2022 Wisconsin River TMDL Update Decision Document

TMDL: Revisions to the Wisconsin "Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin" Based upon the 2022 (Listing Cycle) Integrated Report
Approval Date: 02/16/2022

Background

On April 26, 2019, the United States Environmental Protection Agency approved the Wisconsin River Total Phosphorus Total Maximum Daily Loads (TMDLs) submitted by the State of Wisconsin.[1] For purposes of this Decision Document, the Wisconsin River Watershed TMDLs approved on April 26, 2019 will be referred to as the "Original TMDL." The Original TMDL addresses certain water bodies not meeting aquatic life uses due to exceedances of the numeric phosphorus water quality standard (WQS). The EPA is clarifying that these revisions are titled the 2022 Revisions. As noted below, these revisions are part of the Wisconsin Integrated Report cycle for 2022.

The Original TMDL was developed by the Wisconsin Department of Natural Resources (WDNR) and established load allocations (LA) for nonpoint sources and wasteload allocations (WLA) to point sources, including wastewater treatment facilities, and industrial discharges. A margin of safety (MOS) was established for the Wisconsin River Watershed TMDL.[2]

WDNR assesses phosphorus concentration data on a biennial basis in accordance with its water quality monitoring strategy. This data is most currently assessed according to WDNR's approach described in its 2022 Methodology documents.[3]

WDNR analyzes and assesses new phosphorus data every 2 years and revises the list of waters in Appendix S-2 of the revised TMDL accordingly. Biennial revisions to Appendix S-2 include adding individual water body segments, based upon the new assessments.

2022 Revisions to the Wisconsin River Watershed Phosphorus TMDL

EPA is approving the 2022 Revisions to Appendix S-2 based on the information submitted by the State of Wisconsin on January 19, 2022. The 2022 Revisions were completed using water quality data collected and analyzed for the 2022 Integrated Report listing cycle. The 2022 Revision process does not make any changes to the TMDL targets of the Original TMDL, or the reduction factors, loading capacities, allocations, reduction goals or other TMDL equation elements of the TMDL established in the Original TMDL.

Identification of water bodies for the 2022 Revisions

During the 2022 303(d) Integrated Report listing cycle, WDNR collected and analyzed phosphorus data and compiled a list of waterbody segments which demonstrated phosphorus

[1] TMDL Decision Document dated April 26, 2019.
[2] WDNR, *Wisconsin River Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin*, January, 2019.
[3] WDNR, Wisconsin 2022 Consolidated Assessment and Listing Methodology; January 2021.

impairments consistent with the Original TMDL. WDNR proposed adding this subset of waterbody segments to the Original TMDL's Appendix S-2.

The State identified 10 new lake and river waterbody segments for inclusion in Appendix S-2 for the 2022 Revision to the Wisconsin River Watershed TMDL (Table 1 of this Decision Document). EPA reviewed these proposed water body segments and determined that the proposed water body segments are acceptable to be included in the 2022 Revisions to the Original TMDL.

EPA Assessment:
EPA finds the State's decision to include 10 new water body segments to Appendix S-2 in the 2022 TMDL Revision is reasonable and appropriate. Waterbodies added to Appendix S-2 were identified by the State as having excessive concentrations of phosphorus that exceeded the appropriate WQSs.

Public Participation for the 2022 Revisions
WDNR included information related to the revision of its Wisconsin River Watershed TMDL as part of its 2022 303(d) submittal to EPA. Wisconsin submits its 303(d) list to EPA every two years to fulfill the reporting requirements of Section 303(d) of the CWA. As part of this submittal process, WDNR must provide the public with the opportunity to review and comment on assessment decisions made for the 303(d) list, including the opportunity to provide input on water bodies included or not included within WDNR's efforts to revise its Wisconsin River Watershed TMDL.

WDNR made available its draft 2022 303(d) list, which included draft 2022 Revision information, for public comment from October 16, 2021 to October 21, 2021. An additional public notice period was held from November 29, 2021 to January 7, 2022, to seek additional comments on the revision to the Wisconsin River Watershed TMDL. Information regarding the availability of the 303(d) public notice materials was communicated to the general public through news releases, WDNR's gov.delivery emailing database and WDNR's website. WDNR received no comments regarding the revision of the TMDL.

EPA Assessment:
EPA reviewed the public participation information submitted by the State and concluded that WDNR adequately addressed public comments regarding bacteria impairments. EPA also reviewed information made available by WDNR to the public for review and comment, and WDNR's announcement of the public comment periods. EPA finds that the State of Wisconsin's public participation processes for the 2022 Revisions to the Wisconsin River Watershed Phosphorus TMDL were appropriate and that WDNR provided the general public with reasonable opportunity to review and comment on the proposed revisions to the Statewide Bacteria TMDL for 2022 303(d) listing cycle.

Tribal Consultation
Pursuant to Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments* and with the *EPA Policy on Consultation and Coordination with Indian Tribes*

(May 2011), EPA invited tribal consultation on its review of the 2022 Revisions. No response from the Tribes was received.

Conclusion

EPA has completed a full review of the information provided by WDNR on January 19, 2022, and other appropriate supporting information. EPA finds that pursuant to Section 303(d) of the CWA, 33 U.S.C. Section 1313(d), and EPA's implementing regulations at 40 CFR Part 130, the 2022 Revisions satisfy the elements of an approvable TMDL. This approval addresses changes to Appendix S-2 of the Wisconsin River Watershed Phosphorus TMDL as described in the State's 2022 Revisions. No other elements or documentation relating to the original or subsequent approvals of this TMDL are being revised.

Tables

Table 1: 2022 Revised Wisconsin River Watershed Phosphorus TMDL: 2022 Additions to Appendix S-2

Attachments

Attachment 1: EPA's April 26, 2019 approval of the Wisconsin River Watershed Phosphorus TMDL submitted to EPA on January 11, 2019

Table 1: Additional Waterbodies and impairment listings addressed by the 2019 TMDL report (Table S-2 of 2022 update).

Waterbody Name	WATERS ID (AU ID)	WBIC	EPA ID	County	Start Mile	End Mile	Pollutant Source	Impairment(s)	Pollutant	TMDL Subbasin(s)	Waterbody Criteria (ug/L)	Subbasin Target (ug/L)	Downstream Target (ug/L)
E. Fk. Hemlock Creek	12227	1367800	WI10001884	Wood	0	11.02	NPS	Impairment Unknown	TP	201 and 314	75	75	75 and 75
Hemlock Creek	18327	1366300	WI8154784	Wood	27	32.9	PS/NPS	High Phosphorus Levels	TP	201	75	75	75
Moccasin Creek	12268	1388000	WI10026140	Wood	5.04	19.09	NPS	Impairment Unknown	TP	256	75	75	69
Silvernagle Creek	18369	1467400	WI10006332	Taylor	0	9.16	PS/NPS	High Phosphorus Levels	TP	276	75	75	26
South Squaw Creek	12362	1420500	WI10001975	Marathon, Wood	0	8	NPS	High Phosphorus Levels	TP	150	75	75	75
Unnamed Creek (T23n,R6e,S26,Sesw,72)	12272	1397200	WI8154892	Wood	0	1.42	PS/NPS	High Phosphorus Levels	TP	144 and 259	75	100 and 75	54 and 47
Unnamed Stream	6921935	1281500	WI10042164	Juneau	0	2.39	NPS	Impairment Unknown	TP	16	75	75	56
Unnamed Trib to W Fk Little Rib River	5513762	1453200	WI10033020	Marathon	1.31	2.38	NPS	Impairment Unknown	TP	292	75	75	33
Unnamed Tributary	8110237	5009741	WI10044421	Taylor	0	1.45	NPS	High Phosphorus Levels	TP	100	75	75	31
West Branch Eau Claire River	7155592	1445700	WI10044120	Langlade	31.94	32.79	NPS	Degraded Biological Community	TP	108	75	75	46

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

APR 2 6 2019

REPLY TO THE ATTENTION OF
WW-16J

Adrian Stocks, Director
Water Quality Bureau
Wisconsin Department of Natural Resources
101 S. Webster Street
Box 7921
Madison, Wisconsin 53707-7921

Dear Mr. Stocks:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDLs) for the Wisconsin River Basin, including supporting documentation and follow up information. The Wisconsin River Basin is located in central Wisconsin, in portions of 22 counties. The TMDLs were calculated for total phosphorus. The TMDLs address the impairment of aquatic recreational and aquatic life uses.

EPA has determined that these TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, EPA hereby approves Wisconsin's 128 TMDLs in the Wisconsin River Basin. The statutory and regulatory requirements, and EPA's review of Wisconsin's compliance with each requirement, are described in the enclosed decision document. EPA also agrees that the protection measures outlined in the TMDL document for the remaining unimpaired waterbodies are sufficient to maintain the existing water quality. EPA agrees these measures are appropriate for consideration as "protection strategies" as described in "A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program".

We wish to acknowledge Wisconsin's effort in submitting these TMDLs and protection strategies, addressing aquatic recreational and aquatic life uses, and look forward to future submissions by the State of Wisconsin. If you have any questions, please contact Mr. David Pfeifer, Acting Chief of the Watersheds and Wetlands Branch, at 312-353-9024.

Sincerely,

Joan M. Tanaka
Acting Director, Water Division

Enclosure

cc: Kevin Kirsch, WDNR

TMDL: Wisconsin River Watershed TMDL, WI
Date: 04/26/2019

DECISION DOCUMENT FOR THE WISCONSIN RIVER WATERSHED TMDL, WI

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

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

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

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

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

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

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

Comment:

Location Description/Spatial Extent:

The Wisconsin Department of Natural Resources (WDNR) has submitted TMDLs to address water quality impairments in the Wisconsin River Basin. The Wisconsin River Basin is located in all or parts of 22 counties in central Wisconsin (Figures 1 and 2 of the TMDL). The river flows from just over the border between the upper peninsula of Michigan and Wisconsin, south through central Wisconsin, turns southwest near Portage, Wisconsin, and eventually flows into the Mississippi River near Prairie du Chien, Wisconsin. The Wisconsin River Basin is approximately 9,156 square miles, covering approximately 15% of the state. The mainstem portion of the river that is addressed by the TMDL flows 335 miles and stretches from the headwaters to Lake Wisconsin (Section 1 of the TMDL). The Wisconsin River Basin hydrology has been altered over the years. There are 25 hydroelectric dams on the mainstem, and 21 storage reservoirs on the tributaries of the river.

The Basin is subdivided into four regions by the WDNR (Figure 2 of the TMDL).

Lower Region: The Lower region extends from Castle Rock Reservoir downstream to Lake Wisconsin, a large reservoir on the mainstem of the Wisconsin River. The major tributaries include the Lemonweir River and the Baraboo River. Lake Wisconsin is the downstream end of the Wisconsin River TMDL project (Figure 3 of the TMDL).

Central Region: The Central region extends from just south of Lake DuBay to the Castle Rock Reservoir. Major tributaries include the Yellow River, Mill Creek, Plover River, and two large reservoirs on the main stem, the Petenwell Reservoir and the Castle Rock Reservoir (Figure 4 of the TMDL).

Upper Region: The Upper region extends from just south of the Spirit River watershed downstream to the Little Eau Pleine River/Lake DuBay. Major tributaries include the Eau Claire River, Rib River, Big Eau Pleine River, Little Eau Pleine River, and two large reservoirs, the Big Eau Pleine Reservoir (at the base of the Big Eau Pleine River) and Lake DuBay (on the mainstem of the Wisconsin River) (Figure 5 of the TMDL).

Headwaters Region: The Wisconsin River begins in Lac Vieux Desert, a lake on the border between Wisconsin and Michigan. The Headwaters region begins at Lac Vieux Desert and ends at the Spirit River watershed. Major tributaries include the Eagle River, Gilmore Creek, Tomahawk River, Pelican River, Somo River, and Spirit River (Figure 6 of the TMDL).

