety (MOS)		**32**	**2.6**	**0.61**	**0.13**	**0.019**
Observed Load		-	135	36	6.2	-
Estimated Percent Reduction		-	81%	83%	79%	-
Overall Observed Concentration [a]		600 org/100 mL				
Overall Estimated Percent Reduction		79%				

[a] The highest observed monthly geometric mean from the months that the standard applies using *E. coli* data from 2007 through 2016. Five or more samples were needed in a month to be considered the highest observed monthly geometric mean.

Table 12. *E. coli* TMDL summary for Coon Creek, unnamed creek to unnamed creek (AUID 09020108-577).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 126 *E. coli* org/100 mL
- TMDL and allocations apply April through October

E. coli	**Flow zone**				
	Very High	**High**	**Mid-Range**	**Low**	**Very Low**
	[Billion org/day]				
Total Loading Capacity	**163**	**19**	**4.8**	**0.87**	**0.011**

Wasteload Allocation	**Total WLA**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Load Allocation	**Total LA**	**147**	**17.1**	**4.32**	**0.783**	**0.0099**
Margin of Safety (MOS)		**16**	**1.9**	**0.48**	**0.087**	**0.0011**
Observed Load		-	64	43	-	-
Estimated Percent Reduction		-	70%	89%	-	-
Overall Observed Concentration [a]		652 org/100 mL				
Overall Estimated Percent Reduction		81%				

[a] The highest observed monthly geometric mean from the months that the standard applies using *E. coli* data from 2007 through 2016. Five or more samples were needed in a month to be considered the highest observed monthly geometric mean.

Table 13: *E. coli* TMDL summary for Wild Rice River, Marsh Creek to unnamed creek (AUID 09020108-643).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 126 *E. coli* org/100 mL
- TMDL and allocations apply April through October

E. coli		**Flow zone**				
		Very High	**High**	**Mid-Range**	**Low**	**Very Low**
		[Billion org/day]				
Total Loading Capacity (LC)		3,915	1,574	610	254	73
Boundary Condition (BC) - White Earth Nation LC [a]		2,635	1,059	411	171	49
Minnesota LC		**1,280**	**515**	**199**	**83**	**24**
Wasteload Allocation	**Total WLA**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**
	Gary WWTP (MNG585175)	1.2	1.2	1.2	1.2	1.2
	Twin Valley WWTP (MNG585137)	4.3	4.3	4.3	4.3	4.3
Load Allocation	**Total LA**	**1,146.5**	**457.5**	**173.5**	**69.2**	**16.1**
Margin of Safety (MOS)		**128**	**52**	**20**	**8.3**	**2.4**
Observed Load		8,020	1,074	395	135	-
Observed Load minus BC		5,385	15	-16	-36	-
Estimated Percent Reduction		76%	0%	0%	0%	-
Overall Observed Concentration [b]		137 org/100 mL				
Overall Estimated Percent Reduction		8.0%				

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (67.3%). Loading from six wastewater facilities on tribal land (totaling 29.86 billion org/day) is included in the BC.

b The highest observed monthly geometric mean from the months that the standard applies using *E. coli* data from 2007 through 2016. Five or more samples were needed in a month to be considered the highest observed monthly geometric mean.

Table 14: *E. coli* TMDL summary for Wild Rice River, unnamed creek to South Branch Wild Rice River (AUID 09020108-644).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 126 *E. coli* org/100 mL
- TMDL and allocations apply April through October

E. coli		Flow zone				
		Very High	High	Mid-Range	Low	Very Low
		[Billion org/day]				
Total Loading Capacity (LC)		4,602	2,005	918	316	59
Boundary Condition (BC) – White Earth Nation LC [a]		2,959	1,289	590	203	38
Minnesota LC		**1,643**	**716**	**328**	**113**	**21**
Wasteload Allocation	**Total WLA**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**
	Gary WWTP (MNG585175)	1.2	1.2	1.2	1.2	1.2
	Twin Valley WWTP (MNG585137)	4.3	4.3	4.3	4.3	4.3
Load Allocation	**Total LA**	**1,473.5**	**638.5**	**289.5**	**96.5**	**13.4**
Margin of Safety (MOS)		**164**	**72**	**33**	**11**	**2.1**
Observed Load		3,325	898	952	251	45
Observed Load minus BC		366	-391	362	48	7.0
Estimated Percent Reduction		0%	0%	9%	0%	0%
Overall Observed Concentration [b]		176 org/100 mL				
Overall Estimated Percent Reduction		28%				

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (64.3%). Loading from six wastewater facilities on tribal land (totaling 29.86 billion org/day) is included in the BC.

