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

REPLY TO THE ATTENTION OF:
WW-16J

December 20, 2023

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 email and attachments sent from the Minnesota Pollution Control Agency (MPCA) on December 12, 2023, regarding revisions made to the Osakis Lake Area Excess Nutrient Total Maximum Daily Load (TMDL). EPA approved the Osakis Lake Area Excess Nutrient TMDL on June 5, 2013. MPCA developed a revised phosphorus TMDL for Faille Lake (77-0195-00) to account for phosphorus contributions from the City of Osakis Wastewater Treatment Facility (MN0020028). These phosphorus contributions were assigned a wasteload allocation. MPCA also recalculated the loading capacity, the margin of safety and load allocations for the Faille Lake phosphorus TMDL.

A copy of the revised Decision Document is enclosed for your records. If you have any questions, please contact Mr. David Werbach, at 312-886-4242 or werbach.david@epa.gov or Mr. Paul Proto, at 312-353-8657 or proto.paul@epa.gov.

Sincerely,

12/20/2023

X David Pfeifer

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

(Enclosures)

cc: Andrea Plevan, MPCA

wq-iw8-39g1

**TMDL:** Osakis Lake, Faille Lake and Smith Lake Nutrient TMDLs, Todd and Douglas Counties, MN
**Date:** December 20, 2023 (revised)

# DECISION DOCUMENT FOR THE OSAKIS LAKE, FAILLE LAKE AND SMITH LAKE NUTRIENT TMDLS, TODD AND DOUGLAS COUNTIES, MN

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

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

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

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

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

(1) the spatial extent of the watershed in which the impaired water body is located;
(2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;
(4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and
(5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment

impairments; chlorophyll *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

**Comment:**

***Revision (December 2023):*** The original Faille Lake (DNR ID 77-0195-00) total phosphorus (TP) TMDL was approved by EPA on June 5, 2013. The Minnesota Pollution Control Agency (MPCA) revised the Faille Lake TP TMDL and submitted the revised TMDL to EPA on December 12, 2023 (hereafter the "revised TMDL document").

The revised Faille Lake TP TMDL was recalculated by MPCA to include contributions from the City of Osakis Wastewater Treatment Facility (WWTF) (NPDES/SDS Permit Number MN0020028) as well as revising the loading capacity, the margin of safety and load allocations (Section 9 of the revised TMDL document). The City of Osakis WWTF was assigned a portion of the wasteload allocation of the loading capacity. Table 4.2 of the revised TMDL document summarizes the original Faille Lake TP TMDL (approved June 2013). Table (9.4) of the revised TMDL document shows the revised Faille Lake TP TMDL. The changes in this Decision Document are noted throughout the document, see ***Revision (December 2023)***. The remainder of this decision document remains unchanged.

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**Location Description/Spatial Extent:**

Osakis Lake (DNR ID 77-0215), Faille Lake (DNR ID 77-0195), and Smith Lake (DNR ID 21-0016) are located near the headwaters of the Sauk River watershed in Todd and Douglas Counties, Minnesota. The Sauk River watershed is a part of the upper Mississippi River basin. Faille Lake and Smith Lake are upstream of Osakis Lake. Waters from both of these water bodies drain into Osakis Lake and then eventually into the Sauk River. Osakis Lake is recognized as being the headwaters of the Sauk River (Figure 2.1 of the final TMDL document). Osakis Lake is north of the town of Osakis, Minnesota in central Minnesota.

Osakis Lake, Faille Lake and Smith Lake all are within the boundaries of the North Central Hardwood Forest (NCHF) ecoregion. The Osakis Lake watershed is approximately 88,722 acres (approximately 138.6 square miles ($mi^2$)) in size. Within the Osakis Lake watershed, water generally flows into Osakis Lake from all areas of the watershed and Osakis Lake empties into the Sauk River at an eastern point within Osakis Lake (Figure 2.2 of the final TMDL document). Flow and nutrient loading from the Osakis Lake watershed influence the hydrology and water quality within Osakis Lake.

Osakis Lake has a large drainage area, 88,722 acres, Faille Lake has a direct watershed drainage of 14,722 acres (23.0 $mi^2$) and Smith Lake has a direct watershed drainage of 11,931 acres (18.6 $mi^2$). Osakis Lake has a surface area of 6,361 acres (9.93 $mi^2$), a maximum depth of 73 feet (22.3 meters (m)), and an average depth greater than 17 feet (5.18 m). Faille Lake has a surface area of 78 acres (0.12 $mi^2$), a maximum depth of 7 feet (2.13 m), and an average depth greater than 3.6 feet (1.10 m). Smith Lake has a surface area of 550 acres (0.86 $mi^2$), a maximum depth of 30 feet (9.14 meters (m)), and an average depth greater than 14.4 feet (4.39 m). MPCA classified Osakis Lake and Smith Lake as 'deep lakes', based upon their average depths being greater than 15 feet. MPCA classified Faille Lake as a shallow lake, based upon its average depth being less than 15 feet.

**Table 1: Morphometric and watershed characteristics in Osakis Lake, Faille Lake and Smith Lake**

| Parameter | Smith Lake | Faille Lake | Osakis Lake |
|---|---|---|---|
| Surface Area (acres) | 550 | 78 | 6,361 |
| Average Depth (ft) | 14 | 4 | 17 |
| Maximum Depth (ft) | 30 | 7 | 73 |
| Volume (acre-ft) | 7,928 | 278 | 108,389 |
| Residence Time (years) | 1.9 | 0.05 | 5 |
| Littoral Area (acres) | 265 | 78 | 2,939 |
| Littoral Area (%) | 48 % | 100 % | 46 % |
| Watershed (acres) | 11,931 | 14,722 | 88,722 |

**Land Use:**

Land use in the Osakis Lake watershed is comprised of pastures for growing hay, row crops (corn or soybeans), open water/wetlands, forested lands, areas covered by roads, alfalfa/wheat/rye fields, low/medium and high density urban development and areas utilized for general agricultural purposes (Table 2 of this Decision Document). Figure 2.3 in the final TMDL document presents land use classifications within the Osakis Lake watershed. MPCA estimated that land use within the Osakis Lake watershed is primarily agricultural and is expected to remain as agricultural for the foreseeable future. Lakefront development exists along the shores of Osakis Lake, Faille Lake and Smith Lake. MPCA does not anticipate significant development in the Osakis Lake watershed. The amount of land in agricultural use in the Osakis Lake watershed is likely to remain fairly constant over the next several decades. 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 nutrient loading to Osakis Lake.