The TMDL addresses 120 river segments and nine lakes impaired due to excess nutrients (phosphorus). WDNR also identified several other impairments in Table 1 of this Decision Document (i.e., low DO, degraded biological community, etc.) that will also be addressed by reductions in phosphorus (Table 1 of the TMDL). Table 1 of this Decision Document identifies the waterbodies with approved TMDLs (Table 1 and Figures 3-6 of the TMDL). As further discussed in Section 3 of this Decision Document, the modeling effort determined allocations for all waters in the subbasins, including non-impaired waterbodies. These allocations are considered protection

strategies as described in "A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program".

Table 2 of this Decision Document (Table 3 of the TMDL) identifies the nine lakes impaired due to excessive nutrients. These impairments include low DO, eutrophication, excess algal growth, as noted in the table.

Land Use:
The Wisconsin River Basin is mainly forested land, with a mixture of grassland and agricultural land in the more southern portion. The Headwaters region is mainly forest (over 75%), with limited agricultural land use. The Upper region is a transition area with predominantly forest in the northern section transitioning to mixed forest and agricultural lands further south. The Central and Lower regions are more agricultural in use (30%-50%) and less forest (30%).

Appendices A and D of the TMDL provides a detailed analysis of each tributary watershed (31 in total). The agricultural land use was further described based upon the types of crops and cropping practices. Section 3 of this Decision Document further summarizes how land use and land management were utilized in development of the TMDL.

WDNR identified Tribal lands within the Basin boundaries. A portion of the watershed includes the Lac du Flambeau Band of Lake Superior Chippewa Indians and the Ho-Chunk Nation of Wisconsin Tribal Reservations. Table 6 of the TMDL documents the area in acres for each portion of Tribal land, and the subbasin within which the land is contained. Figure 8 of the TMDL maps the locations of the Tribal lands in the Basin. The TMDL areas in Tables 1 and 2 of this Decision Document do not include the lands within the Lac du Flambeau Band of Lake Superior Chippewa Indians and the Ho-Chunk Nation of Wisconsin Tribal Reservations. The modeling effort discussed in Section 3 of this Decision Document excluded allocations to Tribal lands.

Problem Identification:
All the waterbodies in Table 1 and 2 of this Decision Document are on the 2016 WDNR 303(d) list of impaired waters. WDNR conducted extensive water quality and flow monitoring in support of the Wisconsin River TMDL development (Section 3 of the TMDL). Monitoring was performed over a 4-year period in the rivers and major lakes of the Basin.

River Monitoring: The Wisconsin River mainstem regularly met the phosphorus criteria (Figure 10 of the TMDL). WDNR established 13 monitoring stations along the mainstem, and measured water quality every two weeks (Section 3.1 of the TMDL). Several of the sites are also part of the Wisconsin Long Term Trends River Monitoring network and have been monitored for several decades. Monitoring was also performed at 19 sites on tributaries of the Wisconsin River (Figure 11 of the TMDL). Several of these watersheds showed exceedences of the phosphorus criteria. The watersheds on the western side of the Basin (i.e., Big Eau Pleine River, Little Eau Pleine River, Baraboo River, etc.) significantly exceeded the phosphorus criteria, while tributaries on the east side of the Wisconsin River (Prairie River, Plover River, Tenmile River, etc.) did not exceed the phosphorus criteria.

Reservoir Monitoring: Water quality parameters were monitored from April-October at 20 sites on the five major reservoirs (Figure 12 and Section 3.2 of the TMDL). Hourly flow data were also gathered for the Petenwell and Castle Rock dams. For the reservoirs, parameters were measured at one-meter intervals from the surface to the lake bottom. Algae samples were gathered to identify the major algal species present. The lakes listed as impaired in Table 2 of this Decision Document have had significant algal blooms over the last 20 or more years, as well as several fish kills. Individual lake and reservoir criteria below vary based on the waterbody classification as a stratified or unstratified reservoir, or as a river if there is a short residence time.

Big Eau Pleine Reservoir: Big Eau Pleine Reservoir is a 6,348 acre storage reservoir on the Big Eau Pleine River. As a stratified reservoir, it has a phosphorus criterion of 20 ug/L. Monitoring results indicate the reservoir significantly exceeds the criterion.

Lake DuBay: Lake DuBay is a 4,649 acre reservoir on the Wisconsin River. The Big Eau Pleine reservoir discharges into Lake DuBay. The lake has a short residence time, and therefore the applicable phosphorus criterion is the river criterion of 100 ug/L. Monitoring results indicate the lake is attaining the phosphorus criterion.

Lake Wisconsin: Lake Wisconsin is a 7,197 acre impounded reservoir on the Wisconsin River. It is the downstream-most waterbody of the Wisconsin River Basin TMDL. The lake has a retention time of less than 14 days, and therefore under WDNR rules the applicable phosphorus criterion is the river phosphorus criterion of 100 ug/L (Section NR 102.06 (4); Appendix C of the TMDL). Monitoring results indicate that the lake is meeting the numeric phosphorus criteria, but has significant algal blooms. WDNR is pursuing a site-specific criteria (SSC) change for the lake.

Petenwell Reservoir: The Petenwell Reservoir is 23,173 acres in size, the second largest inland lake in Wisconsin. The reservoir is located on the Wisconsin River. As an unstratified reservoir, it has a phosphorus criterion of 40 ug/L. Monitoring results indicate the reservoir is significantly exceeding the phosphorus criterion.

Castle Rock Reservoir: Castle Rock Reservoir is 12,981 acres in size, and is the fifth largest inland lake in Wisconsin. The reservoir is located just downstream of Petenwell Reservoir. As an unstratified reservoir, it has a phosphorus criterion of 40 ug/L. Monitoring results indicate the reservoir is significantly exceeding the phosphorus criterion.

Lake Redstone: Lake Redstone is a 605 acre reservoir on Big Creek. The lake is a stratified reservoir and has a phosphorus criterion of 30 ug/L. The lake is in an agricultural watershed, and runoff results in phosphorus exceedences and late-summer algal blooms.

Kawaguesaga Lake /Minocqua Lake: These two lakes form the lowermost lakes in a chain of lakes in Oneida County. Kawaguesaga Lake is 700 acres in size and has a maximum depth of 44 feet. Lake Minocqua is 1339 acres, with a maximum depth of 61 feet. Both lakes are defined as two-story fishery lakes, and have a phosphorus criterion of 15 ug/L. Monitoring results indicate the reservoir is significantly exceeding the phosphorus criterion.

Lake Delton: Lake Delton is 249 acres in size, and is located in the Wisconsin Dells resort area. It has an average depth of 12 feet, and as an unstratified reservoir has a phosphorus criterion of 40 ug/L. Monitoring results indicate the reservoir is significantly exceeding the phosphorus criterion.

Pollutant:
Total phosphorus: While phosphorus is an essential nutrient for aquatic life, elevated concentrations of phosphorus can lead to eutrophication and 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).

Degradations in aquatic habitats or water quality (ex. low dissolved oxygen) can negatively impact aquatic life use. Increased algal growth, brought on by elevated levels of nutrients within the water column, can reduce dissolved oxygen in the water column, and cause large shifts in dissolved oxygen and pH throughout the day. Shifting chemical conditions within the water column may stress aquatic biota (fish and macroinvertebrate species). In some instances, degradations in aquatic habitats or water quality have reduced fish populations or altered fish communities from those communities supporting sport fish species to communities which support more tolerant rough fish species.

Source Identification (point and nonpoint sources):
Point Source Identification: WDNR identified 109 permitted wastewater dischargers in the Basin, both municipal wastewater treatment facilities (WWTF) and industrial wastewater facilities (Table 3 of this Decision Document, Section 4.1.1.1 of the TMDL, Figures 26-29 of the TMDL and Table J-3 of Appendix J of the TMDL). Municipal and industrial wastewater facilities can discharge phosphorus in accordance with their NPDES permit. The concentrations and loads vary by facility.

WDNR also identified 15 Municipal Separate Storm Sewer Systems (MS4s) in the watershed (Table 4 of this Decision Document, Section 4.1.1.3 of the TMDL, Tables 9 and 13 of the TMDL, Figures 30-32 of the TMDL, and Table J-4 of Appendix J of the TMDL). Phosphorus can enter the systems after being washed off the land surface. Pet and wildlife (i.e., geese) waste, fertilizer runoff and organic debris are often the source of phosphorus in urban areas. Improper connections between sanitary lines and stormwater lines can be a source of phosphorus as well. High flow rates in the streams can erode streambanks and contribute large amounts of sediment and total suspended solids (TSS) to the waterbodies.

A total of 26 Concentrated Animal Feeding Operations (CAFOs) were identified in the Wisconsin River watershed (Table 11 of this Decision document, Section 4.4.2.4 of the TMDL, Table 14 of the TMDL). CAFOs are generally defined as having over 1000 animal units confined for more than 45 days in a year. Under WDNR NPDES (WPDES) permit requirements, discharges of pollutants from CAFOs are not allowed except under extreme circumstances (24-hour storm duration exceeding the 25-year recurrence interval), and therefore no allocations were developed for the manure-handling facilities. Runoff from the spreading of manure in agronomic rates is not regulated as a point source discharge and is therefore considered in the non-point source load discussed below.

WDNR determined that various types of facilities operate under general permits to control discharges. These include CAFOs, nonmetallic mining sites, non-contact cooling water (NCCW), car washes, etc. Section 5 of the Decision Document discusses how loads from general permits were addressed in the TMDL.

Nonpoint Source Identification: The potential nonpoint sources for the Wisconsin River watershed TMDLs are discussed in Section 4.1.2 of the TMDL:

Non-regulated stormwater runoff: Non-regulated stormwater runoff can add phosphorus to the waterbodies. Runoff from urban areas (urban, residential, commercial or industrial land uses) can contribute pollutants to local water bodies. Stormwater from urban areas (not regulated under an MS4 permit) which drain impervious surfaces, may introduce pollutants (derived from wildlife, pet droppings, fertilizer) to surface waters.

Stormwater from agricultural land use practices and feedlots: Smaller animal feeding operations, in close proximity to surface waters, can be a source of phosphorus to water bodies in the Wisconsin River watershed. These areas may contribute pollutants via the mobilization and transportation of pollutant laden waters from feeding, holding and manure storage sites. Runoff from agricultural lands may contain significant amounts of phosphorus from chemical fertilizers which may lead to impairments in the watersheds. Feedlots generate manure which may be spread onto fields. Runoff from fields with spread manure or chemical fertilizer can be exacerbated by tile drainage lines, which channelize the runoff flows.

Background Sources: Wildlife is a known source of phosphorus in water bodies as many animals spend time in or around water bodies. Deer, geese, ducks, raccoons, and other animals all create potential sources of bacteria. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as park areas, forest, and rural areas. Plant materials, wetlands, and soils can contain phosphorus, which can contribute to phosphorus loading in the waterbodies.

Failing septic systems: WDNR noted that failing septic systems, where waste material can pond at the surface and eventually flow into the waterbodies or be washed in during precipitation events, are potential sources of bacteria and phosphorus. Much of the watershed is rural, and failing septic systems are noted as a source of pollutants in the watershed.

Internal loading: The release of phosphorus from lake sediments via physical disturbance from benthic fish (rough fish, ex. carp), from wind mixing the water column, and from decaying plants may all contribute internal phosphorus loading to the lakes. 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 loads of phosphorus should not be considered independent sources of phosphorus but are related to the other sources of phosphorus building up in the lakes.

Priority Ranking:
The Wisconsin River basin TMDL project was initiated by WDNR in 2008. The nutrient-impaired waters in the Wisconsin River basin were listed as high-priority for TMDL development by WDNR.

Future Growth:
To account for future growth in the watersheds, WDNR calculated a reserve capacity for each reach for phosphorus. A reserve capacity of 5% of the loading capacity for each reach was set aside for future growth for point sources only. In Section 6.6 of the TMDL, WDNR explains the process that will be followed for use of the reserve capacity, and that use of the reserve capacity will not be granted unless the need is demonstrated.

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 waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy (40 C.F.R. §130.7(c)(1)). EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

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

Comment:
Designated Uses:
Wisconsin Chapter NR 102 designates uses for waters of the state. As noted in Tables 1 and 2 of this Decision Document, the impaired waters addressed by these TMDLs are designated for a variety of uses. WDNR applied the criteria discussed below to both the impaired waters and the waters addressed by protection strategies.

