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

JAN 1 2 2017

REPLY TO THE ATTENTION OF:
WW-16J

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDL) for segments within the Long Prairie River watershed, including support documentation and follow up information. The Long Prairie River watershed (LPRW) is in central Minnesota in parts of Douglas, Morrison, Otter Tail, Todd, and Wadena Counties. The LPRW TMDLs address impaired aquatic recreation due to excessive nutrients (phosphorus) and excessive bacteria (*E. coli*).

EPA has determined that the LPRW 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 seven nutrient TMDLs and three bacteria TMDLs. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

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

Sincerely,

C. Korleski

Christopher Korleski
Director, Water Division

Enclosure

cc: Celine Lyman, MPCA

wq-iw8-49g

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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FEB 06 2017

REPLY TO THE ATTENTION OF:
WW-16J

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has reviewed the recent approval of the Long Prairie River Watershed Total Maximum Daily Load (TMDL) report (dated January 12, 2017). EPA has determined that there were errors made in Section 1 (Table 1 of the Decision Document) and Section 3 (Table 8 of the Decision Document) of the January 12th Decision Document. EPA used an incorrect lake identification number for the Echo Lake phosphorus TMDL in Tables 1 and 8 of the January 12th Decision Document.

EPA has corrected the lake identification number for Echo Lake within a revised Decision Document, which I am enclosing a copy for your records. If you have any questions, please contact Mr. David Werbach, TMDL Coordinator, at 312-886-4242.

Sincerely,

Peter Swenson

Peter Swenson
Chief, Watersheds & Wetlands Branch

Enclosure

cc: Celine Lyman, MPCA

**TMDL:** Long Prairie River Watershed bacteria & phosphorus TMDLs, Douglas, Morrison, Otter Tail, Todd, and Wadena Counties, Minnesota
**Date:** February 6, 2017 (Revised)

**DECISION DOCUMENT**
**FOR THE LONG PRAIRIE RIVER WATERSHED TMDLS, DOUGLAS, MORRISON, OTTER TAIL, TODD & WADENA COUNTIES, 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 Long Prairie River Watershed (LPRW) (HUC-8 #07010108) is located in central Minnesota in the Upper Mississippi River basin. The LPRW is approximately 885 square miles (566,612 acres) and spans portions of Douglas, Morrison, Otter Tail, Todd, and Wadena counties. Waters in the LPRW generally flow from southwest to northeast where the surface waters of the Long Prairie River empty into the main stem of the Crow Wing River near Motley, Minnesota.

The LPRW TMDLs address three (3) impaired segments due to excessive bacteria and seven (7) impaired lakes due to excessive nutrients (Table 1 of this Decision Document). The LPRW is within the North Central Hardwood Forest (NCHF) ecoregion.

**Table 1: Long Prairie River Watershed impaired waters addressed by this TMDL**

| Water body name | Assessment Unit ID | Affected Use | Pollutant or stressor | TMDL |
|---|---|---|---|---|
| Crooked Lake (East) | 21-0199-02 | Aquatic Recreation | Excess Nutrients (total phosphorus) | TP TMDL |
| Echo Lake | 21-0157-00 | Aquatic Recreation | Excess Nutrients (total phosphorus) | TP TMDL |
| Fish Lake | 56-0066-00 | Aquatic Recreation | Excess Nutrients (total phosphorus) | TP TMDL |
| Jessie Lake | 21-0055-00 | Aquatic Recreation | Excess Nutrients (total phosphorus) | TP TMDL |
| Latimer Lake | 77-0105-00 | Aquatic Recreation | Excess Nutrients (total phosphorus) | TP TMDL |
| Nelson Lake | 56-0065-00 | Aquatic Recreation | Excess Nutrients (total phosphorus) | TP TMDL |
| Twin Lake | 56-0067-00 | Aquatic Recreation | Excess Nutrients (total phosphorus) | TP TMDL |
| Eagle Creek | 07010108-507 | Aquatic Recreation | Bacteria (*E. coli*) | *E. coli* TMDL |
| Moran Creek | 07010108-511 | Aquatic Recreation | Bacteria (*E. coli*) | *E. coli* TMDL |
| Unnamed Creek | 07010108-512 | Aquatic Recreation | Bacteria (*E. coli*) | *E. coli* TMDL |

To adhere with its eutrophication standard the Minnesota Pollution Control Agency (MPCA) classifies lakes as either shallow or deep lakes. MPCA explained that a lake is considered shallow if its maximum depth is less than 15 feet, or if the littoral area (area where depth is less than 15 feet) covers at least 80% of the lake's surface area (Section 2.1.1 of the final TMDL document). MPCA classified Fish, Nelson and Twin Lakes as shallow lakes in the NCHF ecoregion (Table 2 of this Decision Document – shaded rows).

**Table 2: Morphometric and watershed characteristics of lakes addressed in the Long Prairie River Watershed TMDLs**

| Parameter | Crooked (East) | Echo | Fish | Jessie | Latimer | Nelson | Twin |
|---|---|---|---|---|---|---|---|
| Surface Area (acres) | 102 | 126 | 489 | 110 | 202 | 272 | 134 |
| Littoral Area (% of total area) | 73% | 72% | 98% | 62% | 41% | 100% | 100% |
| Volume (acre-feet) | 935 | 1,422 | 3,262 | 1,255 | 3,378 | 1,360 | 804 |
| Mean depth (feet) | 9.2 | 11.3 | 6.7 | 11.4 | 16.8 | 5 | 6 |
| Maximum Depth (feet) | 25 | 40 | 17 | 26 | 30.5 | 7 | 15 |
| Watershed area (including lake area) (acres) | 1,051 | 1,897 | 10,919 | 8,923 | 1,991 | 4,433 | 12,016 |
| Watershed area (surface area) | 10 : 1 | 15 : 1 | 22 : 1 | 81 : 1 | 10 : 1 | 16 : 1 | 90 : 1 |

## Land Use:

Land use in the LPRW is predominantly agricultural lands. Cropland and pasture lands make up approximately 47% of the total area of LPRW. Woodlands (22%), wetlands (10%) and grasslands (6%) are additional land uses within LPRW (Table 3 of this Decision Document). Significant development is not expected in the LPRW. The land use within the watershed is primarily agricultural and according to MPCA is expected to remain agricultural for the foreseeable future. There may be a shift in crop usage within the watershed (i.e. pasture/hay land uses to row crop land uses) but MPCA does not believe that this will have a significant impact on pollutant loading to water bodies within the LPRW.