**Table 2: Land Use in the Osakis Lake watershed and the Faille Lake and Smith Lake subwatersheds**

| Land Use* | Osakis watershed | | Smith subwatershed | | Faille subwatershed | |
|---|---|---|---|---|---|---|
| | Acres | Percent | Acres | Percent | Acres | Percent |
| Pasture/Hay | 35,139 | 40% | 4,883 | 41% | 4,452 | 30% |
| Corn/Soybean | 21,648 | 24% | 2,999 | 25% | 5,644 | 38% |
| Wetlands/Open Water | 12,744 | 14% | 1,074 | 9% | 1,850 | 13% |
| Forested | 9,517 | 11% | 1,500 | 13% | 584 | 4% |
| Roads/Transportation | 5286 | 6% | 747 | 6% | 966 | 7% |
| Alfalfa/Wheat/Rye | 3862 | 4% | 662 | 6% | 1029 | 7% |
| Low Density Urban Development | 413 | <1% | 52 | <1% | 175 | 1% |
| Medium Density Urban Development | 61 | <1% | 10 | <1% | 29 | <1% |
| General Agriculture | 38 | <1% | 3 | <1% | 8 | <1% |
| High Density Urban Development | 15 | <1% | 1 | <1% | 5 | <1% |
| **TOTAL** | 88,723 | 100% | 11,931 | 100% | 14,742 | 100% |

* Land use data compiled from the 2009 National Agricultural Statistics Services (NASS), 2008 NASS land cover file and U.S. Fish and Wildlife Service National Wetland Inventory (NWI)

**Problem Identification:**

Osakis Lake was originally listed on the 2004 Minnesota 303(d) list for excessive nutrients (phosphorus). Faille Lake was first listed on the 2006 Minnesota 303(d) list and Smith Lake was first listed on the 2008 Minnesota 303(d) list. Both water bodies, similar to Osakis Lake, were added to the

303(d) list for excessive nutrients (phosphorus). All three water bodies are currently on the draft 2012 Minnesota 303(d) list for impaired aquatic recreation due to excessive nutrients.

Water quality monitoring has been completed at several locations in each of the three impaired lakes within the Osakis watershed. MPCA and the Sauk River Watershed District (SRWD) have conducted water quality sampling within the Osakis watershed. Osakis Lake, Faille Lake and Smith Lake have been sampled at various times between 2000-2010. Those water quality sampling efforts informed the modeling efforts of this TMDL. Total phosphorus, chlorophyll-a (chl-a) and Secchi depth (SD) measurements between 2000-2010 indicated that Osakis Lake, Faille Lake and Smith Lake were impaired by excess nutrients (total phosphorus) and were not attaining their designated uses.

MPCA averaged summer TP concentrations (June 1 to September 30) for individual years between 2000 to 2010. Osakis Lake's greatest average TP concentration was 84 µg/L (in 2000), Faille Lake's greatest average TP concentration was 238 µg/L (in 2007), and Smith Lake's greatest average TP concentration was 61 µg/L (in 2010) (Figures 2.5 - 2.7 of the final TMDL document). During the 2000 to 2010 monitoring period, chlorophyll-a concentrations ranged from 9 µg/L to 52 µg/L in Osakis Lake, 12 µg/L to 51 µg/L in Faille Lake and 21 µg/L to 43 µg/L in Smith Lake (Figures 2.8 - 2.10 of the final TMDL document). Secchi disk depth transparencies generally followed the same trends as TP and chl-a (Figures 2.11 - 2.13 in the final TMDL document). The NCHF ecoregion water quality standards (WQS) for deep lakes are 40 µg/L for total phosphorus, 14 µg/L for chl-a, and not less than 1.4 m for SD depth. The NCHF ecoregion WQS for shallow lakes are 60 µg/L for total phosphorus, 20 µg/L for chl-a, and not less than 1.0 m for SD depth.

While TP is an essential nutrient for aquatic life, elevated phosphorus levels can lead to nuisance algal blooms that negatively impact aquatic life and recreation (swimming, boating, fishing, etc.). Algal decomposition depletes oxygen levels which stresses benthic macroinvertebrates and fish. Excess algae can shade the water column which limits the distribution of aquatic vegetation. Aquatic vegetation stabilizes bottom sediments, and also is an important habitat for macroinvertebrates and fish. Furthermore, depletion of oxygen can cause phosphorus release from bottom sediments (i.e. internal loading).

**Priority Ranking:**
The Osakis Lake, Faille Lake and Smith Lake 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 and 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 Osakis Lake watershed are popular locations for aquatic recreation. Water quality degradation has led to efforts to improve the overall water quality within the Osakis Lake, Faille Lake and Smith Lake watersheds, and to the development of TMDLs for these water bodies.

**Pollutant of Concern:**
The pollutant of concern is phosphorus.

**Source Identification (point and nonpoint sources):**
***Point Source Identification:*** The potential point sources to the Osakis Lake watershed are:

*National Pollutant Discharge Elimination Systems (NPDES) permitted facilities:* NPDES permitted facilities may contribute phosphorus loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge treated wastewater according to their NPDES permit.

***Revision (December 2023)***: The revised Faille Lake TP TMDL includes a wasteload allocation assigned to the City of Osakis Wastewater Treatment Facility (NPDES SDS Permit Number MN0020028) (Table 5 of this Decision Document).

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*Municipal Separate Storm Sewer System (MS4) communities:* There are no MS4 communities within the Osakis Lake watershed.

*Stormwater from construction and industrial sites:* Phosphorus input via stormwater from construction and industrial sites may contribute phosphorus loading to the Osakis Lake watershed. The Osakis Lake, Faille Lake and Smith Lake TMDLs assume that there will be phosphorus inputs from construction activities and therefore a portion of the wasteload allocation (WLA) was assigned to construction stormwater. Additionally, the Osakis Lake, Faille Lake and Smith Lake TMDLs assume that there will be phosphorus inputs from industrial activities and a portion of the WLA was also assigned to industrial stormwater. Construction and industrial sites may contribute phosphorus via sediment runoff during stormwater events.