Phosphorus:
Numeric phosphorus criteria for rivers and streams:
Numeric criteria for total phosphorus for rivers and streams are set forth in Section NR 102.06 of the Wisconsin Administrative Code. The criteria are **100 ug/L** (0.100 mg/L) phosphorus for rivers and **75 ug/L** (0.075 mg/L) phosphorus for streams (Section 1.5 and Table 5 of the TMDL). The 100 ug/L applies to the following waterbodies in the basin (NR 102.06(3)):

- Baraboo River from Highway 58 in La Valle to the Wisconsin River.
- Lemonweir River from outlet of New Lisbon Lake in New Lisbon to Wisconsin River, excluding Decorah Lake.
- Wisconsin River from the Rhinelander Dam to Mississippi River, excluding Lake Alice, Lake Mohawksin, Alexander Lake, Lake Wausau, Mosinee Flowage, Lake DuBay, Wisconsin River Flowage, Biron Flowage, Petenwell Flowage, Castle Rock Flowage and Lake Wisconsin.

For the rest of the flowing waterbodies in the basin, the 75 ug/L phosphorus criterion applies.

Numeric phosphorus criteria for lakes and reservoirs:
Numeric criteria for total phosphorus for lakes and reservoirs are set forth in Section NR 102.06 of the Wisconsin Administrative Code. Under WDNR regulations, reservoirs have a residence time of $\geq$ 14 days or more. Waters with less than 14 days residence time must meet the phosphorus criteria for the water flowing into the impoundment.

The criteria range from 15 ug/L to 40 ug/L phosphorus, depending upon the lake classification (Table 2 and Section 1.5 of the TMDL). The existing phosphorus criteria that apply to the waterbodies in the basin are in Table 5 of this Decision Document:

Table 5: Phosphorus Criteria for the Wisconsin River Basin TMDL Lakes

Waterbody	category	phosphorus criteria
Petenwell Reservoir[1]	Non-stratified reservoir	40 ug/L
Castle Rock Reservoir[1]	Non-stratified reservoir	40 ug/L
Lake Wisconsin[1]	Impounded flowing water	100 ug/L
Big Eau Pleine Reservoir	Stratified reservoir	30 ug/L
Kawaguesaga Lake	Two-story Fishery	15 ug/L
Minocqua Lake	Two-story Fishery	15 ug/L
Redstone Lake	Stratified Reservoir	30 ug/L
Lake DuBay	Impounded flowing water	100 ug/L
Lake Delton	Non-stratified reservoir	40 ug/L

[1] Current approved criteria, site-specific criteria are in development

Site-specific Criteria (SSC):
During the development of the TMDL, WDNR determined that three lakes (Petenwell Reservoir, Castle Rock Reservoir, and Lake Wisconsin) needed revised criteria to meet the appropriate designated uses (Section 1.5 of the TMDL; Table 6 of this Decision Document). WDNR is proposing a site-specific phosphorus criterion of 53 ug/L for Petenwell Reservoir, and a site-specific phosphorus criterion of 55 ug/L for Castle Rock Reservoir. WDNR is also proposing a site-specific criterion of 47 ug/L for Lake Wisconsin (Section 1.5 and Table 6 of the TMDL). Appendix C of the TMDL provides additional discussion of the proposed site-specific criteria. WDNR has provided two sets of allocations. The first set of allocations being approved in this Decision Document are based on the current criteria (Appendix J of the TMDL). The second set of allocations being approved are based on the proposed criteria (Appendix K of the TMDL).

This TMDL Decision Document does not opine upon the proposed criteria; the proposed criteria will be reviewed by the EPA Water Quality Standards program and will be decided upon under its authority. The proposed allocations contained in Appendix K of the TMDL were reviewed to determine if they are adequate to attain and maintain the proposed site-specific criteria. Only if the EPA Water Quality Standards program approves the currently proposed site-specific criteria, and those approved site-specific criteria are as seen in Table 6 of this Decision Document, will the allocations in Appendix K become applicable. If the EPA-approved site-specific criteria are not the same as in Table 6 of this Decision Document, then the allocations in Appendix K of the TMDL are not applicable and will need to be revised to ensure the loadings will attain and maintain the approved water quality standards. If revised criteria are not approved by the EPA, then the allocations in Appendix J will remain in effect.

Table 6: Proposed Phosphorus Site-Specific Criteria in the Wisconsin River Basin

Waterbody	Waterbody Type	Existing Criteria	Proposed Site-Specific Criteria
Petenwell Reservoir	Non-stratified Reservoir	40 ug/L	53 ug/L
Castle Rock Reservoir	Non-stratified Reservoir	40 ug/L	55 ug/L
Lake Wisconsin	Impounded Flowing Water	100 ug/L	47 ug/L

Lake Wisconsin:

Lake Wisconsin is a reservoir on the Wisconsin River, at the downstream-most end of the basin and TMDL focus area. The lake has a retention time of less than 14 days, and therefore under WDNR rules the applicable phosphorus criterion is the river phosphorus criterion of 100 ug/L (Section NR 102.06 (4); Appendix C of the TMDL). Water quality data reviewed by WDNR demonstrated that the lake currently meets the 100 ug/L phosphorus threshold, with a summer mean phosphorus concentration of 98 ug/L. However, WDNR determined that the algal blooms in the lake rendered the lake impaired for recreational use. As part of the phosphorus criteria development process, WDNR analyzed the relationship between phosphorus concentrations and chlorophyll-a concentrations, a commonly used surrogate for algal production, in the waterbody (*Protocol for Developing Nutrient TMDLs*, EPA, 1999). WDNR developed the proposed site-specific phosphorus criterion at thresholds that would maintain a 70th percentile chlorophyll-a concentration at < 20 ug/L from July 15-September 15. Currently, the summer mean chlorophyll-a concentration for Lake Wisconsin is 48 ug/L. Further detail on the SSC process can be found in Appendix C of the TMDL.

Lake DuBay:

Similar to Lake Wisconsin, Lake DuBay is an impounded reservoir on the Wisconsin River, just south of Wausau, Wisconsin (Figure 5 of the TMDL). Lake DuBay has a residence time of less than 14 days, so the lake must meet the inflowing river phosphorus criterion of 100 ug/L. The summer average phosphorus concentration is 91 ug/L, and the summer average chlorophyll-a concentration is 27 ug/L. These values indicated that the Lake DuBay is meeting the phosphorus criteria, but the recreational use is impaired (Appendix C of the TMDL). WDNR investigated if a SSC was needed for the lake, and determined that a SSC is not required at this time. WDNR determined that the phosphorus loads and related chlorophyll-a levels are directly related to the release of water from the Big Eau Pleine Reservoir. WDNR calculated that if the TMDL loadings are attained for the portion of the watershed upstream of the Big Eau Pleine Reservoir, and the Big Eau Pleine Reservoir meets the phosphrous criterion of 30 ug/L, then Lake DuBay will meet the chlorophyll-a target of <20 ug/L, and therefore attain the recreation use (Appendix C of the TMDL).

Phosphorus Target:
The TMDL targets for phosphorus for the Wisconsin River Basin TMDL are the phosphorus criteria of 100 ug/L and 75 ug/L for flowing waters, and 15-40 ug/L for lakes and reservoirs as noted in Tables 1 and 2 at the end of this decision document. The TMDL targets will be the values listed in Table 6 of this Decision Document if the proposed criteria are approved.

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

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). If the TMDL is expressed in terms other than a daily load, e.g., an annual load, the submittal should explain why it is appropriate to express the TMDL in the unit of measurement chosen. The TMDL submittal should describe the method used to establish other 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:
Functionally a TMDL is represented by the equation:

$$TMDL = LC = \Sigma WLA + \Sigma LA + MOS + RC,$$

where: LC is the loading capacity; WLA is the wasteload allocation; LA is the load allocation; MOS is the margin of safety; and (pursuant to WDNR rules) RC is any reserve capacity set aside for future growth.

The first step pursued by WDNR was to subdivide the Basin into smaller watersheds (Section 4.2 of the TMDL, Section 3.1 of Appendix D of the TMDL). Initially, the Basin was subdivided into

Hydrological Response Units (HRUs), which are field-sized units with a discrete combination of landcover, soil, and slope (Section 2.2 of Appendix D of the TMDL). The initial run developed tens of thousands of HRUs, which was impracticable to model. WDNR used the Soil and Water Assessment Tool (SWAT) to refine the number of HRUs to 5,351, a more manageable number for modeling purposes.

Next, the Basin was subdivided into 337 subwatersheds on the basis of several factors (Table 6 of the TMDL), such as the confluence of tributaries and significant changes in land use or cover. These basins averaged 26 mi^2, slightly smaller than the HUC 12 watershed area of 32 mi^2. The HRUs within each subbasin were modeled, and the loads calculated. The purpose of the subdivision was to assess pollutant load generation and receiving water loading capacity (Section 4.2 of the TMDL). Figures 15-18 of the TMDL map the locations of the 337 subbasins.

Once the subbasins were delineated, WDNR utilized several models to determine loading capacities for the subbasins.

Model summaries (River): The Wisconsin River TMDLs were developed using several models, as discussed in detail in Appendix D of the TMDL. The primary model is SWAT. SWAT simulates water flow and pollutant transport based upon land use, land cover, precipitation, and numerous other inputs. SWAT is used to determine pollutant loadings for each subbasin. As SWAT looks primarily at nonpoint source loads, WDNR also used Source Loading and Management Model for Windows (WINSLAMM). WINSLAMM estimates daily runoff and pollutant loading based upon precipitation, soil type, and land use. WINSLAMM focuses on urban lands, and the runoff from various urban land covers, such as parking lots, roofs, etc. The results from WINSLAMM were input into the SWAT model. The full SWAT model included the SWAT nonpoint source results, the WINSLAMM results, and loads from point source dischargers (WWTFs, industrial dischargers, etc.).

As part of the calibration and validation process, WDNR utilized the FLUXMASTER model to compare site-specific loads to model results. FLUXMASTER uses water quality sampling results paired with the corresponding streamflow to calculate a load. These results were then compared to the SWAT model results.

WDNR noted that additional modeling efforts were needed to address how phosphorus loads were transported downstream in the tributaries and mainstem of the Wisconsin River. SWAT results indicated that phosphorus was being deposited in the river channels, then being released over time. WDNR developed two sub-models, one for the tributaries and one for the mainstem, to account for the phosphorus loading and associated retention of phosphorus.

Model Summary (Lakes): A separate modeling effort was developed for the nine lakes and reservoirs addressed in the Wisconsin River Basin. Six lakes and one reservoir were modeled using the BATHTUB model, while two reservoirs were modeled using a model developed by Jensen et al, (2006) (Jensen Model). Table 7 of this Decision Document lists the lakes and models used to develop the TMDLs. The BATHTUB model is for lakes and reservoirs to determine steady-state water and nutrient mass balances in a spatially segmented hydraulic network. Two of the reservoirs were too hydrologically complex to model with BATHTUB; Petenwell Reservoir and Castle Rock

Reservoir were modeled using the Jensen model. The Jensen model is an empirical mass balance model using daily inflows of water and phosphorus to track the changes in phosphorus concentrations in the lakes. Both models were used to determine the lake loading capacities to attain the current and proposed water quality criteria.

Table 7: Models used for Lakes in the Wisconsin River Basin TMDL

Lake/Reservoir	Model
Petenwell Reservoir	Jensen Model
Castle Rock Reservoir (Main Body and Yellow River Arm)	Jensen Model
Big Eau Pleine Reservoir	BATHTUB
Lake DuBay	BATHTUB
Lake Wisconsin	BATHTUB
Lake Delton	BATHTUB
Lake Redstone	BATHTUB
Minocqua Lake	BATHTUB
Kawaguesaga Lake	BATHTUB

Model setup:

River models

SWAT: SWAT models the runoff and loading from a wide variety of rural land uses and land covers and allows the user to vary land use based upon potential best management practices. WDNR utilized SWAT to be able to simulate cropping practices in the Basin (Section 4.3.1.3 and Appendix D of the TMDL). Agricultural practices vary in the Basin, and include vegetable farming, dairy farming, and corn/soybean practices. For example, dairy farming involves crop rotation over a 5-year period, and includes eight different variations of cropping involving corn, soybeans, alfalfa, and vegetables (Table 3 of Appendix D of the TMDL). Appendix D of the TMDL provides a detailed explanation of the SWAT modeling process.