[b] The highest observed monthly geometric mean from the months that the standard applies using *E. coli* data from 2007 through 2016. Five or more samples were needed in a month to be considered the highest observed monthly geometric mean.

Table 15. *E. coli* TMDL summary for Spring Creek, 140th Avenue to Wild Rice River (AUID 09020108-648).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 126 *E. coli* org/100 mL
- TMDL and allocations apply April through October

E. coli	Flow zone				
	Very High	High	Mid-Range	Low	Very Low
	[Billion org/day]				
Total Loading Capacity (LC)	411.1	100.7	43.9	21.34	9.48
Boundary Condition (BC) – White Earth Nation LC [a]	401.6	98.4	42.9	20.85	9.26

Minnesota LC		**9.5**	**2.3**	**1.0**	**0.49**	**0.22**
Wasteload Allocation	**Total WLA**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Load Allocation	**Total LA**	**8.55**	**2.07**	**0.9**	**0.441**	**0.198**
Margin of Safety (MOS)		**0.95**	**0.23**	**0.10**	**0.049**	**0.022**
Observed Load		-	141	111	66	15
Observed Load minus BC		-	42.6	68.1	45.15	5.74
Estimated Percent Reduction		-	95%	99%	99%	96%
Overall Observed Concentration [b]		383 org/100 mL				
Overall Estimated Percent Reduction		67%				

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (97.7%). Loading from one wastewater facility on tribal land (totaling 3.0 billion org/day) is included in the BC.

[b] The highest observed monthly geometric mean from the months that the standard applies using *E. coli* data from 2007 through 2016. Five or more samples were needed in a month to be considered the highest observed monthly geometric mean.

Table 16: *E. coli* TMDL summary for Mashaug Creek, T-92 to Wild Rice River (AUID 09020108-650).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 126 *E. coli* org/100 mL
- TMDL and allocations apply April through October

E. coli		Flow zone				
		Very High	**High**	**Mid-Range**	**Low**	**Very Low**
		[Billion org/day]				
Loading Capacity		**430**	**91**	**38**	**18**	**7.7**
Wasteload Allocation	**Total WLA**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
	Gary WWTP (MNG585175)	1.2	1.2	1.2	1.2	1.2
Load Allocation	**Total LA**	**385.8**	**80.7**	**33**	**15**	**5.73**
Margin of Safety (MOS)		**43**	**9.1**	**3.8**	**1.8**	**0.77**
Observed Load		-	87	21	22	1.5
Estimated Percent Reduction		-	0%	0%	18%	0%
Overall Observed Concentration [a]		236 org/100 mL				
Overall Estimated Percent Reduction		47%				

[a] The highest observed monthly geometric mean from the months that the standard applies using *E. coli* data from 2007 through 2016. Five or more samples were needed in a month to be considered the highest observed monthly geometric mean.

Table 17: *E. coli* TMDL summary for South Branch Wild Rice River, T-246 to Wild Rice River (AUID 09020108-659).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 126 *E. coli* org/100 mL
- TMDL and allocations apply April through October

E. coli		Flow zone				
		Very High	High	Mid-Range	Low	Very Low
		[Billion org/day]				
Total Loading Capacity (LC)		955	189	71	22.4	7.8
Boundary Condition (BC) – White Earth Nation LC [a]		177	35	13	4.1	1.4
Minnesota LC		**778**	**154**	**58**	**18.3**	**6.4**
Wasteload Allocation	**Total WLA**	**4.75**	**4.75**	**4.75**	**4.75**	**4.75**
	Borup WWTP (MN0022853)	0.65	0.65	0.65	0.65	0.65
	Ulen WWTP (MNG585088)	4.1	4.1	4.1	4.1	4.1
Load Allocation	**Total LA**	**695.25**	**134.25**	**47.45**	**11.75**	**1.01**
Margin of Safety (MOS)		**78**	**15**	**5.8**	**1.8**	**0.64**
Observed Load		591	239	53	12	-
Observed Load minus BC		414	204	40	7.9	-
Estimated Percent Reduction		0%	25%	0%	0%	-
Overall Observed Concentration [b]		296 org/100 mL				
Overall Estimated Percent Reduction		57%				

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (18.5%). Loading from two wastewater facilities on tribal land (totaling 2.2 billion org/day) is included in the BC.