*Concentrated Animal Feedlot Operations (CAFOs):* There are three (3) identified animal feedlot operations within the Osakis Lake watershed. There are two turkey feedlots located in the Osakis Lake direct subwatershed and one turkey feedlot in the Smith Lake direct subwatershed. All three facilities operate under the same feedlot permit number (MNG440229). By rule, CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota Rule 7020.2003). Manure from these lots is spread on nearby fields and can be a source of phosphorus found in nonpoint derived watershed runoff. However, runoff from manure spread onto fields in accordance with federal and state requirements is unregulated, and included in the watershed runoff portion of the load allocation (LA).

***Nonpoint Source Identification:*** The potential nonpoint sources to the Osakis Lake watershed are:

*Internal loading:* The release of phosphorus from lake sediments, the release of phosphorus 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 Osakis Lake, Faille Lake and Smith Lake. 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.

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

*Agricultural sources (pasture and open lands):* Phosphorus 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, corn/soybeans and alfalfa/wheat/rye. Stormwater runoff may contribute nutrients to surface waters from livestock manure, fertilizers, vegetation and erodible soils.

*Livestock sources(animal feeding operations):* Animal feeding operations (AFOs), which fall beneath the animal threshold limits required for an NPDES permit, may nevertheless transport phosphorus to surface waters during storm events (via stormwater runoff). AFOs may transport phosphorus laden materials from feeding, holding and manure storage areas to surface waters.

*Urban/residential sources:* Nutrients may be added via runoff from homes near Osakis Lake, Faille Lake and Smith Lake. Runoff from residential properties can include phosphorus derived from fertilizers, leaf and grass litter, pet wastes, and other sources of anthropogenic derived nutrients.

*Inadequate Subsurface Sewage Treatment Systems (SSTS):* Phosphorus may be added to the surface waters in the Osakis Lake watershed from failing septic systems. Age, construction and use of SSTS can vary throughout a watershed and influence the nutrient contribution from these systems. It is likely that those systems sited closer to the lake shore are more likely to contribute nutrients than those systems sited further away from the lake. Failing SSTS can discharge nutrients directly into surface waters by straight pipe connections (considered point sources) or by effluents leaching into groundwater or ponding at the surface where they can be washed into surface waters via stormwater runoff.

*Wetland Sources:* Phosphorus may be added to surface waters by stormwater flows through wetland areas in the Osakis Lake watershed. Storm events may mobilize phosphorus through the transport of suspended solids and other organic debris.

*Shoreline Erosion:* Phosphorus may be added to Osakis Lake, Faille Lake and Smith Lake by erosional processes impacting lake shoreline areas. Phosphorus may be attached to eroded shoreline materials and may be mobilized through the transport of sediment and suspended solids.

*Forest Sources:* Phosphorus may be added to surface waters via runoff from forested areas within the watershed. Runoff from forested areas may include debris from decomposing vegetation and organic soil particles.

*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:**
Significant development is not expected in the Osakis Lake watershed. The land use within the watershed is primarily agricultural and according to MPCA is expected to remain as agricultural for the foreseeable future. The WLA and load allocations for the Osakis Lake, Faille Lake and Smith Lake 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 Osakis Lake, Faille Lake and Smith Lake 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:**

Minnesota Rule Chapter 7050 designates uses for waters of the state. Osakis Lake, Faille Lake and Smith Lake are designated as Class 2B water for aquatic recreation use (boating, swimming, fishing etc.). The Class 2 aquatic recreation 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:* Numeric criteria for total phosphorus, chl-a, and SD depth are set forth in Minnesota Rules 7050.0222. These three parameters are the eutrophication standards that must be achieved to attain aquatic recreation designated use. The numeric eutrophication standards that are applicable to Osakis Lake and Smith Lake are those set forth for Class 2B deep lakes in the NCHF ecoregion (Table 3 of this Decision Document). Faille Lake is a designated Class 2B shallow lake in the NCHF ecoregion (Table 3 of this Decision Document).

In developing the lake nutrient standards for Minnesota lakes, MPCA evaluated data from a large cross-section of lakes within each of the State's ecoregions. Clear relationships were established between the causal factor, TP, and the response variables, chl-a and SD depth. Regression relationships were established between the causal factor TP and the response variables chl-a and SD depth in Osakis Lake, Faille Lake and Smith Lake (Figures 4.1 - 4.6 in the final TMDL document). Based on these relationships, TP loadings designed to meet the TP WQS of 40 µg/L for Osakis Lake and Smith Lake and a TP WQS of 60 µg/L for Faille Lake, were estimated to also result in attainment of chl-a and SD depth standards.

**Table 3: Minnesota Eutrophication Standards for Deep and Shallow lakes within the North Central Hardwood Forest (NCHF) ecoregion**

| Parameter | NCHF Eutrophication Standard (deep lakes) [1] | NCHF Eutrophication Standard (shallow lakes) [2] |
|---|---|---|
| | *(Osakis Lake & Smith Lake)* | *(Faille Lake)* |
| 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] Deep lakes are defined as enclosed basins with a maximum depth greater than 15-feet

[2] 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)

*Target:* MPCA selected a target of 40 µg/L of TP to develop the TMDLs for Osakis Lake and Smith Lake and a target of 60 µg/L to develop the TMDL for Faille Lake.

MPCA selected total phosphorus as the appropriate parameter to address eutrophication problems at Osakis Lake, Faille Lake and Smith Lake because of the interrelationships between TP and chl-a, as well as 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.

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:**

The approach utilized by MPCA to calculate the loading capacity for the Osakis Lake, Faille Lake and Smith Lake TMDLs is described in Section 3.0 of the final TMDL document. MPCA first determined appropriate phosphorus budgets for each source contributor and then utilized the BATHTUB model to examine how different lake response variables (chl-a and SD depth) respond to changes in nutrient loads. A unit-area load (UAL) and runoff coefficient approach were used by MPCA to develop watershed runoff and phosphorus loading totals to Osakis Lake, Faille Lake and Smith Lake. The overall Osakis watershed was subdivided into Hydrologic Response Units (HRUs), which were assigned unique values based on land cover, soil, and slope characteristics of each HRU. HRUs were treated as independent units in order for MPCA to accurately calculate runoff and total phosphorus loading within the Osakis watershed.

Watershed runoff and phosphorus loads to Osakis and Faille Lake were calculated using the runoff coefficient model (Table 3.1 of the final TMDL document) and TP monitoring data. The UAL phosphorus model was utilized to estimate watershed phosphorus loads to Smith Lake because MPCA did not have stream TP monitoring data available for the Smith Lake subwatershed. Runoff and phosphorus loads were calculated for each year modeled in BATHTUB (Table 3.2 of the final TMDL document). Upstream lake outflow volumes were calculated based on TP monitoring data (Table 3.3 of the final TMDL document).

