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

OCT 0 1 2019

REPLY TO THE ATTENTION OF:

WW-16J

Glenn Skuta, Director
Watershed Division
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 (TMDLs) and supporting documentation for the Mississippi River Grand Rapids Watershed to address aquatic life and recreational use impairments, and includes seven TMDLs for phosphorus in the lakes and six TMDLs for *E. coli* in the rivers to address aquatic life and recreational use in Aitkin, Carlton, Cass, Itasca and St. Louis Counties.

The lakes are classified as 2B and 3C. The rivers are classified as 1B, 2Bg and 2Be, 3B and 3C. Class 2B is for general warmwater habitat (2Bg) and exceptional water habitat (2Be) and shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life, and their habitats, and suitable for aquatic recreation of all kinds, including bathing. Class 3B and 3C industrial use waters are classified for moderate or heavy treatment, respectively.

These TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, EPA hereby approves Minnesota's TMDLs. This approval addresses the Mississippi River Grand Rapids watershed for phosphorus and for *E. coli*. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

wq-iw8-58g

We wish to acknowledge Minnesota's effort in submitting these TMDLs and look forward to future TMDL submissions by the State of Minnesota. If you have any questions, please contact Mr. David Pfeifer, Chief of the Watersheds and Wetlands Branch, at 312-353-9024.

Sincerely,

Linda Holst

Joan M. Tanaka
Acting Director, Water Division

Enclosure

cc: Celine Lyman, MPCA
Anna Bosch, MPCA

TMDL: Mississippi River Grand Rapids Watershed Minnesota TMDL
Date: October 2019

DECISION DOCUMENT FOR THE APPROVAL OF THE MISSISSIPPI RIVER GRAND RAPIDS WATERSHED MINNESOTA TMDL

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

1. Identification of Waterbody, Pollutant of Concern, Pollutant Sources, and Priority Ranking

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

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

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

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

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

Comment:

Location Description/Spatial Extent: The Mississippi River Grand Rapids Watershed (HUC 07010103) TMDLs were submitted by the Minnesota Pollution Control Agency (MPCA). This TMDL is also developed in conjunction with MPCA's Watershed Restoration and Protection Strategy (WRAPS) for this watershed.

The watershed is located in north central Minnesota (Section 1.1 of the TMDL). The Mississippi River enters the watershed from the west and flows generally eastward then continues southward in this portion of the watershed. The drainage area includes the portion of the Mississippi River from the Cohasset Dam in Grand Rapids to its confluence with the Willow River south of Grand Rapids. The impaired stream segments addressed in this TMDL submittal are not on the mainstem but in tributaries in the watershed. The Mississippi River continues south and eastward downstream from Willow River to its confluence with the St. Croix River south of Minneapolis/ St. Paul near Hastings, where it forms a portion of the border between Minnesota and Wisconsin.

The watershed also includes the Willow River (HUC 07010103-751), and the river's impaired segment is in the headwaters portion of the stream, several miles upstream from its confluence with the Mississippi River. The Mississippi River Grand Rapids watershed TMDL includes seven lakes and six creeks and rivers in Aitkin, Carlton, Cass, Itasca, and St. Louis Counties (Section 3 of the TMDL). The submittal includes seven TMDLs for phosphorus in the lakes and six TMDLs for *E. coli* in the rivers for a total of 13 TMDLs to address aquatic life and aquatic recreational use (Table 1 below).

Table 1. (Modified from Table 1 in the TMDL)

Waterbody	Assessment Unit (AU) ID	Use classification	Pollutant
Eagle Lake	09-0057-00	2B 3C	phosphorus
Horseshoe Lake	01-0034-00	2B 3C (s)	phosphorus
Upper Lake: North Island	09-0060-01	2B 3C	phosphorus
Upper Lake: South Island	09-0060-02	2B 3C	phosphorus
King Lake	31-0258-00	2B 3C	phosphorus
Little Cowhorn Lake	31-0198-00	2B 3C (s)	phosphorus
Split Hand Lake	31-0353-00	2B 3C	phosphorus
Split Hand Creek	07010103-574	2Bg 3C	*E. coli*
Hasty Brook	07010103-603	1B 2Bg 3B	*E. coli*
Willow River	07010103-751	2Bg 3C	*E. coli*
Swan River	07010103-753	2Bg 3C	*E. coli*
Tamarack River	07010103-758	2Be 3C	*E. coli*
Prairie River	07010103-760	2Bg 3C	*E. coli*

Land use: Section 3.4 of the TMDL lists land use percentages in the TMDL in the watershed, separated by individual AUs and an aggregate of percentages in the entire watershed. The aggregate land use is 41.5% forest, 29.9% wetlands, 7.8% open water, 6.1% grassland/pasture, 3.9% developed land, and 1% or less for each of cropland and extraction land use.

Problem Identification: Section 1.1 of the TMDL states that there is exceedance of standards in the rivers, which are impaired for aquatic recreation use due to excess bacteria. The lakes are impaired for aquatic recreation use due to excess nutrients and lake eutrophication. Some of the lakes have stressed fish communities or have had winter kills or partial kills (Horseshoe Lake and Little Cowhorn Lake in the Executive Summary of the TMDL), due to the shallow nature of some of the lakes as well as eutrophication and very low Dissolved Oxygen (DO). South Island Lake has a poor fish community score based on the Fish Index of Biological Integrity (FIBI). Several of the lakes have internal loading from anoxic sediment release of phosphorus. One of the lakes has been affected by changing lake levels due to beaver dams (King Lake in Section 4.1.5.5 of the TMDL). Horseshoe Lake and Split Hand Lake have shoreline erosion also contributing to the impairments. Other stressors such as Total Suspended Solids have been identified by MPCA but will be addressed in other TMDLs in the future. TMDLs have been completed in the past in the watershed for eutrophication or aquatic consumption due to mercury via a statewide TMDL.

Source Identification Phosphorus in Lakes - Section 3.6.1.1 discusses that there is one Wastewater Treatment Plant (WWTP) in the watershed on an impaired lake. It is the only individually-permitted point source for phosphorus loading in the watershed. Nonpoint sources of phosphorus include watershed runoff, wetland export, feedlots not requiring permits, subsurface sewage treatment systems (SSTS), atmospheric deposition, and lake internal loading.

- Watershed runoff modeling was used to quantify runoff and Total Phosphorus (TP) values in the lakes, using land cover, soil type and meteorological data (2001through 2009).