[b] The highest observed monthly geometric mean from the months that the standard applies using *E. coli* data from 2007 through 2016. Five or more samples were needed in a month to be considered the highest observed monthly geometric mean.

Table 18: *E. coli* TMDL summary for South Branch Wild Rice River, unnamed creek to unnamed creek (AUID 09020108-662).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 126 *E. coli* org/100 mL
- TMDL and allocations apply April through October

E. coli	Flow zone				
	Very High	High	Mid-Range	Low	Very Low
	[Billion org/day]				
Total Loading Capacity (LC)	1,306	158	32.4	7.1	0.50
Boundary Condition (BC) – White Earth Nation LC [a]	324	39	8.0	1.8	0.12

Minnesota LC		**982**	**119**	**24.4**	**5.3**	**0.38**
Wasteload Allocation	**Total WLA**	**4.1**	**4.1**	**4.1**	**4.1**	*****
	Ulen WWTP (MNG585088)	4.1	4.1	4.1	4.1	*
Load Allocation	**Total LA**	**879.9**	**102.9**	**17.9**	**0.67**	**0.342**
Margin of Safety (MOS)		**98**	**12**	**2.4**	**0.53**	**0.038**
Observed Load		-	287	32	6.2	-
Observed Load minus BC		-	248	24	4.4	-
Estimated Percent Reduction		-	52%	0%	0%	-
Overall Observed Concentration [b]		193 org/100 mL				
Overall Estimated Percent Reduction		35%				

* The permitted wastewater design flow exceeds the stream flow in the indicated flow zone(s). The allocations are expressed as an equation rather than an absolute number: allocation = (flow contribution from a given source) x 126 org/100 mL (or NPDES/SDS permit concentration).

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (24.8%). Loading from two wastewater facilities on tribal land (totaling 2.2 billion org/day) is included in the BC.

[b] The highest observed monthly geometric mean from the months that the standard applies using *E. coli* data from 2007 through 2016. Five or more samples were needed in a month to be considered the highest observed monthly geometric mean.

ATTACHMENT #2

Table 19: TSS TMDL summary for Wild Rice River, South Branch Wild Rice River to Red River (AUID 09020108-501).

- Listing year: 2006
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 65 mg/L TSS
- TMDL and allocations apply April through September

Total Suspended Solids		Flow zone				
		Very High	High	Mid-Range	Low	Very Low
		[U.S. tons/day]				
Total Loading Capacity (LC)		416	140	68	21	5.3
Boundary Condition (BC) – White Earth Nation LC [a]		198	67	32	10	2.5
Minnesota LC		**218**	**73**	**36**	**11**	**2.8**
Wasteload Allocation	**Total WLA**	**0.861**	**0.714**	**0.677**	**0.652**	**0.6438**
	Borup WWTP (MN0022853)	0.025	0.025	0.025	0.025	0.025
	Felton WWTP (MNG585149)	0.10	0.10	0.10	0.10	0.10
	Gary WWTP (MNG585175)	0.046	0.046	0.046	0.046	0.046
	Hendrum WWTP (MNG585176)	0.14	0.14	0.14	0.14	0.14
	Twin Valley WWTP (MNG585137)	0.17	0.17	0.17	0.17	0.17
	Ulen WWTP (MNG585088)	0.16	0.16	0.16	0.16	0.16
	Construction/Industrial Stormwater	0.22	0.073	0.036	0.011	0.0028
Load Allocation	**Total LA**	**195.139**	**64.986**	**31.723**	**9.248**	**1.8762**
Margin of Safety (MOS)		**22**	**7.3**	**3.6**	**1.1**	**0.28**
Observed 90th percentile Load		2,552	671	233	40	5.0
Observed 90th percentile Load minus BC		2,354	604	201	30	2.5
Estimated Percent Reduction		91%	88%	82%	63%	0%
Overall Observed 90th percentile concentration		320 mg/L				
Overall Estimated Percent Reduction		80%				

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (47.5%). Loading from eight wastewater facilities on tribal land (totaling 1.26 U.S. tons/day) is included in the BC.

Table 20: TSS TMDL summary for Wild Rice River, White Earth River to Marsh Creek (AUID 09020108-504).