**Table 3: Subwatershed Land Cover (NLCD 2011) for the Long Prairie River Watershed**

| Water body Name | Developed | Cropland | Grassland | Pasture | Woodland | Open Water | Wetlands |
|---|---|---|---|---|---|---|---|
| Crooked (East) | 4% | 32% | 9% | 12% | 22% | 20% | 2% |
| Echo | 4% | 23% | 10% | 13% | 20% | 30% | 0% |
| Fish | 5% | 24% | 5% | 31% | 23% | 8% | 3% |
| Jessie | 6% | 46% | 4% | 17% | 14% | 3% | 10% |
| Latimer | 6% | 28% | 2% | 44% | 6% | 11% | 3% |
| Nelson | 4% | 37% | 3% | 20% | 19% | 13% | 3% |
| Twin | 5% | 24% | 8% | 22% | 27% | 13% | 2% |
| **Long Prairie River Watershed** | **7%** | **26%** | **6%** | **21%** | **22%** | **8%** | **10%** |

## Problem Identification:

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

*Phosphorus TMDLs:* Lakes identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive nutrients (phosphorus). Total phosphorus (TP), chlorophyll-*a* (chl-a) and Secchi depth (SD) measurements in the LPRW indicated that lakes addressed via these

TMDL efforts were not attaining their designated aquatic recreation uses due to exceedances of nutrient criteria. Water quality monitoring within the LPRW was completed at several locations and the data collected during these efforts was the foundation for modeling efforts completed in this TMDL study.

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

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

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

**Source Identification (point and nonpoint sources):**

***Point Source Identification:*** The potential point sources to the LPRW are:

**LPRW bacteria TMDLs:**
*National Pollutant Discharge Elimination Systems (NPDES) permitted facilities:* NPDES permitted facilities may contribute bacteria loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge treated wastewater according to their NPDES permit. MPCA determined that there are two wastewater treatment facilities (WWTF) in the LPRW which contribute bacteria from treated wastewater releases. The Clarissa WWTF (MNG580008) and the Eagle Bend WWTF (MN0023248) were assigned a portion of the bacteria wasteload allocation (WLA).

*Concentrated Animal Feedlot Operations (CAFOs):* MPCA recognized the presence of two CAFO facilities (the Twin Eagle Dairy LLP (MN0070068) and the Jerry and Linda Korfe Hog Farm (MNG440982)) in the LPRW. CAFO facilities must be designed to contain all surface water runoff (i.e., have zero discharge from their facilities) and have a current manure management plan. MPCA explained that these facilities do not discharge effluent and therefore were not assigned a portion of the WLA (WLA = 0).

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

**LPRW phosphorus TMDLs:**
*NPDES facilities, Municipal Separate Storm Sewer System (MS4) communities, CSOs and SSOs:* Potential nutrient loading from these sources are not present in the LPRW.

*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 LPRW must comply with the requirements of the MPCA's NPDES Stormwater Program. The NPDES program requires construction and industrial sites to create a Stormwater Pollution Prevention Plan (SWPPP) that summarizes how stormwater will be minimized from the site.

***Nonpoint Source Identification:*** The potential nonpoint sources to the LPRW are:

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

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

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

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

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

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

**LPRW phosphorus TMDLs:**

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

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

*Stormwater runoff from agricultural land use practices:* Runoff from agricultural lands may contain significant amounts of nutrients, organic material and organic-rich sediment which may lead to impairments in the LPRW. 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 LPRW. Phosphorus can be bound to these particles which may add to the phosphorus inputs to surface water environments.

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

*Discharges from Subsurface Sewage Treatment Systems (SSTS) or unsewered communities:* Failing septic systems are a potential source of nutrients within the LPRW. 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 LPRW. Storm events may mobilize phosphorus through the transport of suspended solids and other organic debris.

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

**Future Growth:**
MPCA outlined its expectations for potential growth in the LPRW in Section 4.1.6 of the final TMDL document. Significant development is not expected in the LPRW, though there may be some expansion of the City of Alexandria's MS4 boundaries. The WLA and load allocations for the LPRW 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 LPRW TMDLs.

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

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

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

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

**Comment:**

**Designated Uses:**

Water quality standards (WQS) are the fundamental benchmarks by which the quality of surface waters are measured. Within the State of Minnesota, WQS are developed pursuant to the Minnesota Statutes Chapter 115, Sections 03 and 44. Authority to adopt rules, regulations, and standards as are necessary and feasible to protect the environment and health of the citizens of the State is vested with the MPCA. Through adoption of WQS into Minnesota's administrative rules (principally Chapters 7050 and 7052), MPCA has identified designated uses to be protected in each of its drainage basins and the criteria necessary to protect these uses.

Minnesota Rule Chapter 7050 designates uses for waters of the state. The segments addressed by the LPRW TMDLs are designated as Class 2 waters for aquatic recreation use (fishing, swimming, boating, etc.). The Class 2 designated use is described in Minnesota Rule 7050.0140 (3):

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

**Standards:**

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

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

**Numeric criteria:**

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

**Table 4: Bacteria Water Quality Standards Applicable to the Long Prairie River Watershed TMDLs**

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

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

*Bacteria TMDL Targets:* The bacteria TMDL targets employed for the LPRW bacteria TMDLs are the *E. coli* standards as stated in Table 4 of this Decision Document. The focus of this TMDL is on the 126 organisms (orgs) per 100 mL (126 orgs/100 mL) portion of the standard. MPCA believes that using the 126 orgs/100 mL portion of the standard for TMDL calculations will result in the greatest bacteria reductions within the LPRW and will result in the attainment of the 1,260 orgs/100 mL portion of the standard. While the bacteria TMDLs will focus on the geometric mean portion of the water quality standard, attainment of both parts of the water quality standard is required.