- Wetland export was determined by the MPCA; many streams were monitored in their natural setting in forested areas, which include many peatlands and bogs in the watershed. High phosphorus concentrations are experienced in these locations. As sediment is known to release phosphorus under the right redox conditions, similar conditions may occur in peatlands to release phosphorus into streams and lakes. A strong inverse relationship has been shown between low DO and high iron/phosphorus peaks. The low DO produces the redox conditions that cause the release of iron and phosphorus.

- Phosphorus may be transported to streams from surface runoff or via groundwater transport. Phosphorus can enter groundwater via seepage, and the groundwater may then transport soluble phosphorus into the stream.

- Upstream lakes and streams contribute significant amounts of phosphorus to downstream locations.

- Feedlots are required to have a permit if they have more than 1,000 animal units; there are no registered feedlots within the lake drainage areas in the watershed. There may be smaller feedlots which are not required to be registered or permitted.
- Subsurface sewage treatment systems (SSTS) are present in the area, especially in homes near the impaired lakes. Phosphorus loading estimates for this TMDL were from assumptions made in an MPCA document[1], septic failures reported by county, and shoreline septic counts.
- Average atmospheric deposition rates were used to determine this source for the TMDL submittal, applied to lake surface areas.
- Internal loading may occur from a chemical release from sediments when there are anoxic conditions near the bottom, or a physical disturbance from sediments via bottom-feeding fish behaviors, boats, or wind-driven mixing.

Source Identification Bacteria in Streams - Section 3.6.2.1 of the TMDL describes the loading from point sources of bacteria from Wastewater Treatment Plants (WWTPs) and stabilization ponds. They are:

- Reach -753, Coleraine-Bovey-Taconite Joint WWTP (MN0053341)
- Reach -753, Keewaten WWTP (MN0022012
- Reach -753, Marble WWTP (MN0020214)
- Reach -753, Nashwauk WWTP (MNG580184)
- Reach -751, Remer WWTP stabilization pond (MNG582010)
- Reach -758, Cromwell WWTP stabilization pond (MN0051101)

- WWTP dischargers to Class 2 waters are required to disinfect from April through October. (unless there are potable water supplies)

- Land application of biosolids is not assumed to be a source if all permit requirements and restrictions are followed. Land application is highly regulated via Minn. R. ch. 7041, Sewage Sludge Management.

- Concentrated Animal Feeding Operations (CAFOs) are not present in the watershed. However, application of manure is a potential source of bacteria to the streams since there are many small-scale farms and feedlots within the watershed, as described in the nonpoint section below.

Nonpoint Sources of bacteria are (Section 3.6.2.2 of the TMDL):

- Humans sources of bacteria occur from unsewered portions of the watershed and their contribution was determined by using census data and subwatershed boundary maps, then distributing values to subwatersheds using area-weighted values.
- Wastewater collection releases are not an issue in the watershed.

[1] Detailed Assessment of Phosphorus Sources to Minnesota Watersheds Report. 2004.

- The State acquired illicit discharge data from unsewered communities on failing septic systems at the county level, to determine whether they were listed as an Imminent Threat to Public Health and Safety (ITPHS). The percentage by the five counties ranged from1% - 4% septic system failure.
- Land application of septage was not included as a source of fecal pollution for this TMDL. To get license to apply septage, the operator must properly treat and disinfect the septage. There are regulations through EPA Standards Section 503, and MPCA has management guidelines for site suitability, such as soil conditions, slope and minimum separation distances.
- Pets may contribute to runoff from dog parks, residential yard runoff, rural areas with no pet ordinances, and animal excrement directly into waterbodies.
- Livestock at registered feedlots may contribute contaminants via grazing or if manure is not applied using injection methods. There may be only a portion of the counties in the count depending on their areal extent within the watershed boundary (Table 25 below).

Table 25. MPCA registered feedlot animals by subwatershed (Modified Table from TMDL).

Stream reach	County	Bovines	Horses	Birds
574	Itasca	50		
603	Carlton	17	3	
751	Aitkin, Cass, Itasca			
753	Itasca, St. Louis	12		25
758	Carlton, Aitkin	121		
760	Itasca, St. Louis	21		

Pollutants of Concern: Pollutants of concern are excess nutrients (phosphorus) for the lakes and bacteria (*E. coli*) for the stream segments.

Priority Ranking: Section 1.3 of the TMDL states that the priority ranking is in the TMDL schedule included in Minnesota's 303(d) list, but also the TMDL priorities are aligned with Minnesota's watershed approach and the WRAPS cycle. Minnesota also developed the TMDL Priority Framework Report to meet EPA's national measure and the Long-Term Vision. TMDLs will address impaired segments by 2022 as part of the MPCA prioritization plan.

Future growth: Section 5 of the TMDL states that the watershed is mostly undeveloped; most of the land cover is woodlands and wetlands. The Census from 2010 to 2017 in the counties showed a change in Itasca County of +0.2%, Aitkin County -2.3%, and Carlton County +0.3%. If there are changes in the future due to modifications of a Municipal Separate Storm Sewer System (MS4) areal extents or highways, MPCA will make appropriate changes to the LA or WLA.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this first element.

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

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

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

<u>Comment:</u>
Designated Use: Section 2 of the TMDL submittal states that all waters have protected beneficial uses in Minnesota and in this TMDL are assigned classifications including 1B, 2B, 2Be, 2Bg, 3B, and 3C according to Minn. R. ch. 7050.0470 and 7050.0140 (Table 1 above from the TMDL submittal). This TMDL submittal is developed for Class 2 waters which is the most protective classification for the impaired waters for both phosphorus and bacteria (Section 2 of the TMDL). The classifications below are those that have impairment and addressed by this TMDL.

The quality of Class 2B surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable.

Class 2Be water is a warm water stream protected for aquatic life and recreation, capable of supporting and maintaining an exceptional and balanced, integrated, adaptive community of warm or cool water aquatic organisms that meet or exceed the Exceptional Use biological criteria.

Class 2Bg water is a warm water stream protected for aquatic life and recreation, capable of supporting and maintaining a balanced, integrated, adaptive community of warm or cool water aquatic organisms that meet or exceed the General Use biological criteria.