SLAMM: SLAMM models stormwater runoff, and is utilized primarily in urbanized stormwater environments (Section 4.3.1.2 of the TMDL). SLAMM utilizes more-detailed build-up wash-off routines with more expansive land use classifications and the ability to better simulate Best Management Practices (BMPs). SLAMM has been codified as one of the acceptable models to use for stormwater modeling by WDNR under NR 151.13 and NR 216.07. Section 4.4 of Appendix D of the TMDL provides a detailed explanation of the SLAMM modeling process.

FLUXMASTER: To provide additional calibration of the SWAT model, WDNR utilized the FLUXMASTER model from the USGS (Section 4.3.1.1 of the TMDL). FLUXMASTER estimates site-specific pollutant loads from sampling sites (in this case, the sites in the Wisconsin River Basin) along with streamflow at the time of sampling. This allows pollutant loads to be calculated. These loads are then fitted to a regression equation, and compared to the SWAT results. The SWAT model was then adjusted as appropriate. Section 5.2.3 of Appendix D of the TMDL provides a detailed explanation of the FLUXMASTER modeling process.

Tributary routing submodel: WDNR determined that additional calibration was needed for SWAT to address how phosphorus was transported downstream in the tributaries (Section 4.3.1.4 of the TMDL). WDNR noted that SWAT determines loads exported from fields into waterbodies and is less effective at modeling the phosphorus being transported in the rivers. WNDR also noted that SWAT was not effectively capturing the seasonal fluctuations in phosphorus loading, particularly the portion of phosphorus that settles in the stream bed and is released at a later date. WDNR developed an empirical model to better track the movement of phosphorus loads downstream utilizing lag coefficients and the impact of seasonal temperature fluctuation. Section 5.10 of Appendix D of the TMDL provides a detailed explanation of the tributary routing submodel process.

Mainstem routing submodel: WDNR also determined that a process similar to the tributary routing submodel was needed for the mainstem of the Wisconsin River (Section 4.3.1.5 of the TMDL). WDNR explained that the SWAT model was not calibrated for the mainstem downstream of Merrill, Wisconsin, and that additional work was needed to document how phosphorus was transported downstream, and what fraction of the tributary phosphorus loads are delivered downstream. To determine this, WDNR reviewed the flow records from several monitoring sites along the mainstem, as flow is closely linked to phosphorus loads. Next, the tributary loads were compared to the loads at the selected flow sites. The data indicate that approximately 27% of the tributary phosphorus is retained in the mainstem on an annual basis. WDNR noted that there are additional reservoirs and impoundments along the Wisconsin River, and determined that a portion of the phosphorus is trapped in these reservoirs. Table 10 of the TMDL shows the delivery fractions calculated for several locations on the mainstem. These values were used to further refine the phosphorus loads moving down the Wisconsin River mainstem. Section 5.13 of Appendix D of the TMDL provides a detailed explanation of the mainstem routing submodel process.

Lake models

BATHTUB: WDNR used the U.S. Army Corps of Engineers (USACE) BATHTUB model to calculate the loading capacities for the individual lake TMDLs. BATHTUB is a model for lakes and reservoirs to determine steady-state water and nutrient mass balances in a spatially segmented hydraulic network. BATHTUB uses empirical relationships to determine "eutrophication-related water quality conditions".[1] These TMDLs use the BATHTUB model to link observed phosphorus water quality conditions and modeled phosphorus loading to in-lake water quality estimates. BATHTUB can be a steady-state annual or seasonal model that predicts a lake's water quality. BATHTUB utilizes annual or seasonal time-scales which are appropriate because watershed phosphorus loads are normally impacted by seasonal conditions.

The model estimates in-lake phosphorus concentration by calculating net phosphorus loss (phosphorus sedimentation) from annual phosphorus loads as functions of inflows to the lake, lake depth, and hydraulic flushing rate. To estimate loading capacity the model is rerun, reducing current loading to the lake until the modeled result shows that in-lake total phosphorus would meet the applicable WQS. The BATHTUB model also allows WDNR to assess impacts of changes in nutrient loading from the various sources.

Jensen Model: Two lakes in the Basin, Petenwell Reservoir and Castle Rock Reservoir, were modeled using a different model (Appendix H of the TMDL). The reservoirs were initially modeled

[1] BATHTUB Manual - http://www.wwwalker.net/bathtub/help/bathtubWebMain.html

using CE-QUAL-W2, but the results of that modeling effort resulted in a poor fit when compared to the measured data. WDNR then used the Jensen model to simulate phosphorus reactions in the reservoirs. WDNR noted that the Jensen model is relatively simple in comparison to the CE-QUAL-W2 model but resulted in a better fit when comparing simulated to measured water quality data in the reservoirs. The Jensen model used daily inflow of water, phosphorus, and temperature to determine phosphorus concentrations in the waterbody. Phosphorus loss and gain from sediments are also considered, and the time lag between phosphorus deposition and release is included in the calculations.

Calibration/Validation:
The SWAT model was calibrated for hydrology, water quality, and then validated (Appendix D of the TMDL). During TMDL development, additional sampling data were collected to address data gaps. The calibration effort included the calibration of the model itself, as well as comparison to sampling data as discussed above in the "FLUXMASTER" section. Results of the calibration/validation were considered acceptable by WDNR, and are discussed in much greater detail in Section 5 of Appendix D of the TMDL. EPA has reviewed the calibration and validation of the models, and agrees the models are appropriate.

Model results:
Baseline Nonpoint Source Loads:
WDNR first determined the baseline loads (Section 4.4 of the TMDL). The baseline loads represent the current phosphorus loading from the sources in the watershed. For nonpoint sources, WDNR determined baseline loads for three land use categories; natural background, agricultural, and non-permitted urban lands (Section 4.4.1 of the TMDL). The baseline load for natural background was based upon the forest, wetland, and natural area land cover from the SWAT model. The baseline loads for agricultural use was also based upon the SWAT model, using the dairy grain, cash grain, potato and vegetable crops, pasture, and other agricultural uses. The baseline loads for non-permitted urban areas were calculated from the non-background and non-agricultural land covers outside the permitted MS4 boundaries based upon SWAT and WINSLAMM results.

To develop the baseline loads, WDNR carefully analyzed the various land use and land management processes underway in the Basin. For example, Table 1 of Appendix D of the TMDL lists the various crops raised in the basin, such as corn, soybeans, grains and vegetables. These are further refined into specific grains, vegetables, and other crop types. Then, WDNR reviewed the various crop rotations utilized in the basin, where, for example, corn is planted in a field for two years, then alfalfa for 3 years. WDNR also identified the type of plowing (chisel or mould board), the time of plowing (spring or fall), liquid or solid manure, as well as several other crop management practices to more precisely understand and model the phosphorus runoff from agricultural fields. WDNR met with local farming groups to further refine the cropping practices. Sections 3 and 4 of Appendix D of the TMDL discuss in detail the baseline calculations for agricultural lands.

For natural background, WDNR analyzed land cover to determine deciduous forest, evergreen forest, mixed forest, ponds, and wetlands. Baseline loads were developed for natural loads. For the non-permitted urban loads, WDNR first determined which areas in the Basin were considered "urbanized" as defined by the U. S. Census. Those areas that currently have an MS4 permit were excluded, and then air photos were reviewed to determine areas of non-development (flood plains,

etc.) within the urbanized areas. The WINSLAMM model was used to develop the baseline loads for the non-permitted urbanized land area.

Table F-1 of Appendix F of the TMDL lists the baseline loads for the 337 modeling units.

Baseline Point Source Loads:
For wastewater point sources, the baseline load was based on the concentration effluent limit and design flow in the NPDES permit. The annual average design flow was used for municipal facilities, and the highest average annual flow over five years was used for industrial dischargers (Section 4.4.2.1 of the TMDL). If a permit did not contain a phosphorus effluent limit, monitoring reports for the facility were examined, measured data was used in place of an effluent limit. For all wastewater point sources, the baseline load was set to the technology limit pursuant to the Wisconsin Administrative Code NR 217 technology limit of 1.0 mg/L, unless the limit was below 1.0 mg/L, in which case the lower limit was used.

Table F-2 of Appendix F of the TMDL lists the baseline loads for the individual point sources.

For MS4 baseline loads, the results from the WINSLAMM model discussed above were used (Section 4.4.3.2 of the TMDL and Section 4.4 of Appendix D of the TMDL). The WINSLAMM model included the 20% reduction in TSS under NR 216 of the Wisconsin Code. A 20% reduction in TSS is consistent with a 15% reduction in phosphorus, as determined in the NR 216 development process (*TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance,* WDNR, 2014). Since this reduction is required under Wisconsin rule, WDNR calculated the baseline MS4 loads assuming compliance with NR 216. As discussed in Section 5 of this Decision Document, any reduction for a MS4 system under the TMDL will be in addition to any reduction needed under NR 216. MS4 baseline loads are contained in Table F-3 of Appendix F of the TMDL.

WDNR also determined baseline loads for facilities regulated under a general permit, such as non-metallic mining (quarries), car washes, etc. The permit requirements vary depending upon the type of discharge (Section 4.4.2.2 of the TMDL). General permittees outside of an MS4 area were assigned an aggregate load for phosphorus calculated as 10% of the non-permitted urban baseline load for each subbasin.

Tribal lands as discussed in Section 1 of this Decision Document were included in the baseline loading calculations, as runoff from Tribal lands will enter State lands, and therefore must be taken into account. However, Tribal lands were specifically excluded from the allocation process discussed below. No allocations were developed for Tribal lands.

Allocations:
To determine the loading capacity in the waterbody segments, the average flow was multiplied by the phosphorus water quality criterion for each modeled reach. An additional conversion factor was used to account for the model output (a flow-weighted mean concentration) compared to the phosphorus criterion which is assessed as a growing season median concentration. Section 5.1 of the TMDL discusses how this conversion factor was developed.

The loads were first calculated for the headwater basins, and then each subsequent subbasin had a loading calculation developed, based upon flow and appropriate criteria. The upstream load was subtracted from each basin, so the subbasin loading capacity is based upon the individual subbasin (i.e., is not a cumulative number). To determine the TMDL reach-specific load, the upstream load was subtracted from the overall load. These loads were calculated on a monthly basis, then divided by 30.4 to calculate the daily loads. This process also accounted for the phosphorus criteria changing from 75 ug/L for smaller rivers to 100 ug/L for larger rivers. The daily loading capacity for each reach is in Table J-2 of Appendix J of the TMDL, which is incorporated into this Decision Document. WDNR also calculated annual loading capacities for each reach (Table J-1 of Appendix J of the TMDL).

Once the load capacities were calculated based upon the river criteria, the SWAT model was re-run to include the results from the lake modeling (BATHTUB and the Jensen Model) to determine the load capacities based upon any downstream lake criteria (Table 5 of this Decision Document). Since the lake criteria are lower (more restrictive), additional reductions in phosphorus loads were often necessary to attain water quality standards in the Basin. Section 6.2 of the TMDL describes in more detail the process used by WDNR to determine the final load capacities for the modeled reaches. Figures 38-40 of the TMDL graphically represent the process used by WDNR.

WDNR also calculated what portion of the reduction in loading (by reach) is based upon the local water quality (defined as the immediate reach where discharge is occurring) and what portion of the load reduction is based upon meeting WQS in a downstream reservoir (Table J-5 of Appendix J and Table K-5 of Appendix K of the TMDL). WDNR explained that this siting is important when determining where and how water quality trading or adaptive management activities can be located. This TMDL Decision Document does not opine upon the discussions and calculations in Appendix O regarding water quality trading and adaptive management, which EPA considered under reasonable assurance (Section 8 of this Decision Document) but are not approved or disapproved as part of this decision. The allocations contained in Appendices J and K were reviewed to determine if they are adequate to attain and maintain the appropriate criteria. The use of water quality trading, as well as other implementation tools such as adaptive management, are discussed further in Section 8 of this Decision Document (Section 6.4.1 and Appendix O of the TMDL).

