TMDL: Lake Pepin (Wisconsin) phosphorus TMDLs in St. Croix, Pierce, and Pepin counties in western Wisconsin
Date: 07/21/2026

DECISION DOCUMENT FOR THE LAKE PEPIN (WISCONSIN) TMDLs, IN ST. CROIX, PIERCE, AND PEPIN COUNTIES IN WISCONSIN

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 Total Maximum Daily Loads (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 denote 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. The guidelines provided under each heading in this decision document are an attempt to summarize and provide information regarding currently effective statutory and regulatory requirements relating to TMDLs but are not a substitute for statutory requirements or EPA's regulations.

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.

EPA Review of the final LPWW TMDL:

Location Description/Spatial Extent:

The Lake Pepin (Wisconsin) Watershed (LPWW) on Wisconsin's western border is part of the Mississippi River basin and encompasses parts of St. Croix, Pierce, and Pepin counties. Lake Pepin is a natural impoundment of the Mississippi River and forms part of the boundary between Minnesota and Wisconsin (Figure 1 and Section 3.1 of the final TMDL document). The entire Lake Pepin watershed is approximately 49,000 square miles, the majority in Minnesota. The portion of the watershed that is the subject of this TMDL effort is the Wisconsin portion of the watershed, downstream of the confluence of the St. Croix River and the Mississippi River, to the confluence of the Chippewa River and the Mississippi River. This portion of the LPWW is approximately 514 square miles in size. Several smaller tributaries flow either directly into Lake Pepin or into the Mississippi River and then into Lake Pepin, as noted in Figure 1 of the final TMDL document.

Table 1 of this Decision Document contains the water bodies addressed in the LPWW TMDL effort. The Wisconsin Department of Natural Resources (WDNR) noted that the three water bodies in Table 1 of this Decision Document were listed as impaired due to excessive phosphorus (Appendix A of the final TMDL document).

Table 1: **The LPWW Impairment Listings on the WDNR 2024 303(d) list addressed in this TMDL report**

Water body Name	WATERS ID	WBIC	Start Mile	End Mile	Impairment Indicator(s)	Pollutant	TP Criterion	TMDL Subbasin
Bogus Creek	16305	2438900	0.00	8.25	Unknown	Total Phosphorus	75 µg/L	17
Lost Creek	16302	2438300	0.00	8.00	Unknown	Total Phosphorus	75 µg/L	18
Lake Pepin	4704964	1800	--	--	High Phosphorus Levels	Total Phosphorus	100 µg/L	multiple

WDNR explained in Section 1.1 of the final TMDL document that the LPWW TMDL is designed to complement the phosphorus TMDL developed by the Minnesota Pollution Control Agency (MPCA) for the Minnesota portion of the Lake Pepin watershed. MPCA's TMDL report, "*Lake Pepin and Mississippi River Eutrophication Total Maximum Daily Load Report*" (the "MPCA Lake Pepin TMDL") was approved by the EPA on May 19, 2021, and is found at https://www.pca.state.mn.us/business-with-us/lake-pepin-watershed-excess-nutrients-tmdl. The MPCA Lake Pepin TMDL addresses approximately half of the State of Minnesota by land area. Appendix E of the MPCA Lake Pepin TMDL notes estimated loading for the Wisconsin portion of the Lake Pepin watershed, but those estimated loadings were specifically excluded from the EPA's approval of the MPCA TMDL ("*Decision Document for the Lake Pepin and Mississippi River Watershed, MN*" dated 05/19/2021; EPA).

WDNR also noted that a portion of the overall Lake Pepin watershed includes the St. Croix River watershed (Section 1.1 of the final TMDL document). WDNR and MPCA developed a joint TMDL addressing the St. Croix River watershed in 2012 ("*Lake St. Croix Nutrient Total Maximum Dail Load*", approved by the EPA on August 8, 2012, "*Decision Document for the Approval of the Lake St. Croix, Minesota and Wisconsin TMDL*" dated 08/08/2012; EPA). The water quality target for Lake St. Croix (the downstream portion of the St. Croix River) is below the water quality target for the relevant portion of the Mississippi River and Lake Pepin, and therefore, was excluded by WDNR from the LPWW TMDL. The EPA agrees this is appropriate.

Land Use:

The majority of the land used in the LPWW is agricultural (Table 2 of this Decision Document). WDNR explained that much of the land in the LPWW is used for cultivating crops (e.g., corn or soybean), hay/pasture lands, or areas supporting dairy operations. The remaining land uses are wetland, forest and/or grassland areas, with a small portion of urbanized areas (e.g., cities and towns) (Section 3.1 of the final TMDL document). Appendix C of the final TMDL document includes detailed land use information for all subbasins of the final TMDL.

Table 2: Summary of Land Classifications by TMDL Subbasin for the LPWW TMDLs

TMDL Subbasin	Urban (acres)	Agriculture (acres)	Grassland (acres)	Forest (acres)	Water (acres)	Wetland (acres)
1	141.3	6,647.7	7,585.3	5,960.7	5.1	486.3
2	1,541.5	15,764.0	8,982.3	1,831.7	13.3	534.4
3	151.7	8,641.0	8,717.7	5,841.8	-	412.1
4	115.4	6,721.1	4,729.2	2,361.0	-	121.7
5	114.1	8,618.0	4,862.7	2,906.8	2.0	115.0
6	137.2	8,006.5	4,808.2	5,515.3	2.0	310.2
7	156.4	7,843.0	2,667.3	5,180.6	19.6	250.0
8	35.8	5,397.2	1,288.6	3,185.9	6.0	112.3
9	966.7	1,945.8	748.8	1,379.1	2,098.6	1,600.8
10	1,328.7	7,178.5	2,835.0	8,309.4	13,907.9	2,421.1
11	1,282.4	13,751.5	5,479.3	7,100.3	1,133.4	1,242.6
12	599.8	8,972.9	5,192.2	7,148.0	78.7	719.0
13	156.6	5,104.9	4,571.5	3,555.2	2.0	80.3
14	187.9	6,311.8	2,870.3	3,261.9	0.7	90.5
15	86.1	8,679.8	3,040.0	7,153.9	5.8	393.6
16	615.8	12,494.9	5,283.0	6,882.3	-	304.3
17	31.1	2,615.4	1,400.1	2,961.0	6.2	53.2
18	33.6	1,406.6	1,191.6	2,050.1	-	91.1
Total*	**7,682**	**136,100**	**76,246**	**82,557**	**17,277**	**9,333**
%*	2	41	23	25	5	3
Cumulative Total* = 329,000 acres						

* - approximate

Problem Identification:
Phosphorus TMDLs: The stream and lake segments in Table 1 of this Decision Document were included on the Wisconsin 2024 303(d) list due to excessive phosphorus. WDNR explained that excessive phosphorus can lead to nuisance algae growth, oxygen depletion, fish kills, reduced submerged aquatic vegetation, water clarity problems, and degraded habitat (Section 1.2 of the final TMDL document).