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Lake Phosphorus Standards (Section 2.1 of the TMDL) – standards for lakes in Minnesota were revised in 2008, Minn. R. 7050, based on data from a large cross section of lakes within the state in each ecoregion. The lake eutrophication standard is comprised of three different parameters which may not be exceeded, using summer averages from June 1 through September 30, in the Northern Lakes & Forest Ecoregion where the lakes in this TMDL are located: **Phosphorus < 30 µg/L, chlorophyll-*a* < 9 µg/L, and Secchi depth > 2.0 meters.** These criteria apply to Class 2 waters, regardless of the further classification (2B, 2Bg or 2Be). The phosphorus standards, as well as the chlorophyll-a and Secchi depth, are the targets for the TMDLs.

Rivers/Streams Bacteria Standards (Section 2.2.1 of the TMDL) The standard for bacteria in Class 2B waters is: Minn. R. ch. 7050.0222, *E. coli* water quality standard for Class 2 waters. *E. coli* shall not exceed **126 organisms per 100 milliliters as a geometric mean** of not less than five samples in any calendar month, **nor shall more than ten percent of all samples** taken during any calendar month individually **exceed 1,260 organisms per 100 milliliters**. The standard applies between April 1 and October 31. Class 3 standards are less stringent so the standards will be achieved meeting the Class 2 standards. The *E. coli* standards are the targets for the TMDLs.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this second element.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

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

Comment:
The Loading Capacities for each contaminant are discussed in Sections 4.1 and 4.2 of the TMDL submittal and are shown in the Tables at the end of this document. The lakes were modeled using BATHTUB and the Hydrologic Simulation Program FORTRAN (HSPF), and the stream reaches were modeled using Load Duration Curves (LDCs) and HSPF.

Lake Phosphorus Methodology (Section 4.1 of the TMDL) - Phosphorus allocation in the lakes was determined by using BATHTUB. The model uses segments to represent the lakes or reservoirs, and tributaries are the inputs of flow and pollutant loading. Incoming loads of phosphorus were reduced until the TP criterion was attained. MPCA noted there was often an underestimate of loading using the BATHTUB approach, using the P sedimentation Canfield-Bachmann equation, due to the poor condition of the lakes with a high P sedimentation factor (internal loading). The BATHTUB model was subsequently revised to include increased levels of internal loading for several of the lakes (Table 4.3 and Appendix A of the TMDL). As mentioned above, several of the lakes have varying portions of phosphorus loads from direct drainage. MPCA also determined that if the phosphorus criteria is achieved, the chlorophyll-a and Secchi depth standards will be achieved, based upon the data analysis from the development of the eutrophication criteria (Section 2.1.1 of the TMDL).

The HSPF model generates overland runoff flows from subwatersheds, based on land cover and soil type. HSPF model outputs were used as inputs into BATHTUB where there were not sufficient measured data for watershed runoff volumes and TP loads from the direct drainage area of impaired lakes. Average annual flow data from 2006 through 2015 were used for the approach.

Rivers/Streams Bacteria Methodology - Section 4.2 of the TMDL states that the load duration curve methodology was used for the *E. coli* TMDLs. First, continuous flow data are required and reflect a range of natural occurrences from extremely high flows to extremely low flows. HSPF modeled flows were used where actual flows were not available. Each of the five flow conditions (very high, high, mid-range, low and very low) data are then multiplied by the *E. coli* standard of 126 cfu/100 ml. The LA is calculated by subtracting MOS and WLA from the TMDL. Note the example below in Figure 4-2 taken from the TMDL has exceedences of the TMDL curve under low and very low flow conditions on the right side of the plot, as well as at high and very high flow conditions such as storm runoff. This Figure is an example and other sites may have very different observed values in their respective flow regimes within this watershed.

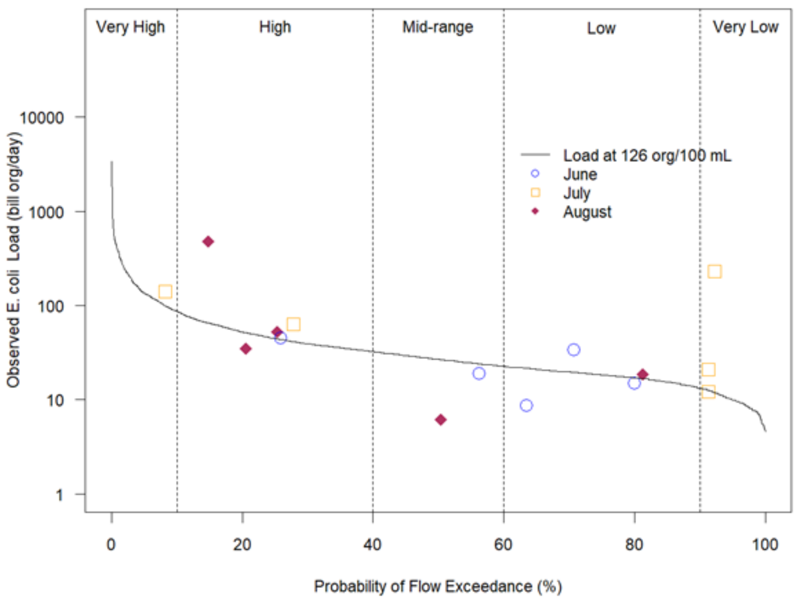
In the TMDL tables of this Decision Document, only five points on the entire loading capacity curve are depicted (the midpoints of the designated flow zones). However, it should be understood that the entire curve represents the TMDL and is what is ultimately approved by the

EPA. In addition, MPCA utilized the 126 cfu/100 mL (geometric mean) portion of the WQS to determine loads, however, both portions of the WQS (geometric mean and single sample maximum) apply to the waterbodies. MPCA expects that achieving the geometric mean will result in the single sample maximum being met.

MPCA did not determine the portion of the loading contributed by direct drainage to the lakes, and MPCA acknowledged that there must be further investigation into the specific sources of loading of bacteria to the lakes from direct drainage. Wetland contributions or shoreline erosion are possible additional sources identified by MPCA.

Figure 4-2. Hasty Brook (07010103-603) *E. coli* Load Duration Curve

The LDC is the *E. coli* standard load at 126 org/100 ml. Plotted sample loads are based on monitored *E. coli* concentrations from station S005-777 collected 2006-2015.