***Phosphorus TMDLs:*** Numeric criteria for TP, chlorophyll-*a*, and Secchi Disk depth are set forth in Minnesota Rules 7050.0222. These three parameters form the MPCA eutrophication standard that must be achieved to attain the aquatic recreation designated use. The numeric eutrophication standards which are applicable to the LPRW lake TMDLs are found in Table 5 of this Decision Document.

**Table 5: Minnesota Eutrophication Standards for Deep and Shallow lakes within the North Central Hardwood Forest (NCHF) ecoregion**

| Parameter | NCHF Eutrophication Standard (general lakes) | NCHF Eutrophication Standard (shallow lakes)[1] |
|---|---|---|
| | *Crooked (East), Echo, Jessie & Latimer Lakes* | *Fish, Nelson & Twin Lakes* |
| Total Phosphorus (µg/L) | TP < 40 | TP < 60 |
| Chlorophyll-a (µg/L) | chl-a < 14 | chl-a < 20 |
| Secchi Depth (m) | SD > 1.4 | SD > 1.0 |

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

In developing the lake nutrient standards for Minnesota lakes, MPCA evaluated data from a large cross-section of lakes within each of the State's ecoregions. Clear relationships were established between the causal factor, TP, and the response variables, chl-*a* and SD depth. MPCA anticipates that by meeting the TP concentrations of 40 µg/L and 60 µg/L the response variables chl-*a* and SD will be attained and the lakes addressed by the LPRW lake TMDLs will achieve their designated beneficial uses. For lakes to achieve their designated beneficial use, the lake must not exhibit signs of eutrophication and must allow water-related recreation, fishing and aesthetic enjoyment. MPCA views the control of eutrophication as the lake enduring minimal nuisance algal blooms and exhibiting desirable water clarity.

*Phosphorus TMDL criteria:* MPCA employed TP criteria of 40 µg/L and 60 µg/L to address eutrophication problems because of the interrelationships between TP and chl-*a*, and TP and SD depth. Algal abundance is measured by chl-*a*, which is a pigment found in algal cells. As more phosphorus becomes available, algae growth can increase. Increased algae in the water column will decrease water clarity that is measured by SD depth. EPA finds the nutrient criteria employed in the LPRW phosphorus TMDLs 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:**
**LPRW bacteria TMDLs:**
For all *E. coli* TMDLs addressed by the LPRW TMDLs the geometric mean portion (**126 orgs/100 mL**) of the *E. coli* water quality standard was used to set the loading capacity of the bacteria TMDLs. MPCA believes the geometric mean portion of the WQS provides the best overall characterization of the status of the watershed. EPA agrees with this assertion, as stated in the preamble of, *"The Water Quality Standards for Coastal and Great Lakes Recreation Waters Final Rule"* (69 FR 67218-67243, November 16, 2004) on page 67224, "…the geometric mean is the more relevant value for ensuring that appropriate actions are taken to protect and improve water quality because it is a more reliable measure, being less subject to random variation, and more directly linked to the underlying studies on which the 1986 bacteria criteria were based." MPCA stated that the bacteria TMDLs will focus on the geometric mean portion of the water quality standard (126 orgs/100 mL) and that it expects that by attaining the 126 orgs/100 mL portion of the *E. coli* WQS the 1,260 orgs/100 mL portion of the *E. coli* WQS will also be attained. EPA finds these assumption to be reasonable.

Typically loading capacities are expressed as a mass per time (e.g. pounds per day). However, for *E. coli* loading capacity calculations, mass is not always an appropriate measure because *E. coli* is expressed in terms of organism counts. This approach is consistent with the EPA's regulations which define "load" as "an amount of matter that is introduced into a receiving water" (40 CFR §130.2). To establish the loading capacities for the LPRW bacteria TMDLs, MPCA used Minnesota's WQS for *E. coli* (126 orgs/100 mL). A loading capacity is, "the greatest amount of loading that a water can receive without violating water quality standards." (40 CFR §130.2). Therefore, a loading capacity set at the

WQS will assure that the water does not violate WQS. MPCA's *E. coli* TMDL approach is based upon the premise that all discharges (point and nonpoint) must meet the WQS when entering the water body. If all sources meet the WQS at discharge, then the water body should meet the WQS and the designated use.

Separate flow duration curves (FDCs) were created for the each of the bacteria TMDLs in the LPRW. The LPRW FDCs were developed using daily modeled flow estimates from Hydrologic Simulation Program-Fortran (HSPF) modeling efforts. MPCA focused on daily modeled flows from 2000-2009. Missing flow records were estimated by regression equations which were developed using 2000-2009 mean daily flow records from a USGS gage (#05245100) (Section 4.2.1 of the final TMDL document). Flow data focused on dates within the recreation season (April 1 to October 31). Daily stream flows were necessary to implement the load duration curve approach.

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

Water quality monitoring was completed within the LPRW. Water quality monitoring station information and bacteria data summaries were presented Appendix C of the final TMDL document. Measured *E. coli* concentrations were converted to individual sampling loads by multiplying the sample concentration by the instantaneous flow measurement observed/estimated at the time of sample collection and then by a conversion factor which allows the individual samples to be plotted on the same figure as the LDCs (e.g., Figure 21 of the final TMDL document). Individual LDCs are found in Appendix C of the final TMDL document.

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

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

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

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

Table 6 of this Decision Document reports five points (the midpoints of the designated flow regime) on the loading capacity curve. However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve. The LDC method can be used to display collected bacteria monitoring data and allows for the estimation of load reductions necessary for attainment of the bacteria water quality standard. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for the segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 6 of this Decision Document identifies the loading capacity for the water body at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