- Listing year: 2018
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 30 mg/L TSS
- TMDL and allocations apply April through September

Total Suspended Solids		Flow zone				
		Very High	High	Mid-Range	Low	Very Low
		[U.S. tons/day]				
Total Loading Capacity (LC)		110	35.4	16.7	8.5	3.16
Boundary Condition (BC) – White Earth Nation LC [a]		91	29.3	13.8	7.0	2.62
Minnesota LC		**19**	**6.1**	**2.9**	**1.5**	**0.54**
Wasteload Allocation	**Total WLA**	**0.019**	**0.0061**	**0.0029**	**0.0015**	**0.00054**
	Construction/Industrial Stormwater	0.019	0.0061	0.0029	0.0015	0.00054
Load Allocation	**Total LA**	**17.081**	**5.4839**	**2.6071**	**1.3485**	**0.48546**
Margin of Safety (MOS)		**1.9**	**0.61**	**0.29**	**0.15**	**0.054**
Observed 90th percentile Load		709	210	43	8.2	1.5
Observed 90th percentile Load minus BC		618	180.7	29.2	1.2	-1.12
Estimated Percent Reduction		97%	97%	90%	0%	0%
Overall Observed 90th percentile concentration		122 mg/L				
Overall Estimated Percent Reduction		75%				

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (82.8%). Loading from five wastewater facilities on tribal land (totaling 1.15 U.S. tons/day) is included in the BC.

Table 21: TSS TMDL summary for Wild Rice River, Marsh Creek to unnamed creek (AUID 09020108-643).

- Listing year: 2010
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 30 mg/L TSS
- TMDL and allocations apply April through September

Total Suspended Solids		Flow zone				
		Very High	High	Mid-Range	Low	Very Low
		[U.S. tons/day]				
Total Loading Capacity (LC)		104	44	18.4	7.3	2.01
Boundary Condition (BC) – White Earth Nation LC [a]		70	30	12.4	4.9	1.35
Minnesota LC		**34**	**14**	**6.0**	**2.4**	**0.66**
Wasteload	**Total WLA**	**0.25**	**0.23**	**0.222**	**0.2184**	**0.21666**

Allocation	Gary WWTP (MNG585175)	0.046	0.046	0.046	0.046	0.046
	Twin Valley WWTP (MNG585137)	0.17	0.17	0.17	0.17	0.17
	Construction/Industrial Stormwater	0.034	0.014	0.0060	0.0024	0.00066
Load Allocation	**Total LA**	**30.35**	**12.37**	**5.178**	**1.9416**	**0.37734**
Margin of Safety (MOS)		**3.4**	**1.4**	**0.60**	**0.24**	**0.066**
Observed 90th percentile Load		1705	411	28	3.9	0.37
Observed 90th percentile Load minus BC		1635	381	15.6	-1	-0.98
Estimated Percent Reduction		98%	96%	62%	0%	0%
Overall Observed 90th percentile concentration		330 mg/L				
Overall Estimated Percent Reduction		91%				

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (67.3%). Loading from six wastewater facilities on tribal land (totaling 1.18 U.S. tons/day) is included in the BC.

Table 22: TSS TMDL summary for Wild Rice River, unnamed creek to South Branch Wild Rice River (AUID 09020108-644).

- Listing year: 2010
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 30 mg/L TSS
- TMDL and allocations apply April through September

Total Suspended Solids		Flow zone				
		Very High	High	Mid-Range	Low	Very Low
		[U.S. tons/day]				
Total Loading Capacity (LC)		121	55	26.9	10.1	1.62
Boundary Condition (BC) – White Earth Nation LC [a]		78	35	17.3	6.5	1.04
Minnesota LC		**43**	**20**	**9.6**	**3.6**	**0.58**
Wasteload Allocation	**Total WLA**	**0.259**	**0.236**	**0.2256**	**0.2196**	**0.21658**
	Gary WWTP (MNG585175)	0.046	0.046	0.046	0.046	0.046
	Twin Valley WWTP (MNG585137)	0.17	0.17	0.17	0.17	0.17
	Construction/Industrial Stormwater	0.043	0.020	0.0096	0.0036	0.00058
Load Allocation	**Total LA**	**38.441**	**17.764**	**8.4144**	**3.0204**	**0.30542**
Margin of Safety (MOS)		**4.3**	**2.0**	**0.96**	**0.36**	**0.058**
Observed 90th percentile Load		1,010	156	86	7.4	-
Observed 90th percentile Load minus BC		932	121	68.7	0.9	-
Estimated Percent Reduction		95%	83%	86%	0%	-
Overall Observed 90th percentile concentration		216 mg/L				
Overall Estimated Percent Reduction		86%				

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (64.3%). Loading from six wastewater facilities on tribal land (totaling 1.18 U.S. tons/day) is included in the BC.