The high concentrations under low flow conditions are often from point sources, but there are none in this segment. Higher observed measurements above standards are due to many sources having the potential to cause exceedance of standards, possibly due to illicit connections, wildlife or pet waste deposited directly into the waters under all conditions (Section 3.6.2.2 of the TMDL), not only storm runoff. The TMDL approach is based upon the premise that all discharges must meet the WQS when entering the waterbody. If all sources are meeting the WQS at the point of discharge, then the waterbody will meet the WQS and the designated use.

Using the load duration curve approach allows MPCA to determine which implementation practices are most effective for reducing *E. coli* loads based on flow regime. For example, if loads are significant during storm events, implementation efforts can target those BMPs that will most effectively reduce storm water run-off. This allows for a more efficient implementation effort. The load duration curve is a cost-effective TMDL approach, while still addressing the reductions necessary to meet WQS for *E. coli*. The approach also aids in sharing the responsibility among various sources in the TMDL watershed, which encourages collective implementation efforts.

Weaknesses of the TMDL analysis are that nonpoint source load allocations were not assigned to specific sources within the watershed. However, EPA believes the weaknesses are outweighed by the strengths of the TMDL approach and is appropriate based upon the information available. If *E. coli* levels do not meet WQS in response to implementation efforts, the TMDL strategy may be amended as new information on the watershed is developed, to better account for sources contributing to the impairment and determining where reductions in the Mississippi River Grand Rapids watershed are most appropriate.

Critical Conditions - *Phosphorus*: Section 4.1.4 of the TMDL states that the critical condition for phosphorus in the lakes is the growing season June through September, when conditions result in higher loading of phosphorus in water due to nutrient runoff. Further, the timing is critical because this is the time of year for aquatic recreation in the lakes. The critical condition was accounted for because the data are collected in the growing season, and standards should be achieved during that timeframe.

Bacteria: For watershed contributions to the bacteria impairment in the rivers, Section 4.2.5 states that the critical condition is April through October, when humans and pets use the waters for primary contact recreational use. This is also the timeframe when the standards apply and the data are collected.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this third element.

4. Load Allocations (LAs)

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.

<u>Comment</u>:
The Load Allocations are in the Tables at the end of this document. Phosphorus loading from nonpoint sources in each of the lakes has a significant amount of internal loading, as well as watershed runoff, failing septics, and atmospheric loading of phosphorus. Several of the lakes have loading contributions from adjacent lakes. *E. coli* in the streams have nonpoint source loading from watershed runoff primarily under high to midflow conditions, with only Hasty Brook having exceedences of *E. coli* under low flow conditions.

EPA finds MPCA's approach for calculating the LA to be reasonable and consistent with EPA guidance. EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this fourth element.

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 permitees 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:
The WLAs are at the end of this document. For the lakes, MPCA identifies point sources discharging phosphorus in the Mississippi River Grand Rapids Watershed as construction and industrial stormwater. The WLA for construction stormwater is based upon the areal extent of construction activities in the watersheds averaged over a 10-year period. For industrial stormwater, MPCA utilized the same loading, noting that there is little industrial activity in the watersheds (Section 4.1.3.3 of the TMDL).

For bacteria loading in the creeks and streams, the WWTPs (Table 3-18 below) and MS4s are contributing to the WLA, but in some segments there are no permittees with *E. coli* discharges. To determine the WLA for the continuous dischargers, MPCA multiplied the design flow by the 126 org/100 mL target for *E. coli*. for the pond systems, MPCA calculated the maximum daily discharge allowed from the pond and multiplied that by the 126 org/100 mL (Section 4.2.3.5 of the TMDL). MPCA noted that discharge permits in Minnesota contain limits for fecal coliform, not *E. coli*. MPCA converted the *E. coli* loads into fecal coliform loads by using the fecal coliform effluent limit of 200 org/100 mL multiplied by the design flow. The EPA notes that this conversion is consistent with studies performed elsewhere in Region 5 (*Translator Development for Bacterial Indicator TMDLs*, McLellan and Dila, 2013).

For MS4s, MPCA determined the areal extent of the city of Hibbing MS4 permit and assigned a corresponding portion of the overall loading (based upon the 126 org/100 mL geometric mean) to the MS4 (Section 4.2.3.1 of the TMDL). This was calculated for both impacted segments, as noted in Table 4-12 below.

Table 3-18. WWTF design flows and permitted bacteria loads

Stream Reach	Facility Name, Permit #	Facility Type	Design Flow Rate (mgd)	Permitted Bacteria Load as Fecal Coliform: 200 org/ 100 ml [billion org/day]	Permitted Bacteria Load as *E. coli*: 126 org. / 100 ml[1] [billion org/day]
-753	Coleraine-Bovey-Taconite Joint WWTP MN0053341	Continuous Discharge	0.499	4.3	2.4
	Keewatin WWTP MN0022012		0.180	1.4	0.9
	Marble WWTP MN0020214		0.324	2.5	1.5
	Nashwauk WWTP MNG580184	Stabilization Pond[2]	0.106	23.4	14.8
-751	Remer WWTP MNG580210	Stabilization Pond[2]	0.353	3.3	2.1
-758	Cromwell WWTP MN0051101	Stabilization Pond[2]	0.595	4.7	2.8

[1] WWTF permits are regulated for fecal coliform, not *E. coli*. The MPCA surface water quality standard for *E. coli* (126 org. / 100 ml) was used in place of the fecal coliform permitted limit of 200 org. / 100 ml, which was also the MPCA surface water quality standard prior to the March 2008 revisions to Minn. R. ch. 7050.

[2]The permit for stabilization ponds allows discharge only during the period March 1 - Jun 30 and September 1 - December 31.

Table 4-12. *E. coli* Wasteload Allocation for MS4s located within the watershed area of an impaired stream (modified).

Impaired Reach AUID 07010103-XXX	MS4 Community	Impaired Stream Watershed Area (ac)	MS4 Area within Watershed (ac)	Area Weight Applied in WLA Calcuation[1]
-753	Hibbing, MN	94,618	11,780	12.4%
-760		299,656	11,835	3.9%

[1]See TMDLs below at end of document for WLAs at each flow regime.

EPA finds MPCA's approach for calculating the WLA to be reasonable and consistent with EPA guidance. EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this fifth element.

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:
An explicit 10% MOS was used for the phosphorus TMDL calculations in the lakes. Section 4.1.3.6 of the TMDL indicates that the agreement between simulated BATHTUB values and observed values was generally good, internal loading was significant and adequately taken into account. Three or more years of in-lake data were used.