MPCA calculated atmospheric load for each of the lakes by multiplying the lake area (acres) by the atmospheric deposition rate (pounds/acre-year). Atmospheric inputs of phosphorus from wet and dry deposition were estimated using rates from a MPCA report *Detailed Assessment of Phosphorus Sources to Minnesota Watersheds*[1] and are based on annual precipitation. The values used for dry conditions

[1] Barr Engineering. 2004. Detailed Assessment of Phosphorus Sources to Minnesota Watersheds. Prepared for the Minnesota Pollution Control Agency, St. Paul, MN.

(less than 25-inches of precipitation), average, and wet conditions (more than 38-inches of precipitation) are 24.9 kg/km$^2$-year (0.22 pounds/acre-year) for dry conditions, 26.8 kg/km$^2$-year (0.24 pounds/acre-year) for average conditions, and 29.0 kg/km$^2$-year (0.26 pounds/acre-year) for wet conditions.

Internal load estimates were calculated by MPCA utilizing anoxia and sediment phosphorus release rate data in order to determine the mass of phosphorus released during the summer growing season. MPCA examined dissolved oxygen data for each of the lakes and used this water quality data to help estimate internal load values. Based on water quality information, MPCA determined that Smith Lake demonstrated minimal anoxic conditions and therefore did not assign any of the load allocation to internal load for the Smith Lake TMDL (Internal Load as LA = 0 lbs/year). Faille Lake (32 lbs/year) and Osakis Lake (365 lbs/year) both were assigned a portion of the load allocation to internal load. Internal load calculations were calculated outside of BATHTUB and incorporated into BATHTUB as individual loads.

MPCA identified manure as a primary contributor of dissolved phosphorus to the Osakis watershed. Manure produced by the animals in the watershed is applied to fields and pastures for fertilizer. Manure applied beyond the nutrient uptake ability of the fields may be transported to surface waters during storm events. There are approximately 129 animal feedlot operations with roughly 13,000 animal units in the Osakis Lake watershed. The UAL model did not explicitly model phosphorus contributions from manure spreading, instead the UAL model implicitly accounted for animal contributions by calibrating to animal unit characteristics of Judicial Ditch #2 subwatershed which was deemed representative of the surrounding subwatersheds. The Judicial Ditch #2 subwatershed contains 44 feedlot operations (with 4,827 animal units) and a wide range of agricultural animal types. MPCA assumed that the manure management practices within this subwatershed were representative of other subwatersheds within the Osakis watershed.

Failing or nonconforming subsurface sewage treatment systems (SSTS) were recognized by MPCA as a nonpoint source of phosphorus to surface waters in the Osakis watershed. Todd County inspectors determined that approximately 33% of SSTS surveyed in 2011 were out of compliance and potential sources of nutrients to surface waters. Phosphorus loading from SSTS were estimated assuming an average phosphorus production rate of 2.7 grams/person/day.[2] Phosphorus estimates attributed to SSTS were calculated outside of BATHTUB and incorporated into BATHTUB as individual loads.

The BATHTUB model was utilized to link phosphorus loads with in-lake water quality and to calculate a loading capacity value for Osakis Lake, Faille Lake and Smith Lake. BATHTUB has previously been used 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 – September 30) average surface water quality. BATHTUB utilizes annual or seasonal timescales which are appropriate because watershed TP loads are normally impacted by seasonal conditions.

BATHTUB has built-in statistical calculations which account for data variability and provide a means for estimating confidence in model predictions. BATHTUB employs a mass-balance TP model that accounts for water and TP inputs from tributaries, direct watershed runoff, the atmosphere, and sources

[2] U.S. Environmental Protection Agency (USEPA). 2002. Onsite Wastewater Treatment Systems Manual. http://www.epa.gov/nrmrl/pubs/625r00008.html

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. For deep lakes in Minnesota, the Canfield-Bachmann lake formulation has proven to be appropriate in most cases. The Canfield-Bachmann lake formulation subroutine was utilized in the Osakis Lake, Faille Lake and Smith Lake TMDLs.

The pollutant sources were identified and estimated based on water quality monitoring data, flow data and modeling efforts (UAL). 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 Margin of Safety (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 of Osakis Lake, Faille Lake and Smith Lake (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 chl-a and SD depth were predicted external from the BATHTUB model simulations using regression equations established by MPCA (Figures 4.3 - 4.6 of the final TMDL document). These regression equations were originally developed to determine relationships between TP, chl-a and SD depth in Minnesota lakes as part of the State's development of ecoregion eutrophication WQS.

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

MPCA estimated the current phosphorus load to Osakis Lake to be 17,327 lbs TP/year (47.47 lbs TP/day). The loading capacity was calculated to be 10,704 lbs TP/year (29.33 lbs TP/day). The loading capacity was determined based on the BATHTUB modeling efforts, while the chl-a and SD depth were predicted using regression equations established by MPCA. These regression equations demonstrated that the summer growing season mean chl-a WQS of 14 µg/L would be met at the designated loading capacity of 10,704 lbs TP/year (Figure 4.4 of the final TMDL document). Also, the regression equation (Figure 4.6 of the final TMDL document) for SD depth showed that the summer growing season mean SD depth WQS of greater than 1.4 meters of visibility would be achieved with an annual TP load of 10,704 lbs/year.

MPCA estimated the current phosphorus load to Faille Lake to be 3,060 lbs TP/year (8.38 lbs TP/day). The loading capacity was calculated to be 913lbs TP/year (2.50 lbs TP/day). The loading capacity was determined based on the BATHTUB modeling efforts, while the chl-a and SD depth were predicted

using regression equations established by MPCA. These regression equations demonstrated that the summer growing season mean chl-a WQS of 20 µg/L would be met at the designated loading capacity of 913 lbs TP/year (Figure 4.3 of the final TMDL document). Also, the regression equation (Figure 4.5 of the final TMDL document) for SD depth showed that the summer growing season mean SD depth WQS of greater than 1.0 meters of visibility would be achieved with an annual TP load of 913lbs/year.