**Table 6: Bacteria (*E. coli*) TMDLs for the Long Prairie River Watershed**

| **Allocation** | **Source** | **Very High** | **High** | **Mid** | **Low** | **Very Low** |
|---|---|---|---|---|---|---|
| | | *E. coli (billions of bacteria/day)* | | | | |
| **TMDL for Eagle Creek (07010108-507)** | | | | | | |
| **Existing Load** | | 1930.00 | 160.70 | 156.20 | 36.10 | 13.60 |
| | | | | | | |
| *Wasteload Allocation* | Clarissa WWTF (MNG580008) | 7.10 | 7.10 | 7.10 | 7.10 | *1 |
| | Eagle Bend WWTF (MN0023248) | 7.00 | 7.00 | 7.00 | 7.00 | *1 |
| | NPDES permitted feedlots | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | ***WLA Totals*** | 14.10 | 14.10 | 14.10 | 14.10 | 0.00 |
| *Load Allocation* | Watershed runoff | 305.40 | 87.60 | 38.00 | 9.10 | * |
| ***Margin Of Safety (10%)*** | | 35.50 | 11.30 | 5.80 | 2.60 | 1.30 |
| **Loading Capacity (TMDL)** | | **355.00** | **113.00** | **57.90** | **25.80** | **13.00** |
| **Estimated Load Reduction (%)** | | 83% | 37% | 67% | 36% | 14% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **TMDL for Moran Creek (07010108-511)** | | | | | | |
| **Existing Load** | | 259.80 | 133.50 | 160.00 | 36.80 | 20.10 |
| *Wasteload Allocation* | NPDES permitted feedlots | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | ***WLA Totals*** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| *Load Allocation* | Watershed runoff | 349.20 | 124.00 | 59.20 | 25.10 | 11.60 |
| ***Margin Of Safety (10%)*** | | 38.80 | 13.80 | 6.60 | 2.80 | 1.30 |
| **Loading Capacity (TMDL)** | | **388.00** | **137.80** | **65.80** | **27.90** | **12.90** |
| **Estimated Load Reduction (%)** | | -- | -- | 63% | 32% | 42% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **TMDL for Unnamed Creek (07010108-552)** | | | | | | |
| **Existing Load** | | 232.30 | 209.40 | 234.70 | 142.60 | No Data |
| *Wasteload Allocation* | NPDES permitted feedlots | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | ***WLA Totals*** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| *Load Allocation* | Watershed runoff | 130.30 | 36.90 | 19.50 | 10.80 | 5.50 |
| ***Margin Of Safety (10%)*** | | 14.50 | 4.10 | 2.20 | 1.20 | 0.60 |
| **Loading Capacity (TMDL)** | | **144.80** | **41.00** | **21.70** | **12.00** | **6.10** |
| **Estimated Load Reduction (%)** | | 44% | 82% | 92% | 92% | n/a |

*[1] = WLA for NPDES permitted facilities are based on the design flow of the facility. WLA and LA are determined by calculation (flow volume contribution from a given source * 126 orgs/100 mL)

* = WLA and LA are determined by calculation (flow volume contribution from a given source * 126 orgs/100 mL)

Table 6 of the Decision Document presents MPCA's loading reduction estimates for each TMDL. These loading reductions (i.e., the estimated load reduction row at the bottom of each TMDL table) were calculated from field sampling data collected in the LPRW. MPCA explained that its load reduction estimates are likely more conservative since they are based on a limited water quality data set.

EPA concurs with the data analysis and LDC approach utilized by MPCA in its calculation of loading capacities, wasteload allocations, load allocations and the margin of safety for the LPRW bacteria TMDLs. The methods used for determining the TMDL are consistent with U.S. EPA technical memos.[1]

**LPRW phosphorus TMDLs:** MPCA used the U.S. Army Corps of Engineers (USACE) BATHTUB model to calculate the loading capacities for each of the nutrient impaired lakes in Table 1 of this Decision 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 TP loads are normally impacted by seasonal conditions.

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

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

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

The BATHTUB modeling efforts were used to calculate the loading capacity for each lake. The loading capacity is the maximum phosphorus load which each of these water bodies can receive over an annual period and still meet the shallow lake nutrient WQS (Table 5 of this Decision Document). Loading capacities on the annual scale (kilograms per year (kg/year)) were calculated to meet the WQS during the growing season (June 1 through September 30). The time period of June to September was chosen by MPCA as the growing season because it corresponds to the eutrophication criteria, contains the months that the general public typically uses the LPRW lakes for aquatic recreation, and is the time of the year when water quality is likely to be impaired by excessive nutrient loading. Loading capacities were divided by 365 to calculate the daily loading capacities.

Loading capacities were determined using Canfield-Bachmann equations from BATHTUB. The model equations were originally developed from data taken from over 704 lakes. The model estimates in-lake phosphorus concentration by calculating net phosphorus loss (phosphorus sedimentation) from annual phosphorus loads as functions of inflows to the lake, lake depth, and hydraulic flushing rate. To estimate loading capacity, the model is rerun, each time reducing current loads to the lake until the model result shows that in-lake total phosphorus would meet the applicable water quality standards.

MPCA subdivided the loading capacity among the WLA, LA, and MOS components of the TMDL (Tables 7 to 13 of this Decision Document). These calculations were based on the critical condition, the summer growing season, which is typically when the water quality in each lake is typically degraded and phosphorus loading inputs are the greatest. TMDL allocations assigned during the summer growing season will protect the LPRW lakes during the worst water quality conditions of the year. MPCA assumed that the loading capacities established by the TMDL will be protective of water quality during the remainder of the calendar year (October through May).

**Table 7: Nutrient TMDL for Crooked Lake (East) (21-0199-02) in the Long Prairie River watershed**

| Allocation | Source | Existing TP Load | TMDL | | Load Reduction | |
|---|---|---|---|---|---|---|
| | | *(kg/yr)* | *(kg/yr)* | *(kg/day)* | *(kg/yr)* | *(%)* |
| *Wasteload Allocation* | Construction Stormwater (MNR100001) | 1.058 | 1.058 | 0.003 | 0.0 | 0% |
| | Industrial Stormwater (MNR50000) | 1.058 | 1.058 | 0.003 | 0.0 | 0% |
| | ***WLA Totals*** | ***2.12*** | ***2.12*** | ***0.006*** | -- | -- |
| *Load Allocation* | Watershed runoff | 62.60 | 48.10 | 0.132 | 14.5 | 23% |
| | Livestock | 1.70 | 1.70 | 0.005 | 0.0 | 0% |
| | Failing Septics | 1.80 | 0.00 | 0.000 | 1.8 | 100% |
| | Atmospheric Deposition | 11.00 | 11.00 | 0.030 | 0.0 | 0% |
| | ***LA Totals*** | ***77.10*** | ***60.80*** | ***0.167*** | ***16.3*** | ***21%*** |
| ***Margin Of Safety (10%)*** | | -- | 7.00 | 0.019 | -- | -- |
| **Loading Capacity (TMDL)** | | 79.22 | 69.92 | 0.192 | 16.3 | 21% |