Section 4.2.3.5 of the TMDL submittal states that the MOS for *E. coli* is an explicit 10%. This value is chosen as a conservative level because some stream gages are near the outlet of the watershed and therefore more upstream flows had to be extrapolated, and regrowth, die-off or natural background of bacteria was not accounted for in the LDC approach, so the MOS assisted in accounting for these issues.

EPA finds MPCA's approach for calculating the MOS to be reasonable and consistent with EPA guidance. EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this sixth element.

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:
Section 4.1.4 of the TMDL states that for the lakes, the approach took into account the seasonal variation to reflect changes from lake loads and concentrations under different flow and loading conditions. Phosphorus loading to the lakes using BATHTUB also quantified internal loading, which is a significant portion of the allocation.

Section 4.2.4 of the TMDL states for the streams that snowmelt, storm events, and other variation based on the presence or harvest of crops are all considered. Flow data for *E. coli* in the streams was either used directly or extrapolated and modeled in HSPF, which includes seasonal variation. These values were then input into the LDC methodology which accounts for variability in flow using five flow regimes: from high flows, such as flood events, to low flows, such as baseflow. Bacteria loading was evaluated at actual flow conditions. Results were evaluated for the best use of BMPs at local levels. The monitoring of bacteria is also focused on the recreational season most important for human contact in April through October.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this seventh element.

8. Reasonable Assurances

When a TMDL is developed for waters impaired by point sources only, the issuance of a National Pollutant Discharge Elimination System (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:
Section 6.1 of the TMDL submittal states that there is reasonable assurance that the TMDL will be implemented. MPCA first reviewed potential nonpoint source reductions for both phosphorus in the lakes and *E. coli* in the rivers. MPCA recognizes that both lake levels and internal lake load management needs to occur, as well as watershed reductions through management of septic systems, shoreline erosion, and stormwater runoff. Wetland water level management can help achieve some of the goals, though difficult due to increased frequency and intensity of rainfall events.

MPCA approved a watershed WRAPS document on September 18, 2019, that outlines strategies to reduce watershed and internal loading. Strategies or programs include: Public and Private Land Protection, Forest Protection programs, Non-functioning Ditch Decommissioning, and Shoreland Ordinance Enforcement. Education is also part of the strategies.

The Aitkin, Carlton and Itasca County Soil and Water Conservation Districts (SWCDs) have programs and have actively improved water quality in the past. Figure 6-1 of the TMDL summarizes the BMPs that have been implemented in the watershed since 2004. US Department of Agriculture (USDA) and Natural Resources Conservation Service (NRCS) administer programs and financial incentives to agricultural producers and landowners. In this watershed actions have included education, livestock exclusion, shoreline revegetation, buffer establishment, rain gardens, shoreline stabilization projects, and conservation easements. MPCA provides a record of BMPs established in the watersheds since 2004.

For point sources, Section 6.2 of the TMDL submittal states that reasonable assurance will be provided by:

- Regulating construction and industrial stormwater;
- Issuing permits for WWTPs based on water quality standards, and disposal systems permits set limits and have controls for land application of sewage;
- Regulation of Subsurface Sewage Treatment systems (SSTS) by including minimum technical standards, providing a framework for local administration of the SSTS program, via statewide licensing of SSTS professionals, product review, and registration, and establishing an advisory committee;
- Feedlots must have manure storage that does not drain into water, and properly applied to so as not to drain into streams and lakes;
- Perennial vegetative buffers are required along lakes, rivers, and streams; they are to be 50 feet in width. Buffers along public ditches are to be 16.5 feet wide or more (Section 6.2.6 in the TMDL submittal). Compliance is reported to be high at 99% in Aitkin County for private lands in the watershed (not including agricultural purposes).

The Clean Water Legacy Act (CWLA) was passed in Minnesota for the purposes of protecting, restoring, and preserving Minnesota water. The CWLA provides the protocols and practices to be followed 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 provided details on public and stakeholder participation, and how the funding will be used. In part to attain these goals, the CWLA requires MPCA to develop WRAPS. The WRAPS are required to contain such elements as the identification of impaired waters, watershed modeling outputs, point and nonpoint sources, load reductions, etc. (*Chapter 114D.26*; CWLA). The WRAPS also contain an implementation table of strategies and actions that are capable of achieving the needed load reductions, for both point and nonpoint sources (*Chapter 114D.26*, Subd. 1(8); CWLA). Implementation plans developed for the TMDLs are included in the table and are considered "priority areas" under the WRAPS process (*Watershed Restoration and Protection Strategy Report Template*, MPCA). https://www.pca.state.mn.us/sites/default/files/wq-ws4-03.docx. 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 action. MPCA has developed guidance on what is required in the WRAPS. As stated above, a WRAPS was completed as a companion document to this TMDL https://www.pca.state.mn.us/sites/default/files/wq-ws4-61a.pdf.

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). Funding for implementation is also available through other nonpoint source programs and the 319 funding mechanism.

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:
In Section 7 of the TMDL MPCA describes that the lake and stream segments will be monitored using several entities and methods:

- Volunteers will monitor through the Citizen's Volunteer Monitoring Program which has been successful in the past and currently monitors six stream and 93 lake sites with 76 volunteers in the watershed.
- The DNR will conduct aquatic life monitoring and includes game fish populations, water quality, water chemistry, and near-shore fish Index of Biological Integrity in lakes that have ongoing assessments.
- MPCA does lake and stream monitoring for biology and water chemistry. MPCA is also recording dissolved oxygen (DO) with DO loggers to assess DO flux every thirty minutes, to assess DO needs to fully support aquatic life.

MPCA is also monitoring BMP effectiveness. Scenarios will be extrapolated from BMP sites if the land use, soil type and BMP is similar from one site to another.

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.

<u>Comment:</u>
Section 8 of the TMDL includes an implementation strategy and reflects many entities working together. The TMDL will be used to aid in implementation activities in the WRAPS process. The point sources would primarily be complying with their permit limits to maintain water quality at construction sites, industrial sites, and WWTFs (Section 8.1 of the TMDL).

The nonpoint sources would be reviewing implementation options using adaptive management, which includes monitoring and course corrections as needed to fine-tune BMP strategies. Adaptive management includes the implementation and monitoring of the strategies, then evaluating and assessing the progress of the BMP activities.