MPCA estimated the current phosphorus load to Smith Lake to be 2,414 lbs TP/year (7.19 lbs TP/day). The loading capacity was calculated to be 1,901 lbs TP/year (5.21 lbs TP/day). The loading capacity was determined based on the BATHTUB modeling efforts, while the chl-a and SD depth were predicted using regression equations established by MPCA. These regression equations demonstrated that the summer growing season mean chl-a WQS of 14 µg/L would be met at the designated loading capacity of 1,901 lbs TP/year (Figure 4.3 of the final TMDL document). Also, the regression equation (Figure 4.5 of the final TMDL document) for SD depth showed that the summer growing season mean SD depth WQS of greater than 1.4 meters of visibility would be achieved with an annual TP load of 1,901 lbs/year.

MPCA subdivided the loading capacity among the WLA, LA and MOS components of the TMDL (Tables 4-6 of this Decision Document). The LA accounted for a majority of the loading capacity. These calculations were based on the critical condition, the summer growing season, which is typically when the water quality in the lake is degraded and phosphorus loading inputs are the greatest. TMDL allocations assigned during the summer growing season will protect Osakis Lake, Faille Lake and Smith Lake during the worst water quality conditions of the year. MPCA assumed that the loading capacities established by the TMDL will be protective of water quality during the remainder of the calendar year (October through May).

**Table 4: Total Phosphorus TMDL for Osakis Lake (77-0215-00)**

| Allocation | Source | Existing TP Load[1] | | TMDL | | Load Reduction | |
|---|---|---|---|---|---|---|---|
| | | *(lbs/yr)* | *(lbs/day)[2]* | *(lbs/yr)* | *(lbs/day)[2]* | *(lbs/yr)* | *(%)* |
| *Wasteload Allocation* | NPDES facilities (ex. WWTPs) | -- | -- | 0 | 0.00 | -- | -- |
| | MS4s within the watershed | -- | -- | 0 | 0.00 | -- | -- |
| | Construction & Industrial Stormwater (1.5 % of Loading Capacity) | 107 | 0.3 | 107 | 0.3 | 0.00 | 0% |
| | CAFOs | -- | -- | 0 | 0.00 | -- | -- |
| | ***WLA Totals*** | ***107*** | ***0.3*** | ***107*** | ***0.3*** | **--** | **--** |
| *Load Allocation* | Watershed contributions | 9,893 | 27.1 | 6,520 | 17.8 | 3,373 | 34% |
| | SSTS | 2,080 | 5.7 | 0 | 0.00 | 2,080 | 100% |
| | Atmospheric Deposition | 1,499 | 4.1 | 1,499 | 4.1 | 0 | 0% |
| | Upstream Lakes (Faille, Smith, Little Osakis, Maple etc.) | 3,383 | 9.3 | 1,678 | 4.6 | 1,705 | 50% |
| | Internal Load | 365 | 1.0 | 365 | 1.0 | 0 | 0% |
| | ***LA Totals*** | ***17,220*** | ***47.5*** | ***10,062*** | ***27.5*** | **--** | **--** |
| ***Margin Of Safety (5 %)*** | | -- | -- | 535 | 1.5 | -- | -- |
| **Total** | | **17,327** | **47.5** | **10,704** | **29.3** | **7,158** | **41%** |

1 = Existing load was calculated from average loading values for 2004 - 2007 & 2009

2 = Daily load is calculated by dividing the annual load by 365.25.

**Table 5: REVISED (December 2023) Total Phosphorus TMDL for Faille Lake (77-0195-00)**

| Load Category | Load Component | Existing Load | TMDL[4] | | Load Reduction[1] | |
|---|---|---|---|---|---|---|
| | | (lb/yr) | (lb/yr) | (lb/day) | (lb/yr) | (%) |
| Wasteload Allocation | WLA: Osakis WWTF (MN0020028) - net load[2] | 176 | 150.3[2] (121 kg/yr) | 0.41 | 25.7 | 15% |
| | WLA: Construction/Industrial stormwater | 0.4 | 0.4 | 0.00 | 0 | 0% |
| **WLA Total** | | **176.4** | **150.7** | **0.41** | **25.7** | **15%** |
| Load Allocation | Direct runoff | 58.5 | 21.8 | 0.06 | 36.7 | 63% |
| | Upstream waterbodies[3] | 2813.2 | 691.2 | 1.89 | 2122 | 75% |
| | SSTS | 45 | 0.0 | 0.00 | 45 | 100% |
| | Atmospheric Deposition | 18.8 | 18.8 | 0.05 | 0 | 0% |
| | Internal Load | 31.5 | 31.5 | 0.09 | 0 | 0% |
| **LA Total** | | **2967.00** | **763.30** | **2.09** | **2203.70** | **74%** |
| Margin of Safety (5 %) | | -- | 48.1 | 0.13 | -- | -- |
| **Loading Capacity** | | **3143** | **962** | **2.63** | **2229** | **71%** |

1 = The TOTAL estimated load reduction equals the (Existing - Allowable) load difference, plus the Margin of Safety.
2 = The Osakis WWTF (NPDES/SDS Permit No. MN0020028) net load WLA reflects P retention in waterbodies upstream of Faille Lake. 176 lb/yr represent the average (2003, 2004, and 2008) current load from the WWTF, taking into account retention in the water bodies upstream of Faille Lake (see Figure 9.1 of the revised TMDL document ). 150.3 lb/year represent the P loading expected to be delivered to Faille Lake if the facility were to discharge its entire 121 kg/yr (266.8 lb/yr) permitted load. The annual and daily WLAs are derived from and consistent with the permit's effluent limit.
3 = Not including Osakis WWTF net load.
4 = Daily load is calculated by dividing the annual load by 365.25.

***Revision (December 2023):*** MPCA's efforts to determine the contribution from the Osakis WWTF to Faille Lake required it to reconsider watershed inputs (e.g., watershed contributions from areas immediately draining to Faille Lake) to reexamine the overall water balance to the lake. MPCA estimated that the flow contribution from the Osakis WWTF increased the total flow by approximately 7.5% through the downstream wetland system (i.e., Clifford Wetland and wetland complex adjacent to the stream which connects Clifford Wetland to Faille Lake). This increase in total flow resulted in an increase to Faille Lake's overall loading capacity and helps explain the difference in loading capacity from the original Faille Lake TP TMDL and the revised Faille Lake TP TMDL.