Phosphorus is an essential nutrient for plant growth but excessive phosphorus loading to surface waters is a concern for aquatic ecosystems. Under natural conditions where human activities do not dominate the landscape, phosphorus is generally in short supply and is a limiting factor for aquatic plant growth. As more phosphorus enters a surface water body, the phosphorus acts to fertilize the aquatic system, allowing for more plant and algae growth. This condition of nutrient enrichment, and a transition from plant to algae-dominated primary production, is referred to as eutrophication. Eutrophication can alter the ecology of the water body and degrade the beneficial uses the surface water provides, such as recreation (i.e., swimming and fishing), and public drinking water supply uses.

Blooms of aquatic plants, nourished by excessive nutrient loading, may also include cyanobacteria (i.e., blue-green algae). Cyanobacteria can release toxins (e.g., microcystin) that can be harmful to aquatic species and pose health risks to humans and animals (e.g., livestock and pets). Additional concerns linked to algal blooms in freshwater environments include appearance (i.e., surface scums), discolored water, reduced light penetration, taste and odor problems, and dissolved oxygen depletions during cyanobacteria die-off events. Depending on the severity of the low dissolved oxygen event, large fish kills can occur. Water quality conditions during algal bloom events adversely affect recreation, public drinking water supply and aquatic life.

Priority Ranking:
The Wisconsin 2024 303(d) list includes a TMDL Priority column where stream and/or lake segments can be designated as a high, medium or low priority. WDNR identified the waters in Table 1 of this Decision Document as high priority waters for TMDL development.

Pollutant of Concern:
The pollutant of concern is phosphorus.

Source Identification (point and nonpoint sources):

Point Source Identification: The potential point sources of phosphorus to the LPWW 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 wastewater according to their NPDES permit. WDNR determined that there are publicly owned treatment works (POTWs) as well as an industrial facility (creamery process water) in the LPWW that can contribute phosphorus from treated wastewater releases (Section 3.5.3 of the final TMDL document). WDNR assigned the facilities a portion of the phosphorus wasteload allocation (WLA) and those values are summarized in Table 3 of this Decision Document (Table B3 of Appendix B of the final TMDL document).

Municipal Separate Storm Sewer System (MS4) communities: Stormwater from MS4s can transport phosphorus to surface water bodies during or shortly after storm events. WDNR did not identify any MS4 permittees in the LPWW; no MS4s were assigned a portion of the WLA for the phosphorus TMDLs (Table 4 at the end of this Decision Document).

Stormwater contributions from construction and/or industrial sites: Construction and industrial sites may contribute phosphorus via sediment runoff during stormwater events. Phosphorus contributions from these point sources were addressed via a general permit allocation calculation as discussed in Section 3.5.4 of the final TMDL document.

WDNR regulates stormwater discharges from certain industries and construction sites under Wisconsin Pollution Discharge Elimination System (WPDES) permits issued pursuant to Chapter Natural Resources (NR) 216 Wisconsin Administrative Code (Wis. Adm. Code) and also via established construction site and post construction performance standards under NR 151 Wis. Adm. Code (Section 6.2 of the final TMDL document).

Concentrated Animal Feedlot Operations (CAFOs): WDNR discusses CAFOs in Sections 3.5.5 and 5.4.3 of the final TMDL document. WDNR explained that CAFOs are agricultural operations that raise 1,000 or more animal units in a confined area. WDNR acknowledged that wastewater derived from CAFO operations can have elevated phosphorus concentrations. CAFOs are required to have a WPDES CAFO permit. WPDES CAFO permits are designed to ensure that CAFO operations use proper planning, construction and manure management to protect water quality (Section 5.4.3 of the final TMDL document). WPDES permits for CAFO facilities cover CAFO production areas, ancillary storage areas, storage areas and land application areas.

WDNR determined that there are six CAFOs in the LPWW (Table 10 and Figure 9 of the final TMDL document). WDNR explained that, for the purposes of calculating TMDLs, CAFOs are covered under a WPDES General Permit for CAFOs. CAFO WLAs were set to zero (WLA = 0) because CAFOs must comply with all authorized discharge and overflow requirements described in the WPDES CAFO General and Individual Permits (Section 5.4.3 of the final TMDL document).

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

Phosphorus contributions from stormwater runoff from agricultural land use practices: Land use in the LPWW is predominantly agricultural and the successful cultivation of row crops requires the use of fertilizer in commercial/inorganic and/or organic (i.e., manure) forms so that producers can ensure the proper nutrient concentration amounts are available in the soil for crop uptake. Fertilizers spread onto agricultural fields may be liberated and transported to surface waters during precipitation events across all seasons. Stormwater runoff from agricultural lands may contribute phosphorus, organic material and organic-rich sediment to surface waters in the LPWW. Fields underlain by tile drainage lines can channelize precipitation to drainage ditches and/or small streams and exacerbate the transport of phosphorus to surface waters. Stormwater runoff may contribute nutrients and/or organic-rich sediment to surface waters from livestock manure, fertilizers, vegetation and erodible soils.

Phosphorus contributions from non-regulated urban runoff: Runoff from urban areas (i.e., impervious surfaces in urban, residential, commercial or industrial areas) can contribute phosphorus to local water bodies. Impervious surfaces such as roads, driveways, rooftops, parking lots and other paved areas may introduce phosphorus derived from fertilizers, leaf and grass litter, pet wastes, from atmospheric deposition to these surfaces and other sources of anthropogenic derived phosphorus, may be sources of phosphorus to the surface waters of the LPWW.

Phosphorus contributions stream channelization and stream/lakeshore erosion: Eroding streambanks/lakeshores and channelization efforts may add nutrients, organic material and organic-rich sediment to local surface waters. Phosphorus may be added if there is particulate phosphorus bound with eroding soils. Eroding riparian areas may be linked to soil inputs within the water column and potentially to changes in flow patterns. Changes in flow patterns may also encourage downcutting of the streambed and streambanks. Stream channelization efforts can increase the velocity of flow (via the removal of the sinuosity of a natural channel) and disturb the natural sedimentation processes of the streambed.

Phosphorus contributions from wetland and/or forest sources: Phosphorus, organic material and organic-rich sediment may be added to surface waters by stormwater flows through wetland and forested areas in the LPWW. The final TMDL document refers to these nonpoint sources as "background sources" (Section 3.4.2.3 of the final TMDL document). Storm events may mobilize phosphorus through the transport of suspended solids and other organic debris.

Phosphorus contributions from internal loading (lake): The release of phosphorus from lake sediments, the release of phosphorus from lake sediments via physical disturbance from benthic fish (i.e., rough fish (e.g., carp)), the release of phosphorus from wind mixing the water column, and the release of phosphorus from decaying plants may all contribute internal phosphorus loading to Lake Pepin. 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. WDNR noted that internal loading should not be considered an independent source of phosphorus; rather, it is the result of historical loadings from other sources (Section 3.4.2.5 of the final TMDL document).