Section 8.2.2 of the TMDL describes the in-lake BMP details that include the management of lake levels, in-lake plant and fish communities, and/or sediment phosphorus release. For watershed BMPs, there is management of septic systems, shoreline erosion, and stormwater runoff. There are details provided on the education and outreach portion of the WRAPS with ways of increasing volunteer participation in monitoring and water quality discussions, engaging citizens, increasing the communication of water quality activities in the watershed, and having a document with contact information for local resources and funding mechanisms (Section 8.2.3 of the TMDL).

Technical assistance is provided to landowners through SWCDs or counties through training and education, and various cost share mechanisms. Conservation practices are included in the WRAPS, and may include stormwater bioretention, septic system upgrades, feedlot improvements, invasive species control, wastewater treatment practices, rural BMPs, internal loading reduction, forest stewardship planning, and shoreline stabilization and revegetation, depending on the best siting for the various locations and practices (Section 8.2.4 of the TMDL).

Many entities are included in the watershed improvement. Costs are included in the analysis of the implementation activities as required by Minnesota's CWLA as described in Section 8 above in this document, for both phosphorus and bacteria reduction. All of the phosphorus load reductions are expected to cost $3.6 million for all the lakes in this TMDL. The two primary bacteria sources, livestock and the imminent threat to public health septic systems (ITPHSS) that are household septics not functioning properly or leaking would cost approximately $2.6 million to address (Section 8.3.1 and 8.3.2 of the TMDL).

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

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 TMDL was public noticed from July 15, 2019 through August 14, 2019. Copies of the draft TMDL were made available upon request and on the Internet web site: https://www.pca.state.mn.us/sites/default/files/wq-iw8-58e.pdf. The WRAPS was also provided as stated previously. MPCA also provided a list for the past public meetings and calls including many stakeholders across the watershed. There were no comments submitted during the public comment period. MPCA also adequately addressed US EPA comments.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this eleventh element.

12. Submittal Letter

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

Comment:

The EPA received the final Mississippi River Grand Rapids Watershed TMDL on September 20, 2019, accompanied by a submittal letter dated September 19, 2019. In the submittal letter, MPCA stated that the submission includes the final TMDL for the Mississippi River Grand Rapids.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this twelfth element.

13. Conclusion

After a full and complete review, EPA finds that the phosphorus and *E. coli* TMDLs for the Mississippi River Grand Rapids Watershed satisfy all of the elements of approvable TMDLs. This approval is for seven phosphorus TP in lakes and six *E. coli* TMDLs in streams and rivers impairing aquatic life and recreational use for a total of 13 TMDLs.

EPA's approval of this TMDL does not extend to those waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.

Table 4-5. Eagle Lake (09-0057-00) TP TMDL and Allocations

Eagle Lake Load Component		Existing	Goal		Reduction	
		(kg/yr)	(kg/yr)	(kg/day)	(kg/yr)	(%)
Wasteload Allocations	Construction stormwater (MNR100001)	0.010	0.010	0.000027	0.0	0%
	Industrial stormwater (MNR500000)	0.010	0.010	0.000027	0.0	0%
	Total WLA	**0.020**	**0.020**	**0.000054**	**0.0**	
Load Allocations*	*Watershed runoff*	*75.8*	*69.0*	*0.189*	*6.8*	*9%*
	Failing septics	*7.4*	*0.0*	*0.000*	*7.4*	*100%*
	Internal load	*99.5*	*68.5*	*0.188*	*31.0*	*31%*
	Total Watershed/In-lake	182.7	137.5	0.377	45.2	25%
	Atmospheric	26.8	26.8	0.073	0.0	0%
	Total LA	**209.5**	**164.3**	**0.45**	**45.2**	**22%**
MOS			**18.3**	**0.050**		
TOTAL		**209.5**	**182.6**	**0.50**		

*LA components are broken down for guidance in implementation planning; loading goals for these components may change through the adaptive implementation process, but the total LA for each lake will not be modified from the total listed in the table above

Table 4-6. Horseshoe Lake (01-0034-00) TP TMDL and Allocations

Horseshoe Lake Load Component		Existing	Goal		Reduction	
		(kg/yr)	(kg/yr)	(kg/day)	(kg/yr)	(%)
Wasteload Allocations	Construction stormwater (MNR100001)	0.024	0.024	0.000066	0.0	0%
	Industrial stormwater (MNR500000)	0.024	0.024	0.000066	0.0	0%
	Total WLA	**0.048**	**0.048**	**0.000132**	**0.0**	
Load Allocations*	*Watershed runoff*	*242.4*	*143.8*	*0.394*	*98.6*	*41%*
	Failing septics	*0.4*	*0.0*	*0.000*	*0.4*	*100%*
	Wetland anoxic release	*4.3*	*4.3*	*0.012*	*0.0*	*0%*
	Near-shore runoff	*79.1*	*33.7*	*0.092*	*45.4*	*57%*
	Total Watershed/In-lake	326.2	181.8	0.498	144.4	44%
	Atmospheric	16.5	16.5	0.045	0.0	0%
	Total LA	**342.7**	**198.3**	**0.543**	**144.4**	**42%**
MOS			**22.0**	**0.060**		
TOTAL		**342.7**	**220.3**	**0.603**		

*LA components are broken down for guidance in implementation planning; loading goals for these components may change through the adaptive implementation process, but the total LA for each lake will not be modified from the total listed in the table above.

Table 4-7. North Island Lake (09-0060-01) TMDL and Allocations

Island Lake (North Basin) Load Component		Existing	Goal		Reduction	
		(kg/yr)	(kg/yr)	(kg/day)	(kg/yr)	(%)
Wasteload Allocations	Construction stormwater (MNR100001)	0.016	0.016	0.000044	0.0	0%
	Industrial stormwater (MNR500000)	0.016	0.016	0.000044	0.0	0%
	Total WLA	**0.032**	**0.032**	**0.000088**	**0.0**	
Load Allocations*	*Watershed runoff*	*133.7*	*110.1*	*0.301*	*23.6*	*18%*
	Failing septics	*2.2*	*0.0*	*0.000*	*2.2*	*100%*
	Internal load	*13.4*	*0.0*	*0.000*	*13.4*	*100%*
	Total Watershed/In-lake	149.3	110.1	0.301	39.2	26%
	Island Lake (South Basin)	83.5	77.5	0.212	6.0	7%
	Atmospheric	7.8	7.8	0.021	0.0	0%
	Total LA	**240.6**	**195.4**	**0.534**	**45.2**	**19%**
MOS			**21.7**	**0.059**		
TOTAL		**240.6**	**217.1**	**0.593**		

*LA components are broken down for guidance in implementation planning; loading goals for these components may change through the adaptive implementation process, but the total LA for each lake will not be modified from the total listed in the table above.