**Table 8: Nutrient TMDL for Echo Lake (21-0157-00) in the Long Prairie River watershed**

| Allocation | Source | Existing TP Load | TMDL | | Load Reduction | |
|---|---|---|---|---|---|---|
| | | *(kg/yr)* | *(kg/yr)* | *(kg/day)* | *(kg/yr)* | *(%)* |
| *Wasteload Allocation* | Construction Stormwater (MNR100001) | 2.90 | 2.90 | 0.008 | 0.0 | 0% |
| | Industrial Stormwater (MNR50000) | 2.90 | 2.90 | 0.008 | 0.0 | 0% |
| | ***WLA Totals*** | ***5.80*** | ***5.80*** | ***0.016*** | -- | -- |
| *Load Allocation* | Watershed runoff | 203.70 | 137.40 | 0.376 | 66.3 | 33% |
| | Failing Septics | 1.80 | 0.00 | 0.000 | 1.8 | 100% |
| | Atmospheric Deposition | 13.70 | 13.70 | 0.038 | 0.0 | 0% |
| | ***LA Totals*** | ***219.20*** | ***151.10*** | ***0.414*** | ***68.1*** | ***31%*** |
| ***Margin Of Safety (10%)*** | | -- | 17.40 | 0.048 | -- | -- |
| **Loading Capacity (TMDL)** | | 225.00 | 174.30 | 0.478 | 68.1 | 30% |

**Table 9: Nutrient TMDL for Fish Lake (56-0066-00) in the Long Prairie River watershed**

| Allocation | Source | Existing TP Load | TMDL | | Load Reduction | |
|---|---|---|---|---|---|---|
| | | *(kg/yr)* | *(kg/yr)* | *(kg/day)* | *(kg/yr)* | *(%)* |
| *Wasteload Allocation* | Construction Stormwater (MNR100001) | 0.172 | 0.172 | 0.000 | 0.0 | 0% |
| | Industrial Stormwater (MNR50000) | 0.172 | 0.172 | 0.000 | 0.0 | 0% |
| | ***WLA Totals*** | ***0.34*** | ***0.34*** | ***0.001*** | -- | -- |
| *Load Allocation* | Watershed runoff | 440.90 | 349.10 | 0.956 | 91.8 | 21% |
| | Upstream impaired lake (Nelson Lake) | 186.00 | 128.30 | 0.352 | 57.7 | 31% |
| | Internal Load | 587.30 | 162.10 | 0.444 | 425.2 | 72% |
| | Atmospheric Deposition | 53.10 | 53.10 | 0.145 | 0.0 | 0% |
| | ***LA Totals*** | ***1267.30*** | ***692.60*** | ***1.898*** | ***574.7*** | ***45%*** |
| ***Margin Of Safety (10%)*** | | -- | 122.30 | 0.335 | -- | -- |
| **Loading Capacity (TMDL)** | | **1267.64** | **815.24** | **2.234** | **574.7** | **45%** |

**Table 10: Nutrient TMDL for Jessie Lake (21-0055-00) in the Long Prairie River watershed**

| Allocation | Source | Existing TP Load | TMDL | | Load Reduction | |
|---|---|---|---|---|---|---|
| | | *(kg/yr)* | *(kg/yr)* | *(kg/day)* | *(kg/yr)* | *(%)* |
| *Wasteload Allocation* | Construction Stormwater (MNR100001) | 8.526 | 8.526 | 0.023 | 0.0 | 0% |
| | Industrial Stormwater (MNR50000) | 8.526 | 8.526 | 0.023 | 0.0 | 0% |
| | ***WLA Totals*** | ***17.05*** | ***17.05*** | ***0.047*** | -- | -- |
| *Load Allocation* | Watershed runoff | 693.10 | 400.70 | 1.098 | 292.4 | 42% |
| | Livestock | 0.40 | 0.40 | 0.001 | 0.0 | 0% |
| | Failing Septics | 1.40 | 0.00 | 0.000 | 1.4 | 100% |
| | Internal Load | 112.30 | 84.90 | 0.233 | 27.4 | 24% |
| | Atmospheric Deposition | 12.00 | 12.00 | 0.033 | 0.0 | 0% |
| | ***LA Totals*** | ***819.20*** | ***498.00*** | ***1.364*** | ***321.2*** | ***39%*** |
| ***Margin Of Safety (10%)*** | | -- | 57.30 | 0.157 | -- | -- |
| **Loading Capacity (TMDL)** | | **836.25** | **572.35** | **1.568** | **321.2** | **38%** |

**Table 11: Nutrient TMDL for Latimer Lake (77-0105-00) in the Long Prairie River watershed**

| Allocation | Source | Existing TP Load | TMDL | | Load Reduction | |
|---|---|---|---|---|---|---|
| | | *(kg/yr)* | *(kg/yr)* | *(kg/day)* | *(kg/yr)* | *(%)* |
| *Wasteload Allocation* | Construction Stormwater (MNR100001) | 0.02 | 0.02 | 0.000 | 0.0 | 0% |
| | Industrial Stormwater (MNR50000) | 0.02 | 0.02 | 0.000 | 0.0 | 0% |
| | ***WLA Totals*** | ***0.04*** | ***0.04*** | ***0.000*** | -- | -- |
| *Load Allocation* | Watershed runoff | 220.80 | 90.70 | 0.248 | 130.1 | 59% |
| | Livestock | 58.20 | 58.20 | 0.159 | 0.0 | 0% |
| | Failing Septics | 1.00 | 0.00 | 0.000 | 1.0 | 100% |
| | Internal Load | 277.00 | 44.50 | 0.122 | 232.5 | 84% |
| | Atmospheric Deposition | 21.90 | 21.90 | 0.060 | 0.0 | 0% |
| | ***LA Totals*** | ***578.90*** | ***215.30*** | ***0.590*** | ***363.6*** | ***63%*** |
| ***Margin Of Safety (10%)*** | | -- | 23.90 | 0.065 | -- | -- |
| **Loading Capacity (TMDL)** | | **578.94** | **239.24** | **0.655** | **363.6** | **63%** |