Future Growth:
WDNR reserved a portion of the overall TMDL loading capacity, the reserve capacity (RC), to be potentially used by future discharges to the LPWW (Section 5.6 of the final TMDL document). Examples include providing wasteload allocations for new or expanding wastewater (industrial or municipal) or for permittees under general permits that may be given individual allocations and/or CAFOs that add a surface water outfall as a result of a manure treatment system (Section 5.5.2 of the final TMDL document).

WDNR utilized the RC developed by MPCA for the MPCA Lake Pepin TMDL (Section 5.6 of the final MPCA Lake Pepin TMDL). In the MPCA Lake Pepin TMDL, MPCA calculated a RC of 5% (196 kg/yr (0.54 lbs/day)) of the WWTP loads in the Wisconsin portion of the Lake Pepin watershed (Section 5.6 of the final Minnesota Lake Pepin TMDL document). WDNR reviewed the RC from the MPCA Lake Pepin TMDL and applied the RC load to the LPWW TMDLs by distributing the RC load (196 kg/yr (0.54 lbs/day))

amongst the 18 subbasins as noted in Table 4 at the end of this Decision Document (Section 5.2 of the final TMDL document).

The EPA finds that the TMDL document submitted by WDNR 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.

EPA Review of the final LPWW TMDL:

Narrative Water Quality Criteria

All waters of the State of Wisconsin are subject to the following narrative water quality criterion established in Section NR 102.04(1) of the Wis. Adm. Code:

> *"To preserve and enhance the quality of waters, standards are established to govern water management decisions. Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development or other activities shall be controlled so that all waters including the mixing zone and the effluent channel meet the following conditions at all times and under all flow conditions: (a) Substances that will cause objectionable deposits on the shore or in the bed of a body of water, shall not be present in such amounts as to interfere with public rights in waters of the state, (b) Floating or submerged debris, oil, scum or other material shall not be present in such amounts as to interfere with public rights in waters of the states, (c) Materials producing color, odor, taste or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state."*

WDNR determined that due to the excessive phosphorus loading, the segments in Table 1 of this Decision Document were not attaining Wisconsin's narrative water quality criteria (Section 2.1 of the final TMDL document). Excess phosphorus loading in the LPWW can cause algal blooms that may be

considered as floating scum, producing a green color, with a strong odor and an unsightly condition. Additionally, algal blooms may contain toxins that can impact the recreational accessibility of the water bodies and also may pose a public health concern.

Designated Uses:
In Section 2.3 of the final TMDL document WDNR outlined the designated uses for the LPWW, as defined in Chapter NR 102 of Wis. Adm. Code. The following designated uses apply to all waters of the state: Fish and Aquatic Life; Recreation; Wildlife; and Public Health and Welfare. Wisconsin water quality standards (WQS) establish criteria for water quality that correspond to attainment of these designated uses. WDNR applied the criteria discussed below to the impaired waters addressed by the final TMDLs (Table 1 of this Decision Document).

The Fish and Aquatic Life use also includes the numeric criteria for phosphorus described in Section 2.3 of the final TMDL document. Section NR 102.04(3) of the Wis. Adm. Code defines the Fish and Aquatic Life use and identifies five fish and aquatic life subcategories for surface water classification (cold water communities; warm water sport fish communities; warm water forage fish communities; limited forage fish communities; limited aquatic life). All fish and aquatic life subcategories are subject to attainment of numeric phosphorus criteria except for waters with limited aquatic life designation.

Phosphorus Standards:
Section NR 102.06 of the Wis. Adm. Code defines the numeric criteria for phosphorus. The numeric criteria are based on relationships between phosphorus and designated use attainment in surface waters (Section 2.2 of the final TMDL document).

The total phosphorus criterion applicable to each of the impaired segments in Table 1 of this Decision Document are included in the 'TP Criterion' column of the table (**75 µg/L** for streams, **100 µg/L** for the lake). The river criteria are for the median phosphorus concentration for the growing season (May 1-October 31), and the lake criteria are for the mean phosphorus concentration for the summer (June 1-September 15).

WDNR noted that Lake Pepin serves as the boundary between Minnesota and Wisconsin, and thus each state's WQS can apply (Section 2.2 of the final TMDL document). WDNR reviewed the WQS applicable for the Wisconsin portion of Lake Pepin as well as the Minnesota portion of Lake Pepin and noted that the phosphorus criteria are the same for both portions of the lake (100 µg/L).

The EPA finds that the TMDL document submitted by WDNR 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 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.

EPA Review of the final LPWW TMDL:

WDNR calculated that loading capacities for each impaired water body for total phosphorus (Appendix B of the final TMDL document). WDNR's TMDL development approach for the LPWW phosphorus TMDLs quantified the magnitude of phosphorus loading by source.

WDNR initially started with the estimated loading calculations for the Wisconsin portion of the MPCA Lake Pepin TMDL (Appendix E of the MPCA Lake Pepin TMDL). WDNR determined that an update of the nonpoint source loading process was needed, based upon more recent NPS-related data collected in the LPWW (Section 3.5 of the final TMDL document).

WDNR subdivided the LPWW area (514 square miles) into 18 subbasins (Figure 1 of the final TMDL document). WDNR used these 18 subbasins to calculate phosphorus TMDLs via the Wisconsin Lake Modeling Suite (WiLMS). WiLMS is an empirical model utilized by WDNR to serve as a lake water quality planning tool. The model utilizes an annual time step and predicts spring turnover, growing season mean, and average annual total phosphorus concentrations in lakes. WiLMS can account for the internal loading of phosphorus in lakes. The model uses export coefficients (amount of phosphorus loss by land use type) to calculate phosphorus loadings in lakes. WDNR utilized this approach for both Lake Pepin and the subbasins draining to Lake Pepin (including the two impaired creeks noted in Table 1 of this Decision Document).

WDNR calculated "baseline" loads as the current phosphorus loads that were used by WDNR to determine the current contribution for each source type (land use) in the watershed (Sections 3.5.1 and 3.6 of the final TMDL document). The initial baseline loads were then compared to different calibration datasets to provide calibration benchmarks for the WiLMS model (detailed in Section 3.5.2 of the final TMDL document).

For calculating the baseline loads for NPDES dischargers (both wastewater and stormwater), WDNR utilized the information used in the MPCA Lake Pepin TMDL Appendix E (Sections 3.5.3 and 3.5.4 of the final TMDL). For CAFOs, WDNR noted that runoff from CAFO land application is already included as agricultural runoff in the WiLMS model (Section 3.5.5 of the final TMDL document). Table 11 of the final TMDL document contains the final summary of the baseline phosphorus loads for the LPWW. WDNR noted that all 18 subbasins were modeled and have baseline loading calculations derived. WDNR utilized this approach as all 18 subbasins contribute phosphorus loads to Lake Pepin and calculating phosphorus loads for each of the 18 subbasins will allow for better targeting of implementation activities for those individual subbasins (Section 3.5 of the final TMDL document).