As discussed in Section 2 of this Decision Document, WDNR is proposing SSC for three waterbodies in the Basin (Lake Wisconsin, Castle Rock Reservoir, and Petenwell Reservoir). WDNR followed the same process for calculating the daily load capacities based upon the proposed SSCs and calculated a set of load capacities based upon the SSCs (Table K-2 of Appendix K of the TMDL, which is incorporated into this Decision Document).

The EPA is approving both sets of allocations at this time. The EPA notes that this approval is based upon the site-specific criteria in Table 6 of this Decision Document. As explained in Section 2 of this Decision Document, this Decision Document does not opine upon the proposed criteria; the proposed criteria will be reviewed separately by the EPA Water Quality Standards program after the proposed criteria are submitted by the State for EPA approval. Only if the proposed criteria are submitted by the State and approved by EPA, as per Table 6 of this Decision Document, will the allocations in Appendix K of the TMDL become applicable. If the EPA-approved site-specific criteria are not the same as those in Table 6 of this Decision Document, then the allocations in

Appendix K of the TMDL would not be applicable and would need to be revised to ensure the loadings will attain and maintain the approved water quality standards. Section 7.6 of the TMDL discusses the process WDNR intends to follow regarding the site-specific criteria. The site-specific criteria will not be considered adopted under this TMDL unless the EPA has formally approved the criteria.

The allocations in Appendix J of the TMDL do not address the impaired recreational use in Lake Wisconsin, and therefore no TMDL is being approved for Lake Wisconsin at this time. If and when the SSC in Table 6 are approved by the EPA, the EPA will notify WDNR in writing that the allocations in Appendix K are effective, including the allocations based upon Lake Wisconsin. Lake Wisconsin will then be considered addressed by this TMDL.

Conclusion:
EPA concurs with the data analysis, modeling results and modeling approach utilized by WDNR in its calculation of loading capacities, wasteload allocations, load allocations and the margin of safety for the TMDLs.

The EPA finds that the TMDL document submitted by the WDNR 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 6.3 of the final TMDL document. The load allocations were calculated for three categories: background, agricultural, and non-permitted urban areas (Section 6.3 of the TMDL). The background category is defined by WDNR as the forest, wetland, and grassland land cover from the SWAT model. WDNR determined that reductions from background sources were unlikely to occur, and therefore the baseline background loads are the background allocation.

Agricultural sources were defined as land areas used for cash grains (corn, soybeans, etc.), dairy crops (corn, soybeans, hay, pasture, etc.), potatoes and vegetables, and pasture. Table 4 of Appendix D of the TMDL documents the various rotations of cropping practices modeled by WDNR. WDNR first developed preliminary cropping practices, then met with local counties and farmers to further refine the data (Section 3.2.3 of Appendix D of the TMDL).

In addition to agricultural land use, the WDNR also investigated land management actions in the watershed. These included tillage practices, drainage, and the application rate of fertilizer and manure on fields in the Basin. WDNR worked with local experts to refine the initial modeling effort, and to provide quality control on initial estimates (Section 3 of Appendix D of the TMDL).

The third category of LA developed by WDNR is non-permitted urban sources (Section 6.3.3 of the TMDL). This category represents the land area that is not background or agricultural as defined by the state, as well as located outside the permitted MS4 boundaries, based upon the SWAT and SLAMM models. Smaller towns and villages, rural subdivisions, etc., make up this category.

Table J-2 of Appendix J of the TMDL contains the daily LAs for each of the modeled reaches. WDNR also calculated the portion of the reduction in LA for each reach that is based upon the local water quality (defined as the immediate reach where discharge is occurring) and the portion of the LA reduction that is based upon meeting WQS in a downstream reservoir, based upon the proposed criteria (Table J-5 of Appendix J of the TMDL). This TMDL Decision Document does not opine upon the discussions and calculations in Appendix O regarding water quality trading and adaptive management, which EPA considered under reasonable assurance (Section 8 of this Decision Document) but are not approved or disapproved as part of this decision. The allocations contained in Appendix J were reviewed to determine if they are adequate to attain and maintain the appropriate criteria. The use of water quality trading, as well as other implementation tools such as adaptive management, are discussed further in Section 8 of this Decision Document (Section 6.4.1 and Appendix O of the TMDL).

WDNR also determined LAs based upon the proposed criteria for the three lakes in Table 6 of this Decision Document and previously discussed in Section 3 of this Decision Document. These daily LAs are in Table K-2 of Appendix K of the TMDL. WDNR also calculated the portion of the reduction in loading for each reach that is based upon the local water quality (defined as the immediate reach where discharge is occurring) and what the portion of the LA reduction that is based upon meeting WQS in a downstream reservoir (Table K-5 of Appendix K of the TMDL). This TMDL Decision Document does not opine upon the discussions and calculations in Appendix O regarding water quality trading and adaptive management, which EPA considered under reasonable assurance (Section 8 of this Decision Document) but are not approved or disapproved as part of this decision. The allocations contained in Appendix K were reviewed to determine if they are adequate to attain and maintain the appropriate criteria. The use of water quality trading, as well as other implementation tools such as adaptive management, are discussed further in Section 8 of this Decision Document (Section 6.4.1 and Appendix O of the TMDL).

The EPA finds that the TMDL document submitted by the 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 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:
WDNR calculated WLAs for NPDES-permitted dischargers for both TMDLs and protection strategies. The individual WLAs are in Table 3 of this Decision Document and Table J-3 of Appendix J of the TMDL. WDNR noted that many facilities discharge upstream of impaired segments, and therefore WLAs need to be determined to ensure downstream uses are protected.

Industrial and Municipal WWTFs: WDNR identified 109 municipal and industrial WWTFs discharging phosphorus to impaired waters in the Wisconsin River Basin (Sections 4.4.2.1 and 6.4.1 and Table J-3 of Appendix J of the TMDL). The baseline load for each facility was calculated based upon the technology-based effluent limit for phosphorus of 1.0 mg/L multiplied by either the average annual design flow (for the municipal facilities) or the highest average flow over five years (for industrial dischargers). Some facilities have a lower effluent concentration limit already in their permit, in which case the lower limit was used (Section 6.4.1 of the TMDL).

The facilities were given an individual WLA based upon the reduction needed to attain WQSs in each modeled reach (Section 6.4.1 of the TMDL). For example, if a facility contributed 15% of the baseline load in a modeled reach, then the facility received 15% of the controllable load based upon the loading capacity. The controllable load is defined by WDNR as the point source, MS4, and the nonpoint source loads for each modeled reach. Some reaches do not have reductions, as the modeled reach is attaining current WQSs.

MS4s: There are 15 cities, villages, and townships within the basin regulated under MS4 permits (Table 4 of this Decision Document, Section 4.4.2.3 and Table 9 of the TMDL). Table 13 of the TMDL lists the municipalities and the specific TMDL subbasins containing MS4 areas, and Figures 30-32 of the TMDL map the locations of the MS4s.

The MS4 WLAs were based upon the land area under the jurisdiction of the MS4 permit as well as the SLAMM model as discussed in Section 3 of this Decision Document and in Section 4.4 of Appendix D of the TMDL. The SLAMM model was used to determine the baseline loads for the MS4 entities, with some adjustments. The model included consideration of the Wisconsin runoff management performance standards requiring a 20% reduction in annual average TSS loads from existing development constructed prior to October 1, 2004 pursuant to Wisconsin NR 216 rules (Section 4.4.2.3 of the TMDL). The WDNR "*TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance*" (WDNR, 2014) determined that the TSS reduction of 20%

equated to a 15% reduction in phosphorus loads. The baseline loads for the MS4 entities were calculated based upon the entities meeting the required performance standard of 20% for TSS and the related 15% reduction in phosphorus. In other words, any reductions through the TMDL are in addition to any reductions needed to meet the performance standard. The WLAs for each MS4 are in Table J-4 of Appendix J of the TMDL and Table 4 of this Decision Document. The WLAs are calculated for each municipality and affected reach.

Two entities, Marathon County and the University of Wisconsin-Stevens Point (UWSP), did not receive specific stormwater WLAs. As discussed in Section 6.4.3 of the TMDL, there is not sufficient detail to separate the stormwater drainage systems for Marathon County and UWSP from the stormwater drainage system of the City of Stevens Point. WDNR noted that the MS4 permits require permittees to map out their stormwater system, and this process is currently underway. Once completed, the allocations can be revised. WDNR also noted that the percent reduction needed is the same for all three entities regardless of land area, but the actual loading may change.

A separate MS4 load was not calculated for the Wisconsin Department of Transportation (WisDOT). WDNR noted that at this time, WisDOT does not have a separate MS4 permit, and therefore the WisDOT runoff is included in the municipal MS4 WLAs (Section 6.4.3 of the TMDL). WDNR explained that a MS4 permit is in development for WisDOT, and referenced the WDNR "*TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance*" as the suggested process to follow for identifying how loads should be split between various highway regulators.

For both MS4s and individual dischargers, WDNR also calculated the portion of the reduction in loading (by reach) that is based upon the local water quality (defined as the immediate reach where discharge is occurring) and the portion of the LA reduction that is based upon meeting WQS in a downstream reservoir. This TMDL Decision Document does not opine upon the discussions and calculations in Appendix O regarding water quality trading, which EPA considered under reasonable assurance (Section 8 of this Decision Document) but are not approved or disapproved as part of this decision. The allocations contained in Appendix J were reviewed to determine if they are adequate to attain and maintain the appropriate criteria. The use of water quality trading, as well as other implementation tools such as adaptive management, are discussed further in Section 8 of this Decision Document (Section 6.4.1 and Appendix O of the TMDL).

Site-specific criteria: WDNR also determined WLAs based upon the proposed criteria for the three waterbodies in Table 6 and Section 3 of this Decision Document. The WLAs are in Table 9 of this Decision Document (Table K-3 of Appendix K of the TMDL for the WWTFs), and Table 10 of this Decision Document (Table K-4 of Appendix K of the TMDL for MS4s). WDNR also calculated the portion of the reduction in loading for each reach that is based upon the local water quality (defined as the immediate reach where discharge is occurring) and the portion of the LA reduction that is based upon meeting WQS in a downstream reservoir, based upon the proposed criteria (Table K-5 of Appendix K of the TMDL). This TMDL Decision Document does not opine upon the discussions and calculations in Appendix O regarding water quality trading, which were not considered as part of this decision. The allocations contained in Appendix K were reviewed to determine if they are adequate to attain and maintain the appropriate criteria. The use of water quality trading, as well as other implementation tools such as adaptive management, are discussed further in Section 8 of this Decision Document (Section 6.4.1 and Appendix O of the TMDL).

The EPA is approving both sets of allocations at this time, to account for both current WQS and the proposed SSC. The EPA notes that this approval is based upon the site-specific criteria in Table 6 of this Decision Document. As noted in Section 2 of this Decision Document, this Decision Document does not opine upon the proposed criteria; the proposed criteria will be reviewed separately by the EPA Water Quality Standards program after the proposed criteria are submitted by the State for EPA approval. Only if the proposed criteria are submitted by the State and approved by EPA as per Table 6 of this Decision Document, will the allocations in Appendix K become applicable. If the EPA-approved site-specific criteria are not the same as in Table 6 of this Decision Document, then the allocations in Appendix K of the TMDL would not be applicable and would need to be revised to ensure the loadings will attain and maintain the approved water quality standards. Section 7.6 of the TMDL discusses the process WDNR intends to follow regarding the site-specific criteria. The site-specific criteria will not be considered adopted under this TMDL unless EPA has formally approved the criteria.