Consistent with the original Faille Lake TP TMDL, MPCA employed the BATHTUB lake model with the Canfield-Bachmann subroutine to recalculate the loading capacity for the revised Faille Lake TP TMDL and the other contributing sources to Faille Lake (e.g., atmospheric deposition, internal load). MPCA's revised modeling efforts adjusted the upstream contributions from Clifford Wetland and the wetland areas adjacent to the stream which connects Clifford Wetland to Faille Lake. Additionally, internal loading and phosphorus retention capabilities from the upstream wetland areas were considered and adjusted in the model. MPCA determined that upstream wetlands retained a percentage of the phosphorus contributions from the City of Osakis WWTF and reflected that retention by adjusting the effective contribution from the WWTF from 121.2 kg/yr to 68.2 kg/yr (approx. 150.3 lbs/yr) (see Tables 9.3 and 9.4 of Section 9 of the revised TMDL document). For the purposes of the TMDL equation, the portion of WLA contribution from the Osakis WWTF (121.2 kg/yr) which actually reaches Faille Lake was determined to be 68.2 kg/yr. MPCA explained that the actual WLA for the City of Osakis WWTF is

121.2 kg/yr, which also is the permit limit for the City of Osakis WWTF. Therefore, EPA is approving a WLA for the Osakis WWTF of 121.2 kg/yr (267.2 lbs/yr).

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**Table 6: Total Phosphorus TMDL for Smith Lake (21-0016-00)**

| Allocation | Source | Existing TP Load[1] | | TMDL | | Load Reduction | |
|---|---|---|---|---|---|---|---|
| | | *(lbs/yr)* | *(lbs/day)[2]* | *(lbs/yr)* | *(lbs/day)[2]* | *(lbs/yr)* | *(%)* |
| *Wasteload Allocation* | NPDES facilities (ex. WWTPs) | -- | -- | 0 | 0.00 | -- | -- |
| | MS4s within the watershed | -- | -- | 0 | 0.00 | -- | -- |
| | Construction & Industrial Stormwater (1.5 % of Loading Capacity) | 27 | 0.1 | 27 | 0.1 | 0.00 | 0% |
| | CAFOs | -- | -- | 0 | 0.00 | -- | -- |
| | ***WLA Totals*** | ***27*** | ***0.1*** | ***27*** | ***0.1*** | **--** | **--** |
| *Load Allocation* | Watershed contributions | 2,255 | 6.2 | 1,647 | 4.5 | 608 | 27% |
| | SSTS | 211 | 0.6 | 0 | 0.0 | 211 | 100% |
| | Atmospheric Deposition | 132 | 0.4 | 132 | 0.4 | 0 | 0% |
| | Internal Load | 0.0 | 0.0 | 0 | 0.0 | 0 | 0% |
| | ***LA Totals*** | ***2,598*** | ***7.2*** | ***1,779*** | ***4.9*** | **--** | **--** |
| ***Margin Of Safety (5 %)*** | | -- | -- | 95 | 0.3 | -- | -- |
| **Total** | | **2,625** | **7.3** | **1,901** | **5.3** | **819** | **31%** |

1 = Existing load was calculated from average loading values for 2004, 2005, 2008 & 2010

2 = Daily load is calculated by dividing the annual load by 365.25.

EPA supports the data analysis and modeling approach utilized by MPCA in its calculation of wasteload allocations, load allocations and the margin of safety for the Osakis Lake, Faille Lake and Smith Lake TMDLs. Additionally, EPA concurs with the loading capacities calculated by MPCA in the Osakis Lake, Faille Lake and Smith Lake TMDLs.

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:**

Load allocations are addressed in Section 4.1.2 of the final TMDL document. MPCA recognized the LA for the Osakis Lake TMDL as originating from a variety of nonpoint sources including; nonpoint source inputs from the Osakis Lake direct watershed, SSTS, atmospheric deposition, nonpoint source inputs from lakes upstream of Osakis Lake (Faille, Smith, Little Osakis, Maple), and internal loading sources

(ex. lake sediments, curly-leaf pondweed). LA for Faille Lake were attributed to the following nonpoint sources; nonpoint source inputs from the Faille Lake direct watershed, SSTS, atmospheric deposition, nonpoint source inputs from lakes upstream of Faille Lake (Clifford), and internal loading sources. LA for Smith Lake were assigned to nonpoint source inputs from the Smith Lake direct watershed, SSTS, and atmospheric deposition.

The direct watershed nonpoint sources for all three water bodies include TP inputs from; agricultural nonpoint source runoff, urban nonpoint source runoff, septic inputs and wetland nonpoint source contributions. The LA assigned to the three lakes within Osakis Lake watershed also includes phosphorus inputs from shoreline erosional processes. MPCA calculated estimated percent reductions for different LA sources. These reductions represent the estimated decreases necessary to meet the NCHF WQS (Tables 4-6 of this Decision Document). The reductions necessary from nonpoint sources ranged from 27% to 100%. 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:**
***Revision (December 2023):*** MPCA explained that the City of Osakis WWTF (MN0020028) discharges into Clifford Wetland. Surface waters from Clifford Wetland then flow through a stream corridor with streamside wetland complexes at certain locations within that corridor before emptying into Faille Lake. The Osakis WWTF's WLA is 121.2 kg/yr (267.2 lbs/yr) or 0.33 kg/day (0.73 kg/day), as explained in the revised Section 3 of this Decision Document and in Section 9 of the revised TMDL).

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WLAs for Osakis Lake, Faille Lake and Smith Lake TMDLs were assigned to construction stormwater sources and industrial stormwater sources. The component of the WLA apportioned to potential construction activities was calculated based on the percentage of land under construction within the Osakis Lake watershed. MPCA reviewed active construction stormwater permits within the Osakis Lake watershed and determined that less than 1% of the watershed area was land which was covered under a construction stormwater permit. To generate the WLA assigned to construction stormwater, MPCA rounded the construction stormwater estimate up to 1% of the land area and applied this 1% estimate to the loading capacity for the Osakis, Faille and Smith TMDLs. The rounding up to 1% also provided a small amount of reserve capacity for potential additional future development activities within the Osakis Lake watershed.

Each TMDL assigned a portion of the wasteload allocation to construction and industrial stormwater. To generate the WLA assigned to industrial stormwater, MPCA set the industrial stormwater estimate at 0.5% of the loading capacity for the Osakis, Faille and Smith TMDLs. For the Faille Lake and Smith Lake TMDLs, the industrial stormwater component of the WLA is covered by a general industrial stormwater permit (*General Permit for Construction Sand and Gravel (MNG49000)*). This permit is issued by MPCA. For the Osakis Lake TMDL, MPCA found an individual industrial stormwater permit within the Osakis Lake watershed (MNRNE378Z).