To calculate the phosphorus loading capacities of the water bodies in the LPWW, WDNR used growing season median (GSM) concentrations and flow weighted mean (FWM) values to create FWM to GSM ratios (Section 4.1 of the final TMDL document). FWM/GSM ratios assisted WDNR in calculating assimilative loading capacity values for the 18 subbasins in the LPWW. WDNR used the Rush River monitoring site which has the highest quality and longest-term data set to determine the appropriate ratios (Section 3.5.2.1 of the final TMDL document). These results were used to determine the loading capacity for each subbasin to meet the 75 µg/L phosphorus criteria for flowing waters.

Once the loading capacities were determined, WDNR then allocated a portion of the load to several source categories for both point and nonpoint sources (Section 5.2 of the final TMDL document). WDNR first reduced the agricultural and non-permitted urban sources loads by 20% to be consistent with the MPCA Lake Pepin TMDL and then reduced these loads proportionally until the TMDL target load was met (Section 5.3.2 of the final TMDL document). A similar process was utilized for point sources in the LPWW (Section 5.4.1 of the final TMDL document).

WDNR included a reserve capacity for the phosphorus TMDLs that is intended to be used for new or expanding NPDES permittees that may discharge phosphorus to the LPWW at some point in the future. See Section 1 of this Decision Document (Future Growth) for further discussion.

Table 4 at the end of this Decision Document includes phosphorus TMDL allocations for the subbasins of the final TMDL.

Critical Condition: WDNR identified the summer growing season as the critical condition for the impacts of phosphrous on the water bodies in the LPWW (Section 4.2 of the final TMDL document). This was noted as the time when temperatures, sunlight and flow conditions are the most conducive to plant and algal growth. WDNR explained that the water quality criteria for phosphorus are applicable to the summer conditions. WDNR also noted that the TMDL calculative approach will address phosphorus loads in the LPWW outside these summer growing season months (e.g., phosphorus loads that may be stored and released during the growing season).

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

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

4. Load Allocations (LA)

EPA regulations require that a TMDL includes 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.

EPA Review of the final LPWW TMDL:

WDNR determined load allocations for three individual nonpoint source types in the final TMDLs: background contributions (e.g., phosphorus contributions from wetland and/or forest sources), agricultural contributions and non-permitted urban contributions (e.g., phosphorus contributions from impervious surfaces in urban areas) (Section 5.3 of the final TMDL document). Each individual nonpoint source contribution was determined via WiLMS modeling results and the assumptions and decision-making employed to derive those three nonpoint source calculations (Section 3.5.1 of the final TMDL document). The total daily phosphorus allocations for background, agricultural and non-permitted urban nonpoint source contributions are found in Appendix B of the final TMDL document and Table 4 of this Decision Document.

The EPA finds WDNR's approach for calculating the LA for the LPWW phosphorus TMDLs to be reasonable and consistent with EPA guidance. The EPA finds that the TMDL document submitted by WDNR 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.

EPA Review of the final LPWW TMDL:

NPDES permitted facilities (municipal and industrial wastewater discharges): WDNR reviewed and utilized the estimated WLAs for WPDES permits from the MPCA Lake Pepin TMDL (Section 5.2 of the final TMDL document). The WLAs were then adjusted as necessary to achieve the Wisconsin tributary phosphrous criteria (75 µg/L). The individual phosphorus WLAs are found in Appendix B of the final TMDL document and Table 3 of this Decision Document. Phosphorus WLAs for facilities in the LPWW that have individual WPDES discharge permits were calculated based on the individual facility's design flow, phosphorus effluent monitoring data (Section 5.4 of the final TMDL document).

MS4s: WDNR noted that there are no MS4 dischargers in the LPWW (Table B2 of Appendix B of the final TMDL document).

General permits: The WLAs for the general permit covers stormwater discharges from industrial facilities and construction sites, as well as wastewater discharges that are deemed by WDNR to not be significant contributors of phosphorus (Section 5.4.2 of the final TMDL document). WDNR explained that baseline phosphorus loads for all stormwater and wastewater general permittees were set using the estimated allocations developed by MPCA in the MPCA Lake Pepin TMDL (Appendix E of the MPCA Lake Pepin TMDL). The general permit allocations were based upon the estimated areal extent of the permitted facilities in the LPWW (Table 4 at the end of this Decision Document).

CAFOs: These point sources must comply with all WPDES permit conditions. Runoff from CAFO land application is considered a nonpoint source when applied in agronomic amounts (Section 5.3 of the final TMDL document). For production areas, CAFOs may not discharge manure or process wastewater pollutants to navigable waters except under extraordinary circumstances; from ancillary or storage areas, CAFOs may discharge stormwater provided they comply with surface water and groundwater standards and do not cause or contribute to the exceedance of a water quality standard (Section 5.4.4 of the TMDL). For this TMDL effort, WDNR has determined a WLA = 0 for manure management facilities (Section 5.4.4 of the final TMDL). WDNR identified the CAFOs within the LPWW in Table 10 and Figure 9 of the final TMDL document.

Table 3: Total Phosphorus Wasteload Allocations for Individual Permitted Point Sources

TMDL Subbasin	Permit no.	Outfall no.	Facility Name	Allocation (lbs./year)	Allocation (lbs./day)
2	26891	1	BALDWIN WASTEWATER TREATMENT FACILITY	2,452	6.71
9	61255	1	BAY CITY VILLAGE	445	1.22
16	22942	1	ELLSWORTH COOP CREAMERY	870	2.38
16	21253	1	ELLSWORTH WASTEWATER TREATMENT FACILITY	1,649	4.52
15	32361	1	MAIDEN ROCK WASTEWATER TREATMENT FACILITY	141	0.39
10	22811	1	PEPIN WASTEWATER TREATMENT FACILITY	1,269	3.48
11	22403	1	PRESCOTT WASTEWATER TREATMENT FACILITY	1,549	4.24

The EPA finds the WDNR's approach for calculating the WLA for the final phosphorus TMDLs to be reasonable and consistent with EPA guidance. The EPA finds that the TMDL document submitted by WDNR satisfies the requirements of the fifth criterion.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL includes 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.

EPA Review of the final LPWW TMDL:

WDNR incorporated both an explicit and implicit margin of safety for the LPWW phosphorus TMDLs. WDNR explained in Section 5.4 of the final TMDL document that they used the explicit MOS determined by MPCA in the MPCA Lake Pepin TMDL (Section 5.4 of the MPCA Lake Pepin TMDL). MPCA noted that the explicit MOS was based upon the robust dataset and high-quality modeling effort used to determine the TMDL for the Minnesota portion of Lake Pepin. WDNR noted that the Wisconsin TMDL effort is designed to align with the Minnesota effort when appropriate, and therefore, utilize the explicit MOS as calculated by MPCA.