**Table 12: Nutrient TMDL for Nelson Lake (56-0065-00) in the Long Prairie River watershed**

| Allocation | Source | Existing TP Load | TMDL | | Load Reduction | |
|---|---|---|---|---|---|---|
| | | *(kg/yr)* | *(kg/yr)* | *(kg/day)* | *(kg/yr)* | *(%)* |
| *Wasteload Allocation* | Construction Stormwater (MNR100001) | 0.09 | 0.09 | 0.000 | 0.0 | 0% |
| | Industrial Stormwater (MNR50000) | 0.09 | 0.09 | 0.000 | 0.0 | 0% |
| | ***WLA Totals*** | ***0.18*** | ***0.18*** | ***0.000*** | -- | -- |
| *Load Allocation* | Watershed runoff | 302.80 | 223.20 | 0.612 | 79.6 | 26% |
| | Livestock | 14.40 | 14.40 | 0.039 | 0.0 | 0% |
| | Internal Load | 93.30 | 20.10 | 0.055 | 73.2 | 78% |
| | Atmospheric Deposition | 29.50 | 29.50 | 0.081 | 0.0 | 0% |
| | ***LA Totals*** | ***440.00*** | ***287.20*** | ***0.787*** | ***152.8*** | ***35%*** |
| ***Margin Of Safety (15%)*** | | -- | 50.70 | 0.139 | -- | -- |
| **Loading Capacity (TMDL)** | | **440.18** | **338.08** | **0.926** | **152.8** | **35%** |

**Table 13: Nutrient TMDL for Twin Lake (56-0067-00) in the Long Prairie River watershed**

| Allocation | Source | Existing TP Load | TMDL | | Load Reduction | |
|---|---|---|---|---|---|---|
| | | *(kg/yr)* | *(kg/yr)* | *(kg/day)* | *(kg/yr)* | *(%)* |
| *Wasteload Allocation* | Construction Stormwater (MNR100001) | 0.13 | 0.13 | 0.000 | 0.0 | 0% |
| | Industrial Stormwater (MNR50000) | 0.13 | 0.13 | 0.000 | 0.0 | 0% |
| | ***WLA Totals*** | ***0.26*** | ***0.26*** | ***0.001*** | -- | -- |
| *Load Allocation* | Watershed runoff | 75.30 | 57.80 | 0.158 | 17.5 | 23% |
| | Livestock | 1.50 | 1.50 | 0.004 | 0.0 | 0% |
| | Upstream Fish Lake Load | 513.10 | 313.50 | 0.859 | 199.6 | 39% |
| | Internal Load | 231.70 | 107.30 | 0.294 | 124.4 | 54% |
| | Atmospheric Deposition | 14.50 | 14.50 | 0.040 | 0.0 | 0% |
| | ***LA Totals*** | ***836.10*** | ***494.60*** | ***1.355*** | ***341.5*** | ***41%*** |
| ***Margin Of Safety (15%)*** | | -- | 87.30 | 0.239 | -- | -- |
| **Loading Capacity (TMDL)** | | **836.36** | **582.16** | **1.595** | **341.5** | **41%** |

Tables 7 to 13 of this Decision Document communicate MPCA's estimates of the reductions required for the LPRW nutrient impaired lakes to meet their water quality targets. These loading reductions (i.e., the percentage column) were estimated from existing and TMDL load calculations. MPCA expects that these reductions will result in the attainment of the water quality targets and the lake water quality will return to a level where their designated uses are no longer considered impaired.

EPA supports the data analysis and modeling approach utilized by MPCA in its calculation of WLA, LA and MOS for the LPRW phosphorus TMDLs. Additionally, EPA concurs with the loading capacities calculated by the MPCA in these seven phosphorus TMDLs. EPA finds MPCA's approach for calculating the loading capacity to be reasonable and consistent with EPA guidance.

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

## 4. Load Allocations (LA)

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

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

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

**LPRW phosphorus TMDLs:** MPCA identified several nonpoint sources which contribute nutrient loading to nutrient impaired lakes of the LPRW (Tables 7 to 13 of this Decision Document). These nonpoint sources included: watershed contributions from each lake's direct watershed, watershed contributions from upstream watersheds, internal loading, and atmospheric deposition. MPCA calculated individual load allocation values for each of these potential nonpoint source considerations where appropriate. Additionally, MPCA estimated nonpoint source loading reductions necessary for the water body to meet the phosphorus TMDL targets. The reductions from nonpoint sources ranged from 21% to 100%.

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

MPCA estimated that certain lakes in the LPRW (ex. Latimer Lake, Table 11 of this Decision Document) have significant contributions from internal loading. MPCA recognizes that its load reduction goals for internal load are aggressive but these goals are based on the best available information for the LPRW TMDLs, and the reduction targets are within the range of reductions required for other lakes in Minnesota. Once implementation actions are conducted to address both internal loads (e.g. alum treatment) and watershed loads (e.g. stormwater treatment) and additional water quality monitoring is completed to assess the progress, MPCA and local partners plan to revisit the reduction goals of the LPRW phosphorus TMDLs. Through this adaptive management approach, MPCA and local partners will be able to decide whether further implementation actions are needed or if MPCA should consider a site-specific water quality standard.

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

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

## 5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to individual existing and future point source(s) (40 C.F.R. §130.2(h), 40 C.F.R. §130.2(i)). In 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:**
**LPRW bacteria TMDLs:** MPCA identified two NPDES permitted facilities within the LPRW and assigned each of these facilities a portion of the WLA (Table 6 of this Decision Document). The WLAs for each of these facilities were calculated based on the facility's wet weather design flow and the *E. coli* WQS (126 orgs /100 mL). MPCA explained that the WLAs assigned to each facility were calculated based on the *E. coli* WQS but that the facility's permits are based on the fecal coliform WQS (200 orgs /100 mL). MPCA explained that if a facility is meeting its fecal coliform limits, which are set in the facility's discharge permit, MPCA assumes the facility is also meeting the calculated *E. coli* WLA for the LPRW TMDLs. The WLAs for Clarissa and Eagle Bend WWTFs were 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 two CAFO facilities in the LPRW (Section 3.5.2.1 of the final TMDL document). CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota Rule 7020.2003). CAFOs were assigned a WLA of zero (WLA = 0) for the Eagle Creek (07010108-507) and the Moran Creek (07010108-511) bacteria TMDLs.