Under MPCA's Stormwater General Permit, managers of sites under construction or industrial stormwater permits must review the adequacy of local Stormwater Pollution Prevention Plans (SWPPPs) to ensure that each plan meets WLA set by EPA approved TMDLs. If 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.

There are no MS4 communities, Combined Sewer Overflows, or Sanitary Sewer Overflows within the Osakis Lake watershed. These potential point sources did not receive an apportionment of the WLA (WLA = 0). MPCA identified one hundred twenty nine (129) animal feedlot operations within the Osakis Lake watershed. Three of the 129 were classified as CAFOs. 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).

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

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:**
Section 4.1.4 of the final TMDL submittal outlines the Margin of Safety used in the Osakis Lake, Faille Lake and Smith Lake TMDLs. The MOS accounts for the inability of MPCA to precisely describe the water quality conditions in Osakis Lake, Faille Lake and Smith Lake. An explicit MOS of 5.0% of the loading capacity was utilized in each of the three TMDLs to account for annual variability and uncertainty in the model outputs (Tables 4-6 of this Decision Document). MPCA believes that using a MOS of 5.0% of the loading capacity will aid to offset the environmental variability in phosphorus loading to Osakis Lake, Faille Lake and Smith Lake, and will allow all three water bodies to meet the NCHF eutrophication WQS.

These TMDLs also utilize an implicit MOS based on a series of conservative assumptions made during the lake response modeling. MPCA incorporated the following conservative assumptions into the BATHTUB modeling and analysis:

- MPCA explained that achieving TP load reductions via implementation activities targeting stormwater runoff from the direct watershed tributaries will reduce soluble phosphorus from animal fertilizer, septic discharge and wetland sources. These expected load reductions will lower the input of soluble phosphorus to Osakis Lake, Faille Lake and Smith Lake. Decreasing soluble phosphorus will aid in eliminating algal productivity in these three lakes, especially as compared with other forms of phosphorus that are less biologically available.[3]
- Phosphorus inputs to each lake were calculated as annual loads. The BATHTUB modeled scenarios were calibrated to the observed annual growing season (June through September) lake water quality conditions. The June through September period is typically when in-lake TP concentrations and chl-a are typically highest and SD depth measurements typically lowest. Calibrating the BATHTUB model to growing season TP empirical data provides additional MOS safety and ensures that each lake should meet state water quality standards during the remainder of the calendar year (October to May).
- The calibration and validation processes of the BATHTUB model also functioned to reduce error from assumptions made in the modeling process.

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)).

[3] Walker, W.W., 1985. *Empirical Methods for Predicting Eutrophication in Impoundments, Report 3*. Prepared for U.S. Army Corps of Engineers, Waterways Experiment Station. http://www.wwwalker.net/BATHTUB.

**Comment:**
Seasonal variation was considered in this TMDL as described in Section 4.3 of the final TMDL document. The nutrient targets employed in the Osakis Lake, Faille Lake and Smith Lake 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 Osakis Lake, Faille Lake and Smith Lake phosphorus TMDL efforts, the LA and WLA estimates were calculated from modeling efforts which incorporated mean growing season total phosphorus values. Nutrient loading capacities were set in the TMDL development process to meet the WQS during the most critical period. The mid-late summer time period is typically when eutrophication standards are exceeded and water quality within the Osakis Lake watershed is deficient. By calibrating the modeling efforts to protect these water bodies during the worst water quality conditions of the year, it is assumed that the loading capacities established by the TMDLs will be protective of water quality during the remainder of the calendar year (October through May).

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

## 8. Reasonable Assurance

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

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

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

**Comment:**
***Revision (December 2023):*** Section 6.3.2 of the revised TMDL document describes MPCA and City of Osakis' compliance agreement regarding the City of Osakis' efforts to develop an inflow and infiltration

reduction plan and additional efforts to reduce inflow and infiltration to the City of Osakis' sewer system from private lateral sewer lines. The City of Osakis also agreed to submit a Wastewater Facility Optimization Plan and Phosphorus Management Plan (i.e., a Facility Management Plan). As part of the compliance agreement the City of Osakis will provide annual updates on the inflow and infiltration reduction efforts, the optimization plan and on trading options being pursued by the City of Osakis to comply with the TP permit limit. MPCA explained that the compliance agreement between MPCA and the City of Osakis will allow for the continued operation of the city's stabilization pond facility and for long term compliance with the City of Osakis WWTF phosphorus effluent limit and TMDL WLA.

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The Osakis Lake, Faille Lake and Smith Lake phosphorus TMDLs outline reasonable assurance activities in Section 7.0 of the final TMDL document. There are several groups which will have a role in ensuring that phosphorus reductions within the Osakis Lake watershed move forward in the coming years. The following groups are expected to work closely with one another to ensure that TP reduction efforts are being implemented within the Osakis Lake watershed: the Sauk River Watershed District, the Todd County Soil and Water Conservation District (SWCD), and the Douglas County SWCD.

The implementation strategies and nutrient reduction goals discussed in the Osakis Lake, Faille Lake and Smith Lake TMDLs are consistent with the objectives outlined in the Sauk River Watershed District's *Watershed Management Plan* and the Todd and Douglas counties' *Comprehensive Local Water Management Plan*. The watershed areas covered by these TMDLs overlap with the geographic areas covered by the SRWD and county management plans. The reasonable assurance practices discussed in the final TMDL document will be implemented over the next several years. Best Management Practices (BMPs) will be employed within the Osakis Lake watershed to target nutrient reductions efforts.

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

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

achieving the actions. MPCA has developed guidance on what is required in the WRAPS (*Watershed Restoration and Protection Strategy Report Template*, MPCA).

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

Reasonable assurance that the WLA set forth will be implemented is provided by regulatory actions. According to 40 CFR 122.44(d)(1)(vii)(B), NPDES permit effluent limits must be consistent with assumptions and requirements of all WLAs in an approved TMDL. MPCA's stormwater program and the NPDES permit program are some of the implementing programs for ensuring effluent limits are consistent with the TMDL. The NPDES program requires construction and industrial sites to create a SWPPP that summarizes how stormwater will be minimized from the site.

Under MPCA's Stormwater General Permit, managers of sites under construction or industrial stormwater permits, must review the adequacy of local SWPPPs to ensure that each plan meets WLA set in the Osakis Lake, Faille Lake and Smith Lake 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 MPCA's general industrial stormwater permit (*General Permit for Construction Sand and Gravel (MNG49000)*). Additionally, the SRWD, under Minnesota Statue 103D, maintains a set of rules meant to govern land development and redevelopment for urban use. These rules require developers and municipalities to provide water quality treatment for any new impervious surfaces, and in some cases, for alterations to existing impervious surfaces.