WDNR explained that the implicit MOS was based on its assimilative loading capacity approach and various assumptions made during WDNR's allocation analysis. One of the main tenets of the implicit MOS was the ratio of the flow weighted mean (FWM) to growing season mean (GSM) (Section 5.5 of the final TMDL document).

WDNR discussed how they calculated FWM/GSM ratios at several stream monitoring sites in the LPWW. At each of these locations, WDNR utilized FWM and GSM values from monitoring data that was adjusted to control for the influence of antecedent precipitation on phosphorus concentrations (via the PhosMER model) (Section 3.5.2.3 of the final TMDL document). WDNR outlined that it employed the PhosMER model for estimating GSMs because:

- NR 102.07(1)(c) of Wis. Adm. Code notes that the PhosMER model can be used to refine total phosphorus assessments;
- PhosMER has the capacity to estimate long-term GSMs for sites where long-term sampling records are unavailable; and
- PhosMER can be used to estimate the uncertainty of a long-term GSM estimate.

The PhosMER model has the capacity to estimate uncertainty in long-term GSM via "bootstrapping", that WDNR explained was a statistical procedure that resamples a single dataset to create many simulated samples for the purpose of estimating uncertainty (Section 5.5 of the final TMDL document). The bootstrapping statistical effort was run in order to simulate different conditions (e.g., each iteration generated a new set of daily total phosphorus estimates) and produced a statistical distribution of GSM at each steam monitoring site. From this statistical distribution, WDNR choose the higher bound of the 90% confidence interval (i.e., the 95th percentile rank value) to represent the GSM for that stream monitoring site. The use of the 90% confidence interval resulted in WDNR's confidence, a 90% certainty, that phosphorus loading estimates derived from the modeling efforts would result in the attainment of water quality criteria.

In addition, WDNR utilized the United States Geological Survey (USGS) LOADEST model to better assess phosphorus loading to the impaired waters (Section 3.5 of the final TMDL document). This modeling effort focused on the two monitoring sites in the LPWW with the largest data set. Table 7 of the final TMDL document contains the calibration and validation statistics from the LOADEST model efforts. The PhosMER and LOADEST results indicate the conservative nature of the WDNR modeling effort.

Additionally, WDNR cited that phosphorus loading attributed to streambank erosion was not explicitly modeled in the final TMDL development efforts but was factored into baseline loading estimates for other nonpoint source categories (e.g., contributions from agriculture nonpoint sources, urban nonpoint sources) (Section 3.5.6 of the final TMDL document). This also represents an implicit MOS for the consideration of nonpoint source allocations as WDNR's implementation approach will encourage practices specifically aimed at reducing streambank erosion while also attaining allocations for land-based sources.

EPA finds the WDNR's approach for calculating the MOS to be reasonable and consistent with EPA guidance. The EPA finds that the TMDL document submitted by WDNR 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)).

EPA Review of the final LPWW TMDL:

Seasonal variation was considered by WDNR as described in Section 5.7 of the final TMDL document. WDNR explained that critical conditions for phosphorus impairments generally occur during the growing season and summer months (i.e., June through September) when water temperature, flow, and sunlight conditions are conducive for plant growth. Phosphorus loading throughout the entire year to stream channels and to lake sediments can contribute to high phosphorus concentrations during the growing/summer season since phosphorus stored in stream bottoms or lake sediments can be released and reintroduced into the water column during the summer months. High streamflow conditions may scour stream bottom sediments or erode riparian areas, thus introducing phosphorus throughout the water column. In lakes, seasonal mixing events (i.e., lake water turnover) can introduce phosphorus from lake sediments throughout the water column.

WDNR also acknowledged that different point and nonpoint sources will contribute loading to the surface waters of the LPWW under varying conditions throughout the year. Typically, the spring and summer seasons will be more conducive for transporting phosphorus in the LPWW via precipitation events (e.g., sediment inputs during wet weather events that may scour stream bottoms or erode streambanks). Additionally, algal plant growth occurs when there is excess phosphorus available, typically in the summer seasons.

The EPA finds that the TMDL document submitted by WDNR 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, the 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 the EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

The 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, the 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.

EPA Review of the final LPWW TMDL:

The objective of a TMDL is to determine the loading capacity of the impaired water body(ies) and to devise an allocation scheme to distribute that load among different pollutant sources (i.e., point sources and nonpoint sources) so that the appropriate control actions can be taken, and water quality standards achieved. The TMDL process is important for improving water quality because it connects the goals of water quality standards to post-TMDL implementation efforts designed to attain those standards.

Pollutant allocations assigned to point sources (i.e., wasteload allocations) are generally implemented through the EPA's National Pollutant Discharge Elimination System permits under CWA section 402. If, after analyzing the effect of a discharge on the receiving water, a permit writer finds that technology-based permit limits are not sufficiently stringent to meet water quality standards, the CWA and the EPA regulations require the development of water quality-based effluent limits (WQBELs) that are more stringent and designed to ensure that water quality standards are met.[1] Under the EPA's permitting regulations, water quality-based discharge limits in NPDES permits must be "consistent with the assumptions and requirements" of wasteload allocations in EPA-approved TMDLs. 40 C.F.R. § 122.44(d)(1)(vii)(B).

Nonpoint source load reduction efforts are implemented through a wide variety of programs at the state, local and federal level. These programs may be regulatory, non-regulatory or incentive-based (e.g., a cost-share program). Additionally, water body restoration efforts can be assisted by voluntary actions on the part of citizens and/or organizations. The EPA Section 319 Nonpoint Source

[1] Clean Water Act § 301 (b)(1)(C) and 40 C.F.R. § 122.44(d)(1).

Management Program[2] provides grant money to states, territories and Tribes to fund specific projects aimed at reducing the nonpoint source pollution.

The LPWW phosphorus TMDLs provide reasonable assurance that actions identified in the Section 6 of the final TMDL document will be applied to attain the loading capacities and allocations calculated for the impaired reaches within the LPWW. The recommendations made by WDNR will be successful at improving water quality if the appropriate local groups (e.g., County Land and Water Conservation Departments (LWCDs)) work to implement these recommendations. Those mitigation suggestions, which fall outside of regulatory authority, will require commitment from state agencies and local stakeholders to carry out the suggested actions.

Continued water quality monitoring within the basin is supported by WDNR. Additional water quality monitoring results would provide insight into the success or failure of best management practices (BMP) systems designed to reduce phosphorus and sediment loading into the surface waters of the LPWW. Local watershed managers would be able to reflect on the progress of the various pollutant removal strategies and would have the opportunity to change course if observed progress is unsatisfactory.

Point sources:
NPDES permitted facilities: WDNR regulates point sources via the WPDES permit program. For any new or reissued WPDES permit, the discharge limits of those permits must be consistent with the WLAs of the final TMDLs. WDNR will follow the expectations described in Chapter NR 217, Wis. Adm. Code for total phosphorus when considering permitting conditions for new or revised permits.