**LPRW phosphorus TMDLs:** MPCA calculated a portion of the WLA and assigned it to construction and industrial stormwater. MPCA's calculation for the construction stormwater WLA was based on areal coverage of construction permits from the previous 5-years. A categorical WLA was assigned to all construction activity in each impaired lake subwatershed. First, the average annual fraction of the impaired lake subwatershed area under construction activity over the past 5 years was calculated based on the MPCA Construction Stormwater Permit data from January 1, 2007, to October 6, 2012 (Table 29 of the final TMDL document). This average annual fraction was then applied, on an area weighted basis, to each county within the subwatershed to determine a percentage of construction activity within that county. This percentage was multiplied by the watershed runoff load, which is the loading capacity minus the total LA and the MOS. The industrial stormwater WLA was set equal to the construction stormwater WLA.

Attaining the construction stormwater and industrial stormwater loads described in the LPRW phosphorus TMDLs is the responsibility of construction and industrial site managers. Local municipal MS4 permittees are responsible for overseeing construction stormwater loads which impact water quality in LPRW. In the final TMDL document MPCA explained that if a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit (MNR100001) and properly selects, installs and maintains all BMPs required under MNR1000001 and applicable local construction stormwater ordinances, including those related to impaired waters discharges and any applicable additional requirements found in Appendix A of the Construction General Permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL. BMPs and other stormwater control measures which act to limit the discharge of the pollutant of concern (phosphorus) are defined in MNR100001.

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

The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under 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 LPRW phosphorus TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18-months of the approval of the TMDL by the U.S. EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

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

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

## 6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). EPA's 1991 TMDL Guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

**Comment:**
The final TMDL submittal outlines the determination of the Margin of Safety for the bacteria and phosphorus TMDLs. The bacteria TMDLs employed an explicit MOS of 10%. The Nelson Lake TMDL and Twin Lake TMDL used an explicit MOS of 15% and the rest of the phosphorus TMDLs employed an explicit MOS set at 10% of the loading capacity.

**LPRW bacteria TMDLs:** The bacteria 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 (Table 6 of this Decision Document). MPCA explained that the explicit MOS was set at 10% due to the following factors discovered during the development of the LPRW bacteria TMDLs:

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

Challenges associated with quantifying *E. coli* loads include the dynamics and complexity of bacteria in stream environments. Factors such as die-off and re-growth contribute to general uncertainty that makes quantifying stormwater bacteria loads particularly difficult. The MOS for the LPRW bacteria TMDLs also incorporated certain conservative assumptions in the calculation of the TMDLs. No rate of decay, or die-off rate of pathogen species, was used in the TMDL calculations or in the creation of load duration curves for *E. coli*. Bacteria have a limited capability of surviving outside their hosts, and normally a rate of decay would be incorporated. MPCA determined that it was more conservative to use the WQS (126 orgs/100 mL) and not to apply a rate of decay, which could result in a discharge limit greater than the WQS.

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

**LPRW phosphorus TMDLs:** The phosphorus TMDLs employed an explicit MOS set at 10% of the loading capacity, except for Nelson Lake and Twin Lake which used an explicit MOS of 15%. MPCA explained that the 15% MOS for Nelson and Twin Lakes was appointed to these lakes because the mean depths were estimated based on approximate maximum depths and comparison to similar surrounding lakes and topography. The mean depth affects the modeled in-lake TP concentration by BATHTUB and therefore MPCA determined that it was appropriate to increase the MOS based upon those uncertainties.

The explicit MOS was applied by reserving either 10% or 15% of the total loading capacity, and then allocating the remaining loads to point and nonpoint sources (Tables 7 to 13 of this Decision Document). MPCA explained that the explicit MOS was set at 10% or 15% due to the following factors discovered during the development of the LPRW phosphorus TMDLs:

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

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

## 7. Seasonal Variation

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

**Comment:**

**LPRW 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 flow measurements from a HSPF modeling efforts and local gages within the LPRW. Flow measurements were collected over a variety of conditions observed during the recreation season. LDCs developed from these flow records represented a range of flow conditions within the LPRW 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).

**LPRW phosphorus TMDLs:** Seasonal variation was considered for the LPRW phosphorus TMDLs as described in Section 4.1.5 of the final TMDL document. The nutrient criteria employed in the LPRW phosphorus TMDLs were based on the average nutrient values collected during the growing season (June 1 to September 30). The water quality targets were designed to meet the NCHF eutrophication WQS during the period of the year where the frequency and severity of algal growth is the greatest.

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

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

## 8. Reasonable Assurance

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

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

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

**Comment:**
The LPRW bacteria and phosphorus TMDLs provide reasonable assurance that actions identified in the implementation section of the final TMDL (i.e., Section 5 of the final TMDL document), will be applied to attain the loading capacities and allocations calculated for the impaired reaches within the LPRW. 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 LPRW. Implementation practices will be implemented over the next several years. The following groups are expected to work closely with one another to ensure that pollutant reduction efforts via BMPs are being implemented within the LPRW: Douglas County Soil and Water Conservation District (SWCD), Morrison County SWCD, Otter Tail County SWCD, Todd County SWCD, and Wadena County SWCD, Minnesota Department of Natural Resources (DNR), Natural Resource Conservation Service (NRCS), National Park Service (NPS) and U.S. Fish and Wildlife Service.

The Douglas County SWCD is an active partner in central Minnesota whose objectives include promoting the science of good land use via assisting landowners and operators in planning and applying the soil and water conservation practices needed to protect and improve their soil and water resources.[2] The Douglas SWCD also promotes the following programming with aims of improving environmental (land and water) quality; Conservation Reserve Program (CRP), Environmental Quality Incentive Program (EQIP), Reinvest in Minnesota (RIM), the Minnesota Agricultural Water Quality Certification Program and the Conservation Stewardship Program (CSP). These different programs offer opportunities for local farmers and landowners to voluntarily employ land and water conservation practices in central Minnesota.