Tables 4-6 of this Decision Document shows the current estimated TP load allocated to nonpoint sources, the TMDL allocated load (due to inputs from nonpoint sources) and the reduction required to meet WQS.

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 Osakis Lake watershed. Annual water quality monitoring is expected to continue on Osakis Lake, Faille Lake and Smith Lake. The SRWD, Todd County SWCD and Douglas County SWCD are expected to continue to measure and document water quality within the Osakis Lake watershed. Data from these water quality monitoring

efforts will inform local watershed managers on the success of nutrient reduction efforts within the Osakis Lake watershed.

Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation efforts utilized in Osakis Lake, Faille Lake and Smith Lake. Water quality information will aid watershed managers in understanding how BMP phosphorus removal efforts are impacting water quality within the Osakis Lake watershed. 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 nutrient loading into Osakis Lake, Faille Lake and Smith Lake. 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 SRWD and county partners.

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:**
Implementation strategies are outlined in Section 6.0 of the final TMDL document. MPCA presented a variety of possible implementation activities which could be undertaken within the Osakis Lake watershed. The Osakis Lake (31% reduction), Faille Lake (54% reduction) and Smith Lake (34% reduction) TMDLs estimated that nonpoint source inputs from watershed sources necessitated reductions in phosphorus inputs, in order for each of the water bodies to individually attain the NCHF WQS for deep lakes (Osakis and Smith) and shallow lakes (Faille). These reduction goals will be met via components of the following strategies:

*Septic Field Maintenance:* Septic systems are believed to be a source of nutrients to Osakis Lake, Faille Lake and Smith Lake. Failing systems in Todd and Douglass Counties are expected to be identified and addressed via upgrades to 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 Osakis Lake watershed.

*Manure management (feedlot and manure stockpile runoff controls):* Manure has been identified as a potential source of nutrients. 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 Osakis Lake watershed. 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.

*Protection and restoration of high-value wetlands:* The Osakis Lake watershed contains numerous high-value wetlands. MPCA recommends protecting these high-value wetlands from unnecessary stormwater introductions, which could potentially turn wetland areas from nutrient sinks to nutrient sources. Additionally, addressing those wetlands which are discharging phosphorus into Osakis Lake, Faille Lake or Smith Lake will aid in the reduction of nonpoint source loads.

*Shoreline restoration activities:* Property owners with yards extending to the shoreline should be encouraged to restore the immediate shoreline with native plants and create buffer areas to capture runoff and prevent erosion. The SRWD is expected to work with landowners to naturalize shoreline through its Water Quality Cost-Share program.

*Increased infiltration and filtration within the direct watersheds:* Reducing nutrient loading to Osakis Lake, Faille Lake and Smith Lake can involve increasing infiltration and filtration of precipitation and precipitation derived stormwater. This can be accomplished through creating infiltration areas (rain gardens, bioretention swales, etc.), removing tile lines from agricultural fields, and incorporating lake shore buffer areas and vegetated swales.

*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 Osakis Lake, Faille Lake and Smith Lakes. The SRWD could mail annual newsletters to local property owners encouraging them to visit the SRWD website or to consult information within the newsletter which would outline nutrient reduction strategies.

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:**

***Revision (December 2023):*** MPCA conducted a public comment period for the revisions to the Faille Lake TMDL of the original Osakis Area Lake Excess Nutrient TMDL from December 5, 2016 to January 4, 2017. MPCA received a comment from the City of Osakis and a contested case hearing request on February 3, 2017. MPCA resolved the contested case hearing on August 7, 2023 and responded to the February 3, 2017 comment letter via a response of December 11, 2023.

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The public participation section of the TMDL submittal is found in Section 5.0 of the final TMDL document. Through the development of the Osakis Lake, Faille Lake and Smith Lake TMDLs the public was given various opportunities to participate in the TMDL process. MPCA encouraged public participation through public meetings and small group discussions. MPCA worked with members of the Technical Advisory Committee, which is composed of local stakeholders, technical staff, city officials, NPDES permitted parties and members of the SRWD and the Todd and Douglas SWCDs, to solicit their input for potential implementation strategies. Members of the Technical Advisory Committee are the main groups which will ultimately be responsible for the implementation efforts within the Osakis Lake watershed. The meetings between MPCA and the Technical Advisory Committee were held in 2011 and 2012. These discussions allowed MPCA to share information about the TMDL development efforts, monitoring data, and to present the public notice draft of the Osakis Lake, Faille Lake and Smith Lake TMDLs.

The draft TMDL was posted online by MPCA at (http://www.pca.state.mn.us/water/tmdl). The 30-day public comment period was started on November 5, 2012 and ended on December 5, 2012. MPCA received a public comment from Minnesota Center for Environmental Advocacy (MCEA) which requested clarification on the point source discussion and the margin of safety. MPCA provided additional clarification to MCEA in its response to MCEA's comments. The Minnesota Agricultural and Water Resource Center (MAWRC) submitted a public comment requesting additional information on language within the TMDL discussing manure application and management. MPCA adequately addressed this comment and provided additional discussion within its response to MAWRC's comment.

MPCA submitted all of the public comments and responses in the final TMDL submittal packet received by the EPA on May 10, 2013.

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 Osakis Lake, Faille Lake and Smith Lake phosphorus TMDL document, submittal letter and accompanying documentation from MPCA on May 10, 2013. The transmittal letter explicitly stated that the final Osakis Lake (DNR ID 77-0215), Faille Lake (DNR ID 77-0195), and Smith Lake (DNR ID 21-0016) TMDLs for excess nutrients 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 Osakis Lake, Faille Lake and Smith Lake by MPCA satisfies the requirements of this twelfth element.

## 13. Conclusion

After a full and complete review, the EPA finds that the TMDLs for Osakis Lake (DNR ID 77-0215), Faille Lake (DNR ID 77-0195), and Smith Lake (DNR ID 21-0016), satisfy all of the elements of an approvable TMDL. This approval is for three TMDLs, addressing three different water bodies for aquatic recreational use impairments.

The EPA's approval of this TMDL extends to the water bodies which are identified as Osakis Lake (DNR ID 77-0215), Faille Lake (DNR ID 77-0195), and Smith Lake (DNR ID 21-0016), 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.