Point sources addressed under general permit contributions: WDNR regulates stormwater discharges from certain industries, and construction sites under WPDES permits issued pursuant to Chapter NR 216, Wis. Adm. Code. WDNR also established urban area, construction site, and post-construction performance standards under NR 151, Wis. Adm. Code, that are implemented through stormwater MS4 and construction site permits (Section 6.2 of the final TMDL document). WDNR anticipates that it will incorporate permit conditions into stormwater permits consistent with the final TMDL WLAs.

CAFOs: Section 6.2 of the final TMDL document explained that WDNR and appropriate state agencies would monitor and enforce CAFO permit requirements to ensure that CAFOs are operated and maintained to prevent discharges as required by their WPDES permit. Section 3.4.1.4 of the final TMDL document notes the permit requirements for CAFOs in Wisconsin.

Nonpoint sources:
Sections 6.3.1 through 6.3.11 of the final TMDL document describe WDNR and Wisconsin nonpoint source performance standards and various grant opportunities that can implemented to mitigate nonpoint source phosphorus loadings to the waters of the LPWW.

NR 151 of the Wis. Adm. Code: NR 151 includes nonpoint source performance standards and manure management prohibitions. Methods include using a tillage setback, the use of the Phosphorus Index to

[2] EPA webpage, https://www.epa.gov/nps/319-grant-program-states-and-territories, (last visited 7/16/26).

limit amount of phosphorus runoff from croplands and pastures, executing a prohibition against excess process wastewater handling, meeting load allocations of a TMDL via implementation of targeted performance standards (BMPs specified in ATCP 50 Wis. Adm. Code), meeting tolerable soil erosion rates for sheet, rill and wind erosion, maintaining manure storage facilities, diverting runoff away from feedlots, manure storage areas and/or barnyards, and utilizing nutrient management planning to manage soil nutrient concentrations.

WDNR cost sharing grant programs: WDNR supports nonpoint source pollution mitigation by administering and providing cost-share grants to fund BMPs via:

- The Targeted Runoff Management (TRM) Grant Program;
- The Notice of Discharge (NOD) Grant Program;
- The Urban Nonpoint Source & Storm Water Management Grant Program;
- The Lake Planning Grant Program (under WDNR's Surface Water Grants Program);
- The Lake Protection Grant Program (under WDNR's Surface Water Grants Program); and
- The River Planning and Protection Grant Program.

Targeted Runoff Management (TRM) Grant Program: WDNR explained that this grant program is designed to fund BMPs for addressing nonpoint source contributions from both urban and agricultural areas. Grants are available to local units of government for both urban and agricultural sites, based on the need for compliance with water quality standards, the existence of impaired waters, outstanding or exceptional resource waters, threats to public health, animal feeding operations receiving a NOD, the existence of water quality concerns of national or statewide importance, projects consistent with priorities of the WDNR, or consistent with approved county land and water resource management plans.

NOD Grant Program: Chapter NR 243, Wis. Adm. Code, states that owners, operators or animal feeding operations that receive a Notice of Discharge for an unacceptable practice shall implement corrective measures within a specified compliance period and may become subject to a CAFO permit under certain circumstances. This grant program provides cost sharing to farmers who must install agricultural BMPs to comply with NOD requirements.

Lake Management Planning Grants (under WDNR's Surface Water Grants Program): Section 281.68, Wis. Stats., and Chapter NR 193 Wis. Adm. Code, provide the framework and guidance for WDNR's Lake Management Planning Grant Program (Section 6.3.5 of the final TMDL document). This program provides grants for assisting eligible partners in the collection and analysis of water quality information necessary to protect and restore Wisconsin lakes and the contributing watershed to that lake and to develop lake management plans. Grants are typically used to gather water quality monitoring data (e.g., physical, chemical and biological), describe land use on shorelines and watersheds, evaluate zoning and sanitation issues, assess fish and wildlife habitats, and develop lake management plans.

Lake and River Protection Grants (under WDNR's Surface Water Grants Program): This program provides grants to eligible parties for various lake and river protection efforts. Grants are typically used for:

- *Lake protection efforts* - purchase land, restore wetlands and shorelands, develop local regulations or ordinances that will protect or improve the water quality of a lake, install BMPs

to control nonpoint sources of pollution to the lake, and develop lake management implementation plans.
- *River protection efforts* – purchase land, develop local regulations or ordinances that will protect or improve the water quality of a river, install BMPs to control nonpoint sources of pollution to the river, improve the capacity of river management organizations, collect information on riverine ecosystems, assessment and planning, and education and outreach (e.g., increasing local understanding of the causes of river water quality problems).

Department of Agriculture, Trade, and Consumer Protection (DATCP) Soil & Water Resource Management Program (SWRM): Wisconsin DATCP oversees and supports county level conservation programming that implements Wisconsin conservation practices. DATCP's SWRM program requires LWCDs to develop Land and Water Resource Management (LWRM) planning documents to identify conservation needs specific to that particular county. County level LWRM plans address nonpoint source contributions via:

- Inventorying water quality and soil erosion conditions in the county;
- Identifying relevant state and local regulations, and any inconsistencies between them;
- Setting water quality goals in consultation with the WDNR;
- Identifying key water quality and soil erosion problems, and practices to address those problems;
- Identifying priority farm areas using a range of criteria (e.g., impaired waters, manure management, high nutrient applications);
- Identifying strategies to promote voluntary compliance with statewide performance standards and prohibitions, including information, cost-sharing, and technical assistance;
- Identifying enforcement procedures, including notice and appeal procedures; and
- Including a multi-year work plan to achieve soil and water conservation objectives.

Counties can receive state cost-share funds for BMP installation once the LWRM has been completed and approved by DATCP.

Federal programming to support nonpoint source mitigation efforts:
WDNR, and its federal, state and local partners, will identify opportunities for leveraging implementation programming and funding to target appropriate phosphorus and sediment reduction implementation efforts to critical areas in the LPWW.

United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) WDNR Environmental Quality Incentive Program (EQIP) and/or USDA-FSA Conservation Reserve Program (CRP): EQIP and CRP resources can be used to accelerate conservation actions toward reducing nutrient and sediment loading in the LPWW (Section 6.3.9 of the final TMDL document). EQIP provides technical and financial assistance to producers for practices aimed at improving agricultural operations and natural resource conservation. Conservation practices under EQIP that target reducing phosphorus inputs (e.g., via the use of variable rate fertilization and/or subsurface placement of fertilizers), reducing erosion (e.g., via the use of cover crops) and better manage water quantity (e.g., via drainage water management).