Table 4-8. South Island Lake (09-0060-02) TP TMDL and Allocations

Island Lake (South Basin) Load Component		Existing	Goal		Reduction	
		(kg/yr)	(kg/yr)	(kg/day)	(kg/yr)	(%)
Wasteload Allocations	Construction stormwater (MNR100001)	0.004	0.004	0.000011	0.0	0%
	Industrial stormwater (MNR500000)	0.004	0.004	0.000011	0.0	0%
	Total WLA	**0.008**	**0.008**	**0.000022**	**0.0**	
Load Allocations*	*Watershed runoff*	*34.9*	*31.6*	*0.086*	*3.3*	*10%*
	Failing septics	*2.8*	*0.0*	*0.000*	*2.8*	*100%*
	Internal load	*78.4*	*54.0*	*0.148*	*24.4*	*31%*
	Total Watershed/In-lake	116.1	85.6	0.234	30.5	26%
	Eagle Lake	46.3	42.4	0.116	3.9	9%
	Atmospheric	22.3	22.3	0.061	0.0	0%
	Total LA	**184.7**	**150.3**	**0.411**	**34.4**	**19%**
MOS			**16.6**	**0.046**		
TOTAL		**184.7**	**166.9**	**0.457**		

*LA components are broken down for guidance in implementation planning; loading goals for these components may change through the adaptive implementation process, but the total LA for each lake will not be modified from the total listed in the table above.

Table 4-9. King Lake (31-0258-00) TP TMDL and Allocations

King Lake Load Component		Existing	Goal		Reduction	
		(kg/yr)	(kg/yr)	(kg/day)	(kg/yr)	(%)
Wasteload Allocations	Construction stormwater (MNR100001)	0.007	0.007	0.000019	0.0	0%
	Industrial stormwater (MNR500000)	0.007	0.007	0.000019	0.0	0%
	Total WLA	**0.014**	**0.014**	**0.000038**	**0.0**	
Load Allocations*	*Watershed runoff*	*16.1*	*14.1*	*0.039*	*2.0*	*12%*
	Failing septics	*2.3*	*0.0*	*0.000*	*2.3*	*100%*
	Internal load	*90.0*	*63.5*	*0.174*	*26.5*	*29%*
	Total Watershed/In-lake	108.4	77.6	0.213	30.8	28%
	Atmospheric	21.4	21.4	0.059	0.0	0%
	Total LA	**129.8**	**99.0**	**0.272**	**30.8**	**24%**
MOS			**11.0**	**0.030**		
TOTAL		**129.8**	**110.0**	**0.302**		

*LA components are broken down for guidance in implementation planning; loading goals for these components may change through the adaptive implementation process, but the total LA for each lake will not be modified from the total listed in the table above.

Table 4-10. Little Cowhorn Lake (31-0098-00) TP TMDL and Allocations

Little Cowhorn Lake Load Component		Existing	Goal		Reduction	
		(kg/yr)	(kg/yr)	(kg/day)	(kg/yr)	(%)
Wasteload Allocations	Construction stormwater (MNR100001)	0.016	0.016	0.000044	0.0	0%
	Industrial stormwater (MNR500000)	0.016	0.016	0.000044	0.0	0%
	Total WLA	**0.032**	**0.032**	**0.000088**	**0.0**	
Load Allocations*	*Watershed runoff*	*41.1*	*30.7*	*0.084*	*10.4*	*25%*
	Failing septics	*0.0*	*0.0*	*0.000*	*0.0*	*0%*
	Internal load	*52.5*	*8.6*	*0.024*	*43.9*	*84%*
	Total Watershed/In-lake	93.6	39.3	0.108	54.3	58%
	Atmospheric	12.5	12.5	0.034	0.0	0%
	Total LA	**106.1**	**51.8**	**0.142**	**54.3**	**51%**
MOS			**5.8**	**0.016**		
TOTAL		**106.1**	**57.6**	**0.158**		

*LA components are broken down for guidance in implementation planning; loading goals for these components may change through the adaptive implementation process, but the total LA for each lake will not be modified from the total listed in the table above

Table 4-11. Split Hand Lake (31-0353-00) TP TMDL and Allocations

Split Hand Lake Load Component		Existing	Goal		Reduction	
		(kg/yr)	(kg/yr)	(kg/day)	(kg/yr)	(%)
Wasteload Allocations	Construction stormwater (MNR100001)	0.094	0.094	0.00026	0.0	0%
	Industrial stormwater (MNR500000)	0.094	0.094	0.00026	0.0	0%
	Total WLA	**0.188**	**0.188**	**0.00052**	**0.0**	
Load Allocations*	*Watershed runoff*	*196.1*	*177.5*	*0.486*	*18.6*	*9%*
	Failing septics	*3.4*	*0.0*	*0.000*	*3.4*	*100%*
	Wetland anoxic release	*78.7*	*78.7*	*0.216*	*0.0*	*0%*
	Internal load	*430.1*	*197.8*	*0.541*	*232.3*	*54%*
	Near-shore runoff	*825.2*	*379.4*	*1.039*	*445.8*	*54%*
	Total Watershed/In-lake	1,533.5	833.4	2.282	700.1	46%
	Atmospheric	94.5	94.5	0.259	0.0	0%
	Total LA	**1,628.0**	**927.9**	**2.541**	**700.1**	**43%**
MOS			**103.1**	**0.282**		
TOTAL		**1,628.2**	**1,031.2**	**2.823**		

*LA components are broken down for guidance in implementation planning; loading goals for these components may change through the adaptive implementation process, but the total LA for each lake will not be modified from the total listed in the table above.