Other Point Sources: WDNR also determined a WLA for dischargers regulated under a general permit. Examples include car washes, non-metallic mining, and non-contact cooling water. WDNR set the WLA for general permits as an aggregated load per reach of 10% of the non-permitted urban baseline load, based upon an analysis of the scale of permitting in the basin and best professional judgement, including consultation with the WPDES staff.

WDNR identified 26 Concentrated Animal Feeding Operations (CAFOs) in the basin (Table 11 of this Decision Document; Table 14 of the TMDL and Figures 34-36 of the TMDL). CAFOs in Wisconsin are regulated under either a general permit (most large dairy operations) or an individual CAFO permit (some large dairy operations and other CAFOs). The State of Wisconsin's NPDES CAFO General Permit (WI-0063274-01) prohibits any dry weather discharge under Section 3.1 of the permit https://dnr.wi.gov/topic/AgBusiness/documents/LargeDairyCAFOGP-WPDESPermit.pdf.

CAFO facilities must comply with all authorized discharge and overflow requirements described in the Wisconsin general CAFO permit, individual CAFO permits, and the performance standards of NR 151 (Section 4.4.2.4 of the TMDL). In accordance with the CAFO General Permit and individual permits, overflow events from CAFOs are allowable due to precipitation related overflows from CAFO storage structures which are properly designed, constructed, operated and maintained in accordance with CAFO permits. Discharges from such overflows are allowable only if they do not cause or contribute to a violation of water quality standards. WDNR determined a WLA = 0 for CAFOs in the basin. WDNR did note that manure spreading from CAFOs at agronomic rates are considered a non-point source of phosphorus and are included in the modeled non-point source loads in the TMDL calculations.

Table 11: CAFOs in the Wisconsin River basin

Facility Name	Permit Number	TMDL Reach	Figure*	Map Number**
Burr Oaks Heifers LLC	0061824	75	Central	LR-3
Central Sands Dairy LLC	0063533	73	Central	C-19
Chapman Brothers Farms	0062774	57	Lower	LMN-8
Destiny Farms LLC	0064343	68	Central	Y-10
Dietsche Dairy LLC	0059277	275	Central	Y-10
Double P Dairy LLC	0062031	292	Upper	R-6
Elusive Hill Dairy	0062022	275	Central	Y-9
Fischer Clark Dairy LLC	0065625	149	Central	P-3
Golden Sands Dairy LLC	0064980	255	Central	TM-1
Heeg Farm	0061841	324	Upper	BEP-8
Hillsprairie Dairy/Mitchell Farm	0062634	21	Lower	B-21
Kingdom Haven Dairy	0062391	106	Upper	R-7
Kinnamon Ridge Dairy LLC	0065129	12	Lower	B-22
Lynn Enterprises	0062413	93	Upper	BEP-10
Maple Ridge Dairy	0061832	152	Upper	BEP-9
Miltrim Dairy	0061638	215	Upper	R-8
Nagel Dairy Farm LLC	0063819	298	Upper	EC-6
New Chester Dairy LLC	0064696	247	Lower	LW-16
Night Hawk Dairy LLC	0065609	328	Upper	LEP-7
Norm-E Lane	0059421	70	Central	Y-10
O'Harrows's Family Farm LLC	0065846	22	Lower	B-23
Rausch Family Farms	0062405	102	Upper	R-9
Richfield Dairy	0064815	75	Central	LR-4
Spring Brook Farm LLC	0058777	216	Upper	EC-7
Tri Star Dairy, Inc.	0062111	207	Central	M-8
Van Der Geest Dairy Cattle, Inc.	0059293	217	Upper	U-23

* - Refers to Figures 34-36 of the TMDL (Upper, Central, or Lower Wisconsin River)
** - Refers to point labels on Figures 34-36 of the TMDL

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

6. Margin of Safety (MOS)

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

Comment:
The Wisconsin River phosphorus TMDLs incorporated certain conservative assumptions in the calculation of the MOS (Section 6.5 of the TMDL). WDNR explained that the fraction of phosphorus load from background is likely overestimated, as the process used by the SWAT model to determine a runoff concentration for natural background land uses (forest, wetlands, etc.) is based

partially on an estimate of the background stream phosphorus concentration (Sections 4.6 and 4.8.2 of Appendix D of the TMDL). Natural areas cover 75% of the land area of the Basin, and therefore even a slight over-estimate of background load will have an impact on overall loading. This results in a slightly smaller load available for the "controllable" sources, and therefore an overestimate in reduction needed to attain water quality standards.

Additional MOS is provided by the allocation calculations in the TMDL. The loading capacities for Petenwell Flowage, Castle Rock Flowage and Lake Wisconsin (once the SSC is approved for Lake Wisconsin) require load reductions from most tributaries greater than that needed to meet the local stream criteria (Tables J-5 and K-5 of the TMDL). WDNR calculated that about 50% of the phosphorus reductions required across the Basin are due to meeting criteria in downstream reservoirs. This MOS increases the likelihood that the streams and rivers will attain the local water quality criteria.

WDNR also noted that significant MOS is not needed based upon the extensive modeling effort developed as part of the TMDL. The Basin was subdivided into 5,351 HRUs to determine phosphorus loading at an appropriate scale to provide accurate information for implementation. The State described the significant amount of monitoring data available, including the number of stations, sampling frequency, and period of record. WDNR also explained the extensive adjustments made to the models during the TMDL development process. For example, additional submodels were developed to correct bias in the tributary modeling, as well as addressing the time lag in phosphorus transportation in the tributaries and mainstem (Sections 4 and 5 of Appendix D of the TMDL; Appendix I of the TMDL; Section 6 of Appendix M of the TMDL). A detailed analysis of the agricultural processes present in the Basin was developed to closely match the actual land uses in the watershed, which was discussed with local landowners and other experts to ensure accuracy.

WDNR noted that the MOS is reasonable due to the results of the generally good calibration and validation of the various models used in the development of the TMDL (Section 6.5 of the TMDL). The calibration and validation results indicate the models adequately characterize the waterbodies, and therefore additional MOS is not needed.

The EPA finds that the TMDL document submitted by the 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)).

Comment:
Pollutant loads vary by season, since much of the pollutant loading is driven by precipitation runoff. WDNR accounted for the seasonal variations in loading through the SWAT and other modeling processes. Both SWAT and SLAMM utilize daily precipitation data to determine runoff from various land covers.

The SWAT output was by month, which allows an examination of various seasonal events such as spring snowmelt and late summer drought. Changes in land cover during the year were modeled, such as crop growth and changes in crops, as well as land management patterns such as fertilization practices. Nutrient influxes to the phosphorus-impaired waters typically occur during wet weather events, such as storms and snow melt. Critical conditions that impact the response of the waters to phosphorus inputs occur during periods of low flow in the summer. During low flow periods, nutrients accumulate and there is less assimilative capacity within the water body, water temperatures increase, and algae thrives. Increased algal growth during low flow periods can deplete dissolved oxygen within the water column. Section 6.3 of Appendix D of the TMDL specifically discusses how temporal changes were accounted for in the model.

The EPA finds that the TMDL document submitted by the 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, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

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

Comment:
Section 7 of the TMDL provides information on actions and activities to reduce pollutant loading in the Wisconsin River Basin. Sections 7.2 and 7.3 of the TMDL discusses the reasonable assurances that the allocations will be implemented. As further discussed in Section 10 of this Decision Document, WDNR will develop a detailed implementation plan to describe how the TMDL goals will be attained.

Point sources:
Reasonable assurance that the WLAs set forth in the TMDLs will be implemented is provided by regulatory actions. Under 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. WDNR's NPDES permit program is the implementing program for ensuring effluent limits are consistent with

the TMDL. WDNR has developed a guidance to address how TMDLs will be implemented through the WPDES program in *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs Edition No. 3,* signed on November 6, 2013.

Appendix O of the TMDL provides specific information on credit calculations, targets, and other details that could be used to implement potential water quality trading and adaptive management efforts. As noted above in previous sections of this Decision Document, this TMDL Decision Document does not opine upon the discussions and calculations in Appendix O regarding water quality trading or adaptive management, which EPA considered under reasonable assurance as part of this decision. The allocations contained in Appendices J and K were reviewed to determine if they are adequate to attain and maintain the appropriate criteria. Water quality trading, adaptive management, and the Multi-Discharger Variance (MDV) are some of the tools that are available to implement the phosphorus allocations.

The point source programs discussed in this section (trading, adaptive management, MDV) could have a significant impact on nonpoint source loads. Although there are limited regulatory efforts that apply to nonpoint sources, the point source programs provide significant financial incentives to assist nonpoint sources in reducing phosphorus loads.

Water quality trading may be used by WPDES permit holders to demonstrate compliance with water quality-based effluent limitations (WQBELs) for different pollutants, including phosphorus. Generally, water quality trading involves a point source compensating another party to achieve less costly pollutant reduction with the same or greater water quality benefit. In other words, water quality trading provides point sources with the flexibility to acquire pollutant reductions from other sources in the watershed to offset their point source load so that they will comply with their own permit requirements.

WDNR has developed two guidances under Wisconsin Statute 283.84 for implementing water quality trading in the state: *Guidance on Implementing Water Quality Trading in WPDES Permits*, signed 08/21/2013, and *A Water Quality Trading How-To Manual: Guidance on developing a water quality trading strategy based upon protocols specified in Guidance on Implementing Water Quality Trading in WPDES Permits*, signed 09/09/2013. These guidances, along with other WDNR documents, discuss the process and actions available to implement effective water quality trading efforts in the state. Through water quality trading, WDNR anticipates that additional pollutant reductions can be attained beyond point source reductions alone. For further information, see the WDNR website at https://dnr.wi.gov/topic/surfacewater/waterqualitytrading.html

To specifically address phosphorus loads in TMDLs, WDNR has promulgated regulations regarding adaptive management (NR 217). Adaptive management as defined by WDNR is a process where point and nonpoint sources can work together to reduce phosphorus loads into impaired waters. Adaptive management differs from water quality trading in several ways, including that trading requires credits to be developed by nonpoint sources before being applied to permit discharges, differing applicability requirements, and a focus on in-stream water quality for adaptive management. WDNR has developed the *Adaptive Management Handbook: A Guidance Document for Stakeholders* (WDNR, 2013), which provides more information on how adaptive management

works. Through adaptive management, WDNR anticipates that additional pollutant reductions can be attained beyond point source reductions alone. For further information, see the WDNR website at https://dnr.wi.gov/topic/surfacewater/adaptivemanagement.html

All regulated MS4 communities are required to satisfy the requirements of the MS4 general permit. Section 1.5 of the WDNR Stormwater General Permit documents the requirements for MS4 dischargers in TMDL watersheds (WPDES permit numbers WI-S050075-2 and WI-S0050181-1). The MS4 general permit requires the permittee to develop a storm water management program which addresses all permit requirements, including the following six minimum control measures:

- Public education and outreach;
- Public participation;
- Illicit Discharge Detection and Elimination (IDDE) Program;
- Construction-site runoff controls;
- Post-construction runoff controls; and
- Pollution prevention and municipal good housekeeping measures.

The storm water management plan describes the MS4 permittee's activities for managing stormwater within their jurisdiction or regulated area. In the event a TMDL study has been completed, approved by EPA prior to the effective date of the general permit, and assigned a wasteload allocation to an MS4 permittee, that permittee must document the WLA in its application and provide an outline of the best management practices to be implemented in the current permit term to address any needed reduction in loading from a MS4 community.

The stormwater program requires construction and industrial sites to create a Stormwater Pollution Prevention Plan (SWPPP) that summarizes how stormwater will be minimized from a site. Permittees are required to review the adequacy of local storm water management plans to ensure that each plan meets the WLA set in the TMDL. In the event that the storm water management plan does not meet the WLA, the storm water management plan will need to be modified prior to the effective date of the next General Permit.

In addition, WDNR has developed the "*TMDL Guidance for MS4 Permits: Planning, Implementation, and Modeling Guidance*" (WDNR, 2014). This guidance can assist governmental officials and technical contractors on integrating TMDL allocations and MS4 permit requirements.