CRP is a program which provides funding to producers that remove environmentally sensitive land from agricultural production areas and install conservation practices (e.g., riparian buffers, wetlands,

etc.). The goals of the CRP are to improve water quality, prevent soil erosion and reduce loss of wildlife habitat. WDNR advocates the deployment of BMPs that reduce phosphorus and sediment sources/promote nutrient retention, reduce erosion and improve water quantity storage on the landscape in critical subbasins the LPWW. Conservation programming that aligns with these goals should be leveraged and expanded as much as possible in the watershed.

USDA-FSA Conservation Reserve Enhancement Program (CREP): The USDA-FSA's CREP is a component of the USDA-FSA's CRP and designed to address conservation activities on agricultural lands in specific geographic areas, such as the LPWW. These incentives encourage landowners to enroll new acres or maintain existing acres in conservation practices (e.g., filter strips, saturated buffers, wetlands and wooded riparian buffers).

USDA-NRCS Regional Conservation Partnership Program (RCPP): The USDA-NRCS's RCPP promotes coordination between NRCS and its partners to deliver conservation assistance to producers and landowners.

Water Quality Trading (WQT) and Adaptive Management (AM): Available to eligible municipal and industrial wastewater dischargers to demonstrate compliance with final TMDL WLAs. These options provide a watershed-based opportunity to reduce pollutant loading through point and nonpoint source collaboration.

Phosphorus Multi-discharger Variance: Variances were developed to assist in extending the timeline to wastewater dischargers. In exchange, point sources commit to assist in reduction from NPS loading.

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.

EPA Review of the final LPWW TMDL:

Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation efforts utilized in the LPWW. Water quality monitoring information will aid watershed managers in understanding how BMP pollutant removal efforts are impacting water quality throughout the watershed. Water quality monitoring combined with reviews of BMP efficiency will provide information on the success or failure of BMP systems designed to reduce phosphorus and sediment loading events to the water bodies of the LPWW. Watershed managers will have the opportunity to reflect on the progress or lack of progress made by implementation efforts and will

have the opportunity to revise/alter their existing implementation strategy if they deem that progress is unsatisfactory. Review of BMP efficiency is expected to be completed by local implementing partners (e.g., County LWCDs).

WDNR describes its post-implementation monitoring plan in Section 6.4 of the final TMDL document. WDNR and/or its partners (e.g., local citizen monitoring groups) will complete water quality monitoring efforts in the LPWW in areas where management practices have been installed in response to post-TMDL implementation efforts. These monitoring locations would include sites where WDNR, DATCP and/or NRCS grant monies have sponsored on-the-ground BMPs designed to mitigation phosphorus loading in the LPWW. WDNR explained that water quality monitoring will occur as staff and fiscal resources allow until it is determined that stream and/or lake water quality is meeting its codified designated uses and applicable water quality standards (Section 6.4 of the final TMDL document).

Certain water quality monitoring sites in the LPWW may also be monitored, on a rotational basis, as part of Wisconsin's statewide water quality monitoring strategy. Wisconsin's statewide water quality monitoring strategy collects data in order to assess current water quality conditions, to track water quality trends over time and monitor metrics for habitat and biota. WDNR will also work with citizen monitoring groups to assist and supplement WDNR data.

Section 6.4.1 of the final TMDL document discusses the State tracking database "BMP Implementation Tracking System" (BITS) that facilitates data submission on location and information regarding the BMPs in the LWPP. WDNR explained there are currently five modules to track various BMP efforts, and additional modules are planned.

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.

EPA Review of the final LPWW TMDL:

WDNR explained in Section 6.1 of the final TMDL document that its implementation approach will build off previous and ongoing planning and implementation efforts to mitigate phosphorus inputs to the surface waters of the LPWW. WDNR and its implementing partners (e.g., LWCDs) will determine the most effective mix of federal, state and county-based programming to maximize the available implementation resources to generate the greatest water quality improvements in the LPWW. Local implementing partners have access to a variety of programs and grant opportunities to assist in selecting and sitting BMPs to critical areas of the LPWW in order to amplify phosphorus reductions and

attain the pollutant reduction goals of the final TMDL. Implementation may occur across multiple sectors (e.g., individual permittees, general permits, nonpoint sources) and in different settings (e.g., urban land use areas and agricultural land use areas). The diversity of implementation approaches helps ensure that point and nonpoint source reductions efforts will occur in the watershed.

WDNR estimated percent reductions of phosphorus (Table B4 of Appendix B of the final TMDL document) for each individual subbasin in the LPWW. Providing these reduction estimates for individual subbasins will help inform local planning efforts to enable the attainment of the water quality goals of the final TMDLs.

WDNR acknowledged that implementation efforts to reduce phosphorus and sediment sources to the LPWW will involve both point source and nonpoint source reduction activities. In additon to the activities discussed in Section 8 of this Decision Document (Reasonable Assurance), WDNR included addition explanation of implementation activities for the LPWW.

Ongoing Implementation Activities:

WDNR noted that there are currently three Nine Key Element Plans (9KEP) in development in portions of the watershed (Table 12 of the final TMDL document). These plans are part of Section 319 of the Clean Water Act and contain milestones and goals to meet LAs in the appropriate watersheds. These plans are expected to include agricultural field erosion/risk rankings and loading model results completed by a contractor.

In 2022 and 2023, WDNR and their contractor developed edge-of-the-field agricultural baseline phosphorus results and targets to address phosphorus runoff from fields (Section 6.1.1 of the final TMDL document). WDNR utilized their EVAAL model to identify fields that are the most susceptible to erosion, which will be prioritized for BMPs (Appendices C and D of the final TMDL document).

Approaches to address nonpoint source contributions:

Manure collection and storage practices: WDNR identified manure as a nutrient rich fertilizer which is commonly spread on agricultural fields in the LPWW. Nutrients from manure can be transported to surface water bodies via stormwater runoff and can also leach into groundwater resources. Improved strategies for the collection, storage (e.g., repairing storage facilities/infrastructure, building roofs over storge areas) and management of liquid and dried manure can minimize the potential for nutrients derived from manure to enter surface and groundwater systems.

Manure management plans: Developing manure management plans can ensure that the storage and application rates of manure are appropriate for soil conditions. Determining application rates that take into account the crop to be grown on that particular field, the soil type and the existing phosphorus concentrations of the fields where the manure is planned to be spread will ensure that the correct amount of manure is spread on a field given the conditions. Spreading the correct amount of manure will reduce the availability of nutrients derived from manure to migrate to surface and groundwaters.

Livestock feedlot runoff controls: Slowing and holding surface stormwater runoff from feedlot areas via diversion structures, holding and/or storage areas, and treating the stormwater runoff via stream buffers or settling/sediment traps can reduce the transmission of nutrients derived from manure to

surface waters. Additionally, landowners can consider diverting potential stormwater runoff from non-feedlot areas away from feedlot areas to minimize the introduction of additional stormwater runoff to feedlot areas. Additionally, introducing rotational grazing to increase grass coverage in pastures, and maintaining appropriate numbers of livestock per acre for grazing, can also aid in the reduction of phosphorus inputs.