Table 23: TSS TMDL summary for Marsh Creek, -95.9973 47.4054 to Wild Rice River (AUID 09020108-652).

- Listing year: 2008
- Baseline year(s): 2011-2012
- Numeric standard used to calculate TMDL: 30 mg/L TSS
- TMDL and allocations apply April through September

<table>
<tr><th colspan="2" rowspan="3">Total Suspended Solids</th><th colspan="5">Flow zone</th></tr>
<tr><th>Very High</th><th>High</th><th>Mid-Range</th><th>Low</th><th>Very Low</th></tr>
<tr><th colspan="5">[U.S. tons/day]</th></tr>
<tr><td colspan="2">Total Loading Capacity (LC)</td><td>29.2</td><td>6.7</td><td>2.91</td><td>1.31</td><td>0.589</td></tr>
<tr><td colspan="2">Boundary Condition (BC) – White Earth Nation LC [a]</td><td>24.7</td><td>5.7</td><td>2.46</td><td>1.11</td><td>0.498</td></tr>
<tr><td colspan="2">Minnesota LC</td><td>4.5</td><td>1.0</td><td>0.45</td><td>0.20</td><td>0.091</td></tr>
<tr><td rowspan="2">Wasteload Allocation</td><td>Total WLA</td><td>0.0045</td><td>0.0010</td><td>0.00045</td><td>0.00020</td><td>0.000091</td></tr>
<tr><td>Construction/Industrial Stormwater</td><td>0.0045</td><td>0.0010</td><td>0.00045</td><td>0.00020</td><td>0.000091</td></tr>
<tr><td>Load Allocation</td><td>Total LA</td><td>4.0455</td><td>0.899</td><td>0.40455</td><td>0.1798</td><td>0.081809</td></tr>
<tr><td colspan="2">Margin of Safety (MOS)</td><td>0.45</td><td>0.10</td><td>0.045</td><td>0.020</td><td>0.0091</td></tr>
<tr><td colspan="2">Observed 90th percentile Load</td><td>-</td><td>81</td><td>1.4</td><td>0.62</td><td>-</td></tr>
<tr><td colspan="2">Observed 90th percentile Load minus BC</td><td>-</td><td>75.3</td><td>-1.06</td><td>-0.49</td><td>-</td></tr>
<tr><td colspan="2">Estimated Percent Reduction</td><td>-</td><td>99%</td><td>0%</td><td>0%</td><td>-</td></tr>
<tr><td colspan="2">Overall Observed 90th percentile concentration</td><td colspan="5">102 mg/L</td></tr>
<tr><td colspan="2">Overall Estimated Percent Reduction</td><td colspan="5">71%</td></tr>
</table>

[a] No reductions are assigned to the BC for White Earth Nation which was calculated based on the amount of tribal government land located in the impaired stream reach drainage area (84.5%). Loading from one wastewater facility on tribal land (totaling 0.028 U.S. tons/day) is included in the BC.

<u>**ATTACHMENT #3**</u>

Table 24: Total phosphorus TMDL for Rockstad Lake (15-0075-00).

- Listing year or proposed year: 2018
- Baseline year(s): 2014-2015
- Numeric standard used to calculate TMDL: 30 µg/L
- TMDL and allocations apply January through December

Rockstad (15-0075-00)		Observed TP Load		Allowable TP Load		Estimated TP Load Reduction	
		lbs/year	lbs/day	lbs/year	lbs/day	lbs/year	%
Wasteload Allocation	**Total WLA**	**0.121**	**0.000332**	**0.121**	**0.000332**	**0**	**0**
	Construction/Industrial Stormwater	0.121	0.000332	0.121	0.000332	0	0
Load Allocation	**Total LA**	**234**	**0.641**	**109**	**0.298**	**125**	**53**
	Watershed Runoff	195	0.533	71.8	0.197	123	63
	Atmosphere	31.7	0.0868	31.7	0.0868	0	0
	Excess internal load [a]	N/A	N/A	N/A	N/A	N/A	N/A
	SSTS	7.60	0.0208	5.26	0.0144	2.34	31
Margin of Safety (MOS)		**N/A**	**N/A**	**12.1**	**0.0332**	**N/A**	**N/A**
Loading Capacity		**234**	**0.641**	**121**	**0.332**	**113**	**48%**

[a] This is internal loading that occurs in excess of what is intrinsically included in the BATHTUB model