Wisconsin has a phosphorus Multi-Discharger Variance (MDV) that is designed to provide eligible point source facilities another option to comply with WPDES permit requirements. Under the MDV, eligible permittees qualify for additional time to comply with phosphorus limits, provided they commit to reducing phosphorus effluent concentrations and implement a watershed project to help reduce nonpoint source phosphorus loads. Further information can be found at the WDNR website: https://dnr.wi.gov/topic/surfaceWater/phosphorus/variance/

Nonpoint sources:
WDNR discussed a variety of programs and requirements that provide reasonable assurances that the LAs will be attained (Section 7.3 of the TMDL). The *Wisconsin Nonpoint Source Program Management Plan* (WDNR, 2015) describes the variety of financial, technical, educational, and enforcement programs which will support the implementation of the TMDL. WDNR and the

Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) coordinate efforts to implement the nonpoint source program throughout the state. Examples of some of the programs are noted below.

Agricultural Nonpoint Source Program Standards: Wisconsin has developed regulations to address nonpoint source runoff management for both agricultural and non-agricultural facilities. These regulations are in NR 151, and are the minimum performance standards necessary to attain water quality standards. These include:

- **Tillage setback:** A setback of 5 feet from the top of a channel of a waterbody for the purpose of maintaining stream bank integrity and avoiding soil deposits into state waters. Tillage setbacks greater than 5 feet but no more than 20 feet may be required if necessary to meet the standard. Harvesting of self-sustaining vegetation within the tillage setback is allowed.
- **Phosphorus Index (PI):** A limit on the amount of phosphorus that may run off croplands and pastures as measured by a phosphorus index with a maximum of 6, averaged over an eight-year accounting period, and a PI cap of 12 for any individual year.
- **Process wastewater handling**: A prohibition against significant discharge of process wastewater from milk houses, feedlots, and other similar sources.
- **Meeting TMDLs**: A standard that requires crop and livestock producers to reduce discharges, if necessary, to meet a load allocation specified in an approved TMDL by implementing targeted performance standards specified for the TMDL area, using best management practices specified in ch. DATCP 50, Wis. Adm. Code. If a more stringent or additional performance standard is necessary to meet water quality standards, it must be promulgated by rule before compliance is required. Before promulgating targeted performance standards to implement a TMDL, the department must determine, using modeling or monitoring, that a specific waterbody or area will not attain water quality standards or groundwater standards after substantial implementation of the existing NR 151 performance standards and prohibitions.
- **Sheet, rill and wind erosion**: All cropped fields shall meet the tolerable (T) soil erosion rate established for that soil. This provision also applies to pastures.
- **Manure storage facilities**: All new, substantially altered, or abandoned manure storage facilities shall be constructed, maintained or abandoned in accordance with accepted standards, which includes a margin of safety. Failing and leaking existing facilities posing an imminent threat to public health, or fish and aquatic life, or violating groundwater standards shall be upgraded or replaced.
- **Clean water diversions**: Runoff from agricultural buildings and fields shall be diverted away from contacting feedlots, manure storage areas and barnyards located within water quality management areas (300 feet from a stream or 1,000 feet from a lake or areas susceptible to groundwater contamination).
- **Nutrient management**: Agricultural operations applying nutrients to agricultural fields shall do so according to a nutrient management plan (each nutrient management plan must be designed to limit or reduce the discharge of nutrients to waters of the state for the purpose of complying with state water quality standards and groundwater standards). In addition, for croplands in watersheds that contain impaired surface waters, a plan must be designed to manage soil nutrient concentrations so as to maintain or reduce delivery of nutrients contributing to the impairment of impaired surface waters. DATCP Chapter 50.04 contains

additional requirements for all nutrient management plans. This standard does not apply to applications of industrial waste, municipal sludge or septage regulated under other DNR programs, provided the material is not commingled with manure prior to application.

- **Manure management prohibitions:**
  - no overflow of manure storage facilities
  - no unconfined manure piles in a water quality management area
  - no direct runoff from feedlots or stored manure into state waters
  - no unlimited livestock access to waters of the state in locations where high concentrations of animals prevent the maintenance of adequate or self-sustaining sod cover

WDNR, DATCP, and the county Land Conservation Departments (LCDs) will work with landowners to implement agricultural and non-agricultural performance standards and manure management prohibitions to address nutrient loadings in the TMDL area. WDNR explained that some landowners voluntarily install BMPs to help improve water quality and comply with the performance standards. Cost-sharing funds, provided via state or federal funds, may or may not be available for many of these BMPs. Wisconsin statutes, and the NR 151 implementation and enforcement procedures of NR 151.09 and 151.095, require that farmers must be offered at least 70% cost-sharing funds for BMP installation before they can be required to comply with the agricultural performance standards and prohibitions. If cost share money is offered, those in violation of the standards are obligated to comply with the rule. The amount of cost sharing funds available for use by LCDs, DATCP and WDNR will require implementing the performance standards and prohibitions throughout the TMDL area over time. DATCP's Farmland Preservation Program requires that any agricultural land enrolled in the program must be determined to be in compliance with the performance standards by no later than 2020 to continue receive tax credits associated with the program.

Appendix N of the TMDL describes the process that WDNR will pursue to address the NPS reductions. The appendix focuses on the agricultural phosphorus targets in the Basin. WDNR noted that the loading targets developed for each subbasin (LA) are not generally compatible with the nutrient management planning process used by county conservationists, crop consultants, and producers in the Basin. To help translate the loads into more useful numbers, WDNR uses the Soil Nutrient Application Planner (SnapPlus) model. SnapPlus is a field -scale model used throughout the state to develop nutrient managment plans. SnapPlus calculates crop nutrient recommendations for fields based upon the Revised Universal Soil Loss Equation (RUSLE) and the nutrient levels in soil. Once the current levels of nutrient runoff are calculated, the SnapPlus model can then be used to determine which practices can be implemented to then attain the phosphorus loading targets. SnapPlus can be used for both manure application as well as chemical fertilizer application. Table 1-1 of Appendix N of the TMDL contains the current phosphorus loads as pounds of phosphorus per acre per year, as well as the translated LA targets under both the current criteria and the recommended criteria for each of the TMDL subbasins. WDNR explained that a stakeholder could use SnapPlus to determine their field-specific phosphorus loading, and compare it to results in Table 1-1 of Appendix N of the TMDL to determine what load reductions apply to their land to be consistent with the appropriate LA.

County/Local programs: Counties and other local governments have also developed programs to address nonpoint source runoff (Section 7.3 of the TMDL). One example that WDNR noted was Marathon County. The county has developed its own ordinance and program to address manure storage and management in the county. Marathon County is in a particularly critical position in the Basin, and has some of the highest phosphorus runoff rates in the region, as well as being just upstream of Castle Rock and Petenwell Reservoirs. The program includes citation authority and penalties to enforce code violations and expanded operation and maintenance planning.

Appendix L of the TMDL contains a list of the numerous implementation activities developed from 2005-2015 in the Basin. This includes projects developed under the Agricultural Runoff Management Grants, Urban Runoff Management Grants, Lake Planning Projects, and Lake Protection Projects (Tables L-1 to L-4 of Appendix L of the TMDL). The tables document the costs of the projects and whether they have been completed or are in progress. Many of these projects are implemented by third-parties.

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 Wisconsin River Basin (Section 7.4 of the TMDL). Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation planning efforts for these watersheds.

WDNR noted that there are numerous permanent flow gages in the Basin, operated by either the USGS or WDNR (Appendix D of the TMDL). WDNR also used flow data from the numerous dams located in the Basin (Section 3.1 of the TMDL). These gages will continue to be monitored for the foreseeable future. WDNR also discussed the Long-Term Monitoring sites located within the Basin, and noted that these sites have been in place for several decades. These sites will continue to provide water quality data for the Basin.

Follow-up monitoring is integral to the adaptive management approach. Monitoring addresses uncertainty in the efficacy of implementation actions and can provide assurance that implementation measures are succeeding in attaining water quality standards, as well as inform the ongoing TMDL implementation strategy. To assess progress toward meeting the TMDL targets, monitoring of the waterbodies will continue to be a part of the WDNR monitoring programs. In addition to the WDNR state water quality monitoring program, several counties operate water quality monitoring programs in the basin. For example, Sauk County monitors several waterbodies in the Basin,

including the Baraboo River and Petenwell and Castle Rock Reservoirs (Land and Water Resource Management Plan for Sauk County, 2018). Many of the larger projects in the Basin include follow-up monitoring after BMP implementation.

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 7 of the TMDL. The WDNR presented a variety of possible implementation activities which could be undertaken within the watersheds. Most of these actions will address other pollutants, such as sediment and bacteria, as well as phosphorus. WDNR has begun the development of a more-detailed implementation plan for the basin (Section 7.1 of the TMDL), which will address specific actions and activities designed to implement the TMDL and attain WQSs. Many of the examples below are or could be funded through several state programs, such as the Targeted Runoff Management Program, Notice of Discharge Grant Program, Lake Planning Program, and the River Planning and Protection Grant Program (Sections 7.1 and 7.3 of the TMDL). WDNR also included the DATCP programs that will also serve to implement the TMDL reductions (Section 7.3.8 of the TMDL)

Urban/residential stormwater reduction strategies: Some of the watersheds have significant amounts of urban/suburban land. WDNR anticipates that controls on stormwater will be needed to attain and maintain WQS. As noted in Section 5 of this Decision Document, the storm water management plans will be reviewed and revised as needed.

Pasture and Agricultural Management BMPs: 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.

Riparian Area Management Practices: Protection of streambanks within the watershed through planting of vegetated/buffer areas with grasses, legumes, shrubs or trees will mitigate pollutant inputs into surface waters. These areas will filter runoff before the runoff enters into the creeks.

Public Education Efforts: Public programs will be developed to provide guidance to the general public on pollutant 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 the waterbodies.

Many of the BMPs and implementation activities discussed in Section 8 of this Decision Document would be addressed in the implementation plan.

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

11. Public Participation

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

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

Comment:
The public participation section of the TMDL submittal is found in Section 8 of the TMDL. Throughout the development of the Wisconsin River Basin TMDLs the public was given various opportunities to participate in the TMDL process. The WDNR encouraged public participation through public meetings and small group discussions with stakeholders within the watershed.

Efforts to address problems in the Basin have been underway since at least the early 1990's. Active development of a TMDL for the Wisconsin River began in 2011, when the WDNR in collaboration with the University of Wisconsin - Stevens Point held an annual Wisconsin River symposium, where the public and stakeholders were provided updates of activities in the Basin. Approximately 150 people attended the symposium each year through 2015.

The WDNR met with local stakeholders and citizen groups from 2012 to 2016 to discuss progress of the TMDL effort and answer questions. WDNR held technical meetings in 2013 to discuss TMDL data, modeling approaches, and other technical issues. Several webinars were held for stakeholders as the TMDL was be developed, and Table 18 of the TMDL lists the various modeling efforts that were presented to stakeholders and interested parties.

A series of meetings and webinars were held in February and March of 2018 when the WDNR released a pre-draft version of the TMDL. The WDNR took comments on the report and developed a response to the comments which was circulated to interested parties and is in Appendix P of the

TMDL. The pre-draft TMDL was updated and revised as appropriate, based on the preliminary comments.

The formal public comment period was announced on August 7, 2018. The public comment period was open from August 20, 2018 to September 19, 2018. A public meeting was held on August 22, 2018, to provide the opportunity for comments from the public. The official draft TMDL was posted online by WDNR at https://dnr.wi.gov/topic/TMDLs/WisconsinRiver/. Copies of the public notice were posted on the Wisconsin River Basin TMDL Govdelivery electronic distribution list, as well as the WDNR permit distribution list.

The WDNR received public comments from ten commentors and adequately addressed these comments. The comments were from various stakeholders, including several environmental/watershed groups, several wastewater dischargers, and several trade groups representing permitted dischargers. The comments are in Appendix Q of the TMDL, and the responses by WDNR are in Appendix R of the TMDL. A summary of the major issues and WDNR responses is below.