Table 4-14. Split Hand Creek (07010103-574) *E. coli* TMDL and allocations

Split Hand Creek 07010103-574 Load Component		Flow Regime				
		Very High	High	Mid	Low	Very Low
		E. coli (billion organisms per day)				
Existing Load		***NA***	***151.5***	***57.1***	***4.8***	***2.6***
Wasteload Allocations	*NPDES Permitted Facilities*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
	Total WLA	**0**	**0**	**0**	**0**	**0**
Load Allocations	*Watershed Runoff*	*242.5*	*74.1*	*26.9*	*11.7*	*3.3*
	Total LA	**242.5**	**74.1**	**26.9**	**11.7**	**3.3**
10% MOS		**26.9**	**8.2**	**3.0**	**1.3**	**0.4**
Total Loading Capacity		**269.4**	**82.3**	**29.9**	**13.0**	**3.7**
Estimated Load Reduction		*NA*	*69.2*	*27.2*	*NA*	*NA*
		NA	*46%*	*48%*	*NA*	*NA*

Table 4-15. Hasty Brook (07010103-603) *E. coli* TMDL and allocations

Hasty Brook 07010103-603 Load Component		Flow Regime				
		Very High	High	Mid	Low	Very Low
		E. coli (billion organisms per day)				
Existing Load		***140***	***52***	***12***	***17***	***21***
Wasteload Allocations	*NPDES Permitted Facilities*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
	Total WLA	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Load Allocations	*Watershed Runoff*	*121.2*	*40.2*	*24.1*	*16.4*	*8.9*
	Total LA	**121.2**	**40.2**	**24.1**	**16.4**	**8.9**
10% MOS		**13.5**	**4.5**	**2.7**	**1.8**	**1.0**
Total Loading Capacity		**134.7**	**44.7**	**26.8**	**18.2**	**9.9**
Estimated Load Reduction		*5.3*	*7.3*	*NA*	*NA*	*11.1*
		4%	*14%*	*NA*	*NA*	*53%*

Table 4-16. Willow River (07010103-751) *E. coli* TMDL and allocations

Willow River 007010103-751 Load Component		Flow Regime				
		Very High	High	Mid	Low	Very Low
		Billion organisms per day				
Existing Load[1]		*245.0*	*101.5*	*23.7*	*8.4*	*NA*
Wasteload Allocations	*Remer WWTP (MNG580210)*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
	Total WLA	**1.7**	**1.7**	**1.7**	**1.7**	**1.7**
Load Allocations	*Watershed Runoff*	*244.4*	*72.1*	*33.6*	*20.0*	*12.7*
	Total LA	**244.4**	**72.1**	**33.6**	**20.0**	**12.7**
10% MOS		**27.3**	**8.2**	**3.9**	**2.4**	**1.6**
Total Loading Capacity[1]		**273.4**	**82.0**	**39.2**	**24.1**	**16.0**
Estimated Load Reduction		*NA*	*19.5*	*NA*	*NA*	*NA*
		NA	*19%*	*NA*	*NA*	*NA*

[1]The TMDL for Willow River reach -751 was calculated using for data from the HSPF model area weighted to WQ station S006-257. Existing load were estimated using observed *E.coli* data from WQ station W006-257.

Table 4-17. Swan River (07010103-753) *E. coli* TMDL and allocations

Swan River 07010103-753 Load Component		Flow Regime				
		Very High	High	Mid	Low	Very Low
		E. coli (billion organisms per day)				
Existing Load		*NA*	*160.8*	*349.9*	*33.7*	*NA*
Wasteload Allocations	*Coleraine-Bovey WWTP (MN0053341)*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
	Keewatin WWTP (MN0022012)	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*
	Marble WWTP (MN0020214)	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
	Nashwauk WWTP(MNG580184)	*14.8*	*14.8*	*14.8*	*14.8*	*14.8*
	Hibbing, MN MS4 (MS400270)	*93.7*	*34.1*	*16.3*	*9.0*	*3.5*
	Total WLA	**112.9**	**53.3**	**35.5**	**28.2**	**22.7**
Load Allocations	*Watershed Runoff*	*658.4*	*239.9*	*114.3*	*62.8*	*24.1*
	Total LA	**658.4**	**239.9**	**114.3**	**62.8**	**24.1**
10% MOS		**85.7**	**32.6**	**16.6**	**10.1**	**5.2**
Total Loading Capacity		**857.0**	**325.8**	**166.4**	**101.1**	**52**
Estimated Load Reduction		*NA*	*NA*	*183.5*	*NA*	*NA*
		NA	*NA*	*52%*	*NA*	*NA*

Table 4-18. Tamarack River (07010103-758) *E. coli* TMDL and allocations

Tamarack River 07010103-758 Load Component		Flow Regime				
		Very High	High	Mid	Low	Very Low
		E. coli (billion organisms per day)				
Existing Load		***189.1***	***122.3***	***NA***	***129.2***	***5.0***
Wasteload Allocations	*Cromwell WWTP (MN0051101)*	*2.8*	*2.8*	*2.8*	*2.8*	*2.8*
	Total WLA	**2.8**	**2.8**	**2.8**	**2.8**	**2.8**
Load Allocations	*Watershed Runoff*	*395.6*	*127.1*	*70.2*	*43.3*	*20.8*
	Total LA	**395.6**	**127.1**	**70.2**	**43.3**	**20.8**
10% MOS		**44.3**	**14.4**	**8.1**	**5.1**	**2.6**
Total Loading Capacity		**442.7**	**144.3**	**81.1**	**51.2**	**26.2**
Estimated Load Reduction		*NA*	*NA*	*NA*	*78*	*NA*
		NA	*NA*	*NA*	*60%*	*NA*

Table 4-19. Prairie River (07010103-760) *E. coli* TMDL and allocations

Prairie River 07010103-760 Load Component		Flow Regime				
		Very High	High	Mid	Low	Very Low
		E. coli (billion organisms per day)				
Existing Load		***NA***	***198.7***	***61.2***	***73.3***	***NA***
Wasteload Allocations	*Hibbing, MN MS4 (MS400270)*	*76.0*	*26.0*	*12.7*	*7.9*	*5.6*
	Total WLA	**76.0**	**26.0**	**12.7**	**7.9**	**5.6**
Load Allocations	*Watershed Runoff*	*1,850.0*	*631.0*	*308.9*	*191.9*	*136.4*
	Total LA	**1,850.0**	**631.0**	**308.9**	**191.9**	**136.4**
10% MOS		**214.0**	**73.0**	**35.7**	**22.2**	**15.8**
Total Loading Capacity		**2,140.0**	**730.0**	**357.3**	**222.0**	**157.8**
Estimated Load Reduction		*NA*	*NA*	*NA*	*NA*	*NA*
		NA	*NA*	*NA*	*NA*	*NA*