The Morrison, Otter Tail, Todd and Wadena County SWCDs offer similar opportunities for local farmers and landowners to participate different programs to improve water quality in the LPRW. These opportunities include applying for grant assistance (ex. Natural Resource Block Grants) or participating in cost share programming to obtain state funding to install BMPs for erosion and sedimentation control or water quality improvements which are designed to protect and improve soil and water resources. EPA believes that efforts and programming offered by these SWCDs in central Minnesota demonstrate the commitment of stakeholders toward improving water quality. While measureable progress may be slow to develop, actions from these groups and other stakeholders in the LPRW should ultimately result in improvements to water quality for all of the pollutants addressed by the LPRW TMDLs.

Continued water quality monitoring within the basin is supported by MPCA. Additional water quality monitoring results could provide insight into the success or failure of BMP systems designed to reduce nutrient and bacteria loading into the surface waters of the watershed. Local watershed managers would be able to reflect on the progress of the various pollutant removal strategies and would have the opportunity to change course if observed progress is unsatisfactory.

Reasonable assurance that the WLA set forth will be implemented is provided by regulatory actions. According to 40 CFR 122.44(d)(1)(vii)(B), NPDES permit effluent limits must be consistent with assumptions and requirements of all WLAs in an approved TMDL. MPCA's NPDES permit program is the implementing program 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 LPRW 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

[2] Douglas County SWCD webpage, http://douglasswcd.com/about/default.html

General Stormwater Permit for Construction Activity (MNR100001) and its NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) or NPDES/SDS General Permit for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production facilities (MNG490000).

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

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

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

The Minnesota Board of Soil and Water Resources administers the Clean Water Fund as well, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (FY 2014 Clean Water Fund Competitive Grants Request for Proposal (*RFP*); *Minnesota Board of Soil and Water Resources*, 2014).

The EPA finds that this criterion has been adequately addressed.

## 9. Monitoring Plan to Track TMDL Effectiveness

EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a

TMDL involves both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions and, such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

**Comment:**

The final TMDL document outlines the water monitoring efforts in the LPRW (Section 6 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 Douglas County SWCD, Morrison County SWCD, Otter Tail SWCD, Todd County SWCD and Wadena County SWCDs) as long as there is sufficient funding to support the efforts of these local entities. Additionally, volunteers may be relied on to complete monitoring in the lakes discussed within this TMDL. At a minimum, the LPRW 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 LPRW. 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 LPRW. Watershed managers will have the opportunity to reflect on the progress or lack of progress, and will have the opportunity to change course if progress is unsatisfactory. Review of BMP efficiency is expected to be completed by the local and county partners.

**Stream Monitoring:**

River and stream monitoring in the LPRW, has been completed by a variety of organizations (i.e., Morrison or Todd SWCDs) and funded by Clean Water Partnership Grants, and other available local funds. MPCA anticipates that stream monitoring in the LPRW 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 (MN-DNR), or other agencies every five to ten years during the summer season.

**Lake Monitoring:**

The lakes of the LPRW 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 LPRW TMDLs will be used to inform the selection of implementation activities as part of the Long Prairie 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 7 of the final TMDL document. MPCA outlined the importance of prioritizing areas within the LPRW, education and outreach efforts with local partners, and partnering with local stakeholders to improve water quality within the watershed. It is anticipated that the LPRW WRAPS document will include additional detail regarding specific recommendations from MPCA to aid in the reduction of bacteria and nutrients to surface waters of the LPRW. Additionally, stakeholders may consult the Statewide Nutrient Reduction Strategy (https://www.pca.state.mn.us/water/nutrient-reduction-strategy) for focused implementation efforts targeting phosphorus nonpoint sources in LPRW. The reduction goals for the bacteria and phosphorus TMDLs may be met via components of the following strategies:

**LPRW 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 LPRW.

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

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

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

**LPRW phosphorus TMDLs:**

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

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

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

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

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

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

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

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

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

## 11. Public Participation

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

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

**Comment:**
The public participation section of the TMDL submittal is found in Section 8 of the final TMDL document. Throughout the development of the LPRW TMDLs the public was given various opportunities to participate. As part of the strategy to communicate the goals of the TMDL project and to engage with members of the public, MPCA formed a 'civic engagement committee'. This committee was composed of staff from Sherburne, Benton and Wright SWCDs, Clearwater River Watershed District, Minnesota Department of Natural Resources, and MPCA. The LPRW civic engagement committee held public meetings in 2011, 2013, and 2014 where the committee explained the TMDL process, the results of water quality sampling conducted in the LPRW, draft results of LPRW TMDLs and the WRAPS process. A full description of civic engagement activities associated with the TMDL process will be available within in the LPRW WRAPS report.

MPCA posted the draft TMDL online at (https://www.pca.state.mn.us/water/total-maximum-daily-load-tmdl-projects) for a public comment period. The 30-day public comment period was started on June 27, 2016 and ended on July 27, 2016. MPCA received one public comment during the public comment period from the Minnesota Department of Natural Resources (MDNR).

The comment from MDNR requested that MPCA update information within the TMDL regarding fishery information for Jessie Lake within the main body and the appendices of the document. MDNR cited language from a MDNR authored 2008 lake survey report which described more up-to-date fishery survey information. MPCA agreed to update language within the final LPRW TMDL. EPA believes that MPCA adequately addressed the comment from MDNR and updated the final TMDL appropriately.

MPCA submitted MDNR's public comment and its response in the final TMDL submittal packet received by the EPA on October 17, 2016.

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

## 12. Submittal Letter

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

**Comment:**
The EPA received the final Long Prairie River watershed TMDL document, submittal letter and accompanying documentation from MPCA on October 17, 2016. The transmittal letter explicitly stated that the final TMDLs referenced in Table 1 of this Decision Document were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval.

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

The EPA finds that the TMDL transmittal letter submitted for the Long Prairie 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 3 bacteria TMDLs and the 7 nutrient (TP) TMDLs satisfy all elements for approvable TMDLs. This TMDL approval is for **ten TMDLs**, addressing ten different segments for aquatic recreational use impairments (Table 1 of this Decision Document).

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