Nonpoint Source Reductions:
Numerous commenters raised concerns that the TMDLs do not adequately address nonpoint source reductions. Although several commenters agreed the TMDL modeled the nonpoint source loads in detail, significant concerns were voiced regarding the likelihood of the reductions occurring. Several comments noted the lack of enforceable regulation on nonpoint sources, and the lack of funding for the implementation of nonpoint source BMPs remained a concern. Several comments from point source facilities or trade groups requested the TMDL be delayed until meaningful regulatory authority was in place to address nonpoint source reductions, or to apply a "phased TMDL" approach as discussed in EPA guidances (*Guidance for Quality-Based Decisions: The TMDL Process*, EPA (1994); *Memorandum: Clarification Regarding "Phased" Total Maximum Daily Loads*, EPA (2006)).

WDNR explained that the modeling and TMDL development process was designed to provide stakeholder (both point ant nonpoint dischargers) with sufficient information to identify those locations where nonpoint source reductions were most critical. The SWAT model and SnapPlus model were designed to calculate loads at the edge of field, allowing a better definition of location and magnitude of reductions needed on a much smaller scale.

WDNR pointed out that the development of enforceable regulations on nonpoint sources would have to include changes in Wisconsin Statutes and rules, as well as possibly the Clean Water Act. WDNR discussed the various options that exist under state rules that can address nonpoint source reductions in conjunction with point source dischargers. These options are water quality trading, adaptive management, and the multi-discharger variance processes. As further discussed in Appendix O of the TMDL, these options can provide a path for various dischargers to work at reducing the overall phosphorus loads to the impaired waters.

WDNR also pointed out that a delay in issuing the TMDL could result in even lower WLAs for permitted dischargers. WDNR noted that under NR 217, water-quality-based effluent limits (WQBELs) can be more stringent than those calculated in the TMDL. In addition, NR 217 defines

adaptive management to allow a facility to have more time to achieve compliance with the WQBEL. However, this requires an approved TMDL. WDNR explained that a phased TMDL approach is consistent with the processes already in place in state rules, such as adaptive management and MDV.

SSC:
Another series of comments were submitted regarding the site-specific criteria being developed for Petenwell Reservoir, Castle Rock Reservoir, and Lake Wisconsin. Commenters generally supported the less stringent criteria proposed for Petenwell and Castle Rock Reservoirs, but some were more concerned over the more stringent criteria for Lake Wisconsin. Several comments suggested the TMDL be delayed until the criteria were approved for the two reservoirs, and the revised allocations be delayed for Lake Wisconsin until the effects of the TMDLs' implementation on Lake Wisconsin's water quality are better understood. They were concerned that the reductions in loadings to the two reservoirs would be sufficient to allow Lake Wisconsin to attain the appropriate designated use.

WDNR noted that, as discussed above in the Nonpoint Source Reductions section, delay in the TMDL would have ramifications for WPDES dischargers in the Basin. The SSC process will likely end no earlier than October of 2019, and may take longer. The State is proceeding with the TMDL ahead of the SSC so that the stringent NR 217 WQBEL limits will not be implemented immediately in the Petenwell and Castle Rock Flowages.

WDNR discussed how the BATHTUB and Jensen models document the impairments in the lakes, and that reductions are going to be required throughout the Basin, regardless of which criteria are in place. WDNR noted that not only will a delay impact discharger permits, but also that it would hamper nonpoint source implementation actions, as portions of the Basin would require differing allocations and make other processes such as water quality trading and adaptive management more difficult.

Water Quality Trading (WQT)/Adaptive Management (AM)/Multi-Discharger Variance (MDV):
WDNR received several comments on the use of WQT/AM/MDV for point source dischargers to more-economically attain the WLAs. Commenters strongly urged the use of these programs and requested more flexibility and streamlined procedures in implementing the programs. Several commenters submitted suggestions on ideas for flexibility and suggested that the current processes make it difficult for nonpoint sources to generate credits for trading (or the like) for use in the Basin.

WDNR explained that much of the WQT/AM/MDV processes are set forth in State statutes, rules, or in EPA guidance. Significant changes to the program would have to go through legislation or State rulemaking before any changes could be implemented. The WDNR highlighted that a basic requirement for any program is to ensure that the purchase of credits or similar methods do not cause a local water quality exceedence, and work to attain water quality standards in both the local waterbody and any downstream reservoir.

Reserve Capacity:
Several commenters raised questions and concerns about how reserve capacity would be used. They objected to the use of reserve capacity for nonpoint sources, CAFOs, and NCCW. One other commenter suggested more detail on how reserve capacity would be applied in the Basin, and a better explanation of what reserve capacity would be applied.

WDNR discussed why CAFOs might be able to use reserve capacity. Currently, CAFO permits do not allow discharge from production facilities except under very specific conditions (Section 4.4.2.4 of the TMDL; Section 5 of this Decision Document). WDNR explained that Wisconsin rules under NR 243.13 allow an alternative discharge limitation from production areas based upon the use of an alternative treatment technology through the WPDES permit process. This resulting discharge of a pollutant would still need a WLA, and therefore WDNR determined that it is appropriate to note the possibility that a CAFO could need a WLA.

For non-contact cooling water, WDNR explained that individual WLAs were calculated for facilities with individual permits, and that an aggregated WLA was calculated for the facilities addressed through the WPDES General Permit (Section 4.4.2.1 of the TMDL). The State noted that in the future, NCCW facilities may need to obtain an individual permit, and therefore would need a WLA. WDNR further explained that any NCCW discharge would be subject to the same process and reductions as any other individually permitted facility.

WDNR stated in several responses that the use of reserve capacity is solely applicable to point sources. WDNR included an example of how reserve capacity would be calculated, to provide a better explanation of the process.

The EPA carefully reviewed the comments submitted during the public notice period, as well as the responses from WDNR. The EPA agrees that WDNR appropriately addressed the comments and revised the TMDL document as appropriate. The EPA finds that the TMDL document submitted by the 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 waterbody, and the pollutant(s) of concern.

Comment:
The EPA received the final Wisconsin River Basin TMDL document, submittal letter and accompanying documentation from the WDNR on January 28, 2019. The transmittal letter explicitly stated that the final TMDLs for the rivers, streams, lakes, and reservoirs in the Wisconsin River Basin were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval. The submittal also contained the names of the watersheds as they appear on Wisconsin's 303(d) list, and the causes/pollutants of concern. This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130.

The EPA finds that the TMDL transmittal letter submitted for the Wisconsin River Basin by the WDNR satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the TMDLs for the Wisconsin River Basin satisfy all of the elements of approvable TMDLs. This approval is for **128** TMDLs, addressing aquatic recreational use and aquatic life use impairments due to phosphorus as listed in Tables 1 and 2 of this Decision Document.

EPA also agrees that the protection measures outlined in the TMDL document for the remaining segments in the Wisconsin River Basin are sufficient to maintain the existing water quality in the lakes. EPA agrees these measures are appropriate for consideration as "protection strategies" as described in the "A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program".

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.

Pursuant to Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments* and with *EPA Policy on Consultation and Coordination with Indian Tribes (May 2011),* EPA invited tribal consultation on its action to review the Wisconsin River Basin TMDL. EPA explained that its policy is to consult on a government-to-government basis with Federally recognized tribal governments when EPA actions and decisions may affect tribal interests. Letters were sent to the Lac du Flambeau Band of Lake Superior Chippewa Indians and the Ho-Chunk Nation. EPA received a request for consultation from the Lac du Flambeau Band of Lake Superior Chippewa Indians. A conference call was held on February 20, 2019 with a representative of the tribe. The tribe's principal interest was to understand more about the TMDL, how the TMDL was calculated, and to confirm there would be no impact on tribal lands. The questions were addressed in the call, and no further response was received from the Tribe. No response was made from the Ho-Chunk Nation of Wisconsin.

Table 1. Total phosphorus impaired river and stream segments

Waterbody	Start Mile	End Mile	Counties	Assessment Unit	WBIC	Pollutants	Impairments[2]	Phosphorus Criteria[3] (µg/L)	Fish & Aquatic Life Designated Use *(proposed DU, if different)*[4]	TMDL Subbasin(s)	Figure Region	Tributary Watershed
Baraboo River	0	28.16	Sauk, Columbia	944741	1271100	Total Phosphorus	Water Quality Use Restrictions	100	Default FAL	4, 137, 179,	Lower	Baraboo
Baraboo River	28.16	60.23	Sauk	944788	1271100	Total Phosphorus	Impairment Unknown	100	Default FAL	5, 179, 180, 184, 231	Lower	Baraboo
Baraboo River	60.23	86.79	Juneau, Sauk	944844	1271100	Total Phosphorus	Impairment Unknown	100	Default FAL	184-187, 227	Lower	Baraboo
Baraboo River	86.79	101.29	Juneau	944915	1271100	Total Phosphorus	Impairment Unknown	100	Default FAL	187,274	Lower	Baraboo
Baraboo River	101.35	106.16	Juneau	13023	1271100	Total Phosphorus	Impairment Unknown	100	Default FAL*	27	Lower	Baraboo
Baraboo River	108.6	118.93	Monroe	12978	1271100	Total Phosphorus	Impairment Unknown	100	Cold	28, 189	Lower	Baraboo
Bear Creek	0	13.95	Juneau, Monroe	13102	1311600	Total Phosphorus	Degraded Biological Community	75	Default FAL	51, 52	Lower	Lemonweir
Bear Creek	0	11.7	Portage, Wood	12317	139870	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	78	Central	Mill
Beaver Creek	0	4	Wood	12237	1372300	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	307	Central	Yellow

2 Water Quality Use Restrictions = phosphorus criteria were "overwhelmingly" exceeded (1.5 times the criteria for lakes and 2 times the criteria for rivers/streams); Degraded Biological Community = In addition to phosphorus exceedance biological impairment was shown (poor macroinvertebrate and/or fish Index of Biological Integrity (IBI) scores); Impairment Unknown = phosphorus exceeded criteria but no biological impairment was shown (either no biological data or all IBIs were fair – excellent); Low DO = Low dissolved oxygen

3 Phosphorus criteria (µg/L): The waterbody's applicable phosphorus criterion under s. NR 102.06, Wis. Admin. Code.

4 Fish & Aquatic Life Designated Use Status: This column indicates the waterbody's current Fish & Aquatic Life (FAL) Designated Use (DU) subcategory. If the DU has an asterisk behind it, that indicates that the waterbody was classified as Trout Class III before 1980, and may or may not be proposed as Cold in future DU revisions. Acronyms within this column are as follows: FAL=Fish & Aquatic Life; LFF=Limited Forage Fish; LAL=Limited Aquatic Life; WWSF=Warmwater Sport Fish; default FAL = Default Fish & Aquatic Life

Table 1. Total phosphorus impaired river and stream segments

Waterbody	Start Mile	End Mile	Counties	Assessment Unit	WBIC	Pollutants	Impairments[2]	Phosphorus Criteria[3] (µg/L)	Fish & Aquatic Life Designated Use *(proposed DU, if different)*[4]	TMDL Subbasin(s)	Figure Region	Tributary Watershed
Beaver Creek	4	6.21	Wood	5735909	1372300	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	307	Central	Yellow
Beaver Creek	0	4	Juneau, Monroe	18435	1314000	Total Phosphorus	Impairment Unknown	75	Default FAL	53	Lower	Lemonweir
Big Eau Pleine River	0	16.6	Marathon	12398	1427200	Total Phosphorus	Low DO	75	WWSF	87, 88	Upper	Big Eau Pleine
Big Eau Pleine River	16.61	21.84	Marathon	12399	1427200	Total Phosphorus	Low DO	75	WWSF	327	Upper	Big Eau Pleine
Big Eau Pleine River	22.34	45.64	Marathon	886772	1427200	Total Phosphorus	Low DO	75	WWSF	91, 152, 324	Upper	Big Eau Pleine
Big Rib River	44.8	49.91	Taylor	886912	1451800	Total Phosphorus	Impairment Unknown	75	Cold	276	Upper	Rib
Big Rib River	49.91	55.13	Taylor	1443175	1451800	Total Phosphorus	Impairment Unknown	75	Default FAL	276	