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.

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

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

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

Wetland restoration and preservation: The creation of wetlands, via man-made or constructed wetlands, and/or the preservation or restoration of existing wetlands can create phosphorus ‘sinks’ and slow water transport across the landscape in the LPWW. Wetlands provide nutrient and sediment reduction opportunities and water quality benefits by slowing the movement of water across the landscape by intercepting and slowing overland runoff. Capturing overland runoff reduces peak flooding and erosion of streambanks during high streamflow events. Wetland ecosystems are also beneficial in that they provide habitat for fish and other wildlife.

Urban/residential nutrient reduction strategies: These strategies involve reducing stormwater runoff from urban/suburban areas and lakeshore homes in the LPWW. 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 phosphorus and sediment reduction efforts and their impact on water quality.
Municipal activities: Municipal programs, such as street sweeping in urban/suburban areas, can also aid in the reduction of phosphorus to surface water bodies within the LPWW. Municipal partners can team with local watershed groups or LWCD partners to assess how best to utilize their monetary resources for installing new stormwater BMPs (e.g., vegetated swales) or retrofitting existing stormwater BMPs.

Internal load reduction strategies: Minimizing the contribution from internal loads to lakes in the LPWW may be addressed to meet the lake phosphorus TMDL allocations. WDNR recommends that before any strategy is put into action, an intensive technical review, to evaluate the costs and feasibility of internal load reduction options be completed. Several options should be considered to manage internal load inputs to each of the water bodies addressed in this TMDL.

- *Management of fish populations:* Monitor and manage fish populations to maintain healthy game fish populations and reduce rough fish (i.e., carp, bullheads, fathead minnows) populations.
- *Vegetation management:* Improved management of in-lake vegetation in order to limit phosphorus loading and to increase water clarity. For example, controlling the vitality of curly-leaf pondweeds via chemical treatments (i.e., herbicide applications) can reduce a potential source of internal loading, the senescence of curly-leaf plants in the summer months.

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 for 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.

EPA Review of the final LPWW TMDL:
Section 7 of the final TMDL outlines Wisconsin's public participation process during the development and drafting of the final TMDL. WDNR held a comment period for the draft LPWW TMDL. WDNR accepted comments on the draft final TMDL during a comment public period that started on April 16, 2026, and concluded on May 15, 2026. A public informational meeting was held on April 27, 2026, to present the LPWW TMDL to the public. No comments were received.

The EPA finds that the TMDL document submitted by WDNR 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.

EPA Review of the final LPWW TMDL:

The EPA received the final Lake Pepin (Wisconsin) Watershed TMDL document, submittal letter and accompanying documentation on July 6, 2026. In the submittal letter, WDNR stated that the final TMDLs and supporting Appendices were submitted to EPA pursuant to Section 303(d) of the Clean Water Act and 40 C.F.R. §130 for EPA review and approval.

The EPA finds that the TMDL submittal letter for the Lake Pepin (Wisconsin) Watershed TMDL by WDNR satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the two stream phosphorus TMDLs and the one lake phosphorus TMDL satisfy all elements for approvable TMDLs. This TMDL approval is for **three TMDLs**, addressing segments for fish and aquatic life use (Table 1 of this Decision Document).

The EPA's approval of these TMDLs extends to the water bodies which are identified in Table 1 of this Decision Document 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.

Table 4: TMDL summary

(from Table B2: Daily Total Phosphorus Load Allocations by TMDL Subbasin of Appendix B of the final TMDL document)

Note: Some columns names have been abbreviated: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Amounts shown are rounded; therefore, subtotals and totals may not sum exactly.

TMDL Subbasin	TMDL Subbasin Name	Total (LA+WLA+RC) (lbs./day)	LA (BG+Ag+NPU) (lbs./day)	BG (lbs./day)	Agric. (lbs./day)	NPU (lbs./day)	WLA (GP+MS4+IP) (lbs./day)	GP (lbs./day)	MS4 (lbs./day)	IP (lbs./day)	RC (lbs./day)
1	Trimbelle River—mile 19.0 to headwaters	**11.51**	**11.30**	3.29	7.79	0.22	**0.14**	0.14	0.00	0.00	**0.07**
2	Rush River—mile 34.3 to headwaters	**30.17**	**23.16**	2.74	17.62	2.80	**6.91**	0.19	0.00	6.72	**0.10**
3	Rush River—mile 25.9 to mile 34.3	**14.13**	**13.88**	3.51	10.13	0.24	**0.16**	0.16	0.00	0.00	**0.09**
4	Cave Creek	**9.93**	**9.79**	1.70	7.88	0.20	**0.10**	0.10	0.00	0.00	**0.05**
5	Lost Creek (tributary to Rush River)	**12.32**	**12.15**	1.86	10.10	0.19	**0.11**	0.11	0.00	0.00	**0.06**
6	Rush River—mile 13.4 to mile 25.9	**12.23**	**12.03**	2.46	9.39	0.18	**0.13**	0.13	0.00	0.00	**0.07**
7	Rush River—mouth to mile 13.4	**11.50**	**11.33**	1.87	9.20	0.27	**0.11**	0.11	0.00	0.00	**0.06**
8	Pine Creek	**7.53**	**7.42**	1.05	6.33	0.05	**0.07**	0.07	0.00	0.00	**0.04**
9	Mississippi River	**7.54**	**6.23**	2.41	2.28	1.53	**1.28**	0.06	0.00	1.22	**0.03**
10	**Lake Pepin**	**27.26**	**23.41**	13.30	8.42	1.69	**3.72**	0.24	0.00	3.48	**0.13**
11	Mississippi River	**26.59**	**22.03**	4.03	16.12	1.88	**4.45**	0.20	0.00	4.24	**0.11**
12	Trimbelle River—mouth to mile 19.0	**14.84**	**14.61**	3.07	10.52	1.01	**0.15**	0.15	0.00	0.00	**0.08**
13	Big River	**8.27**	**8.13**	1.92	5.99	0.23	**0.09**	0.09	0.00	0.00	**0.05**
14	Little Trimbelle River	**9.28**	**9.15**	1.44	7.40	0.31	**0.09**	0.09	0.00	0.00	**0.05**
15	Rush River—mouth to mile 7.4	**13.28**	**12.70**	2.42	10.18	0.10	**0.52**	0.13	0.00	0.39	**0.07**
16	Isabelle Creek	**24.85**	**17.69**	2.88	13.81	1.00	**7.07**	0.17	0.00	6.90	**0.09**
17	**Bogus Creek**	**6.19**	**6.12**	1.44	4.60	0.08	**0.05**	0.05	0.00	0.00	**0.03**
18	**Lost Creek (tributary to Lake Pepin)**	**4.12**	**4.07**	2.44	1.59	0.04	**0.03**	0.03	0.00	0.00	**0.02**

Note – waters in red are the three impaired segments noted in Table 1 of this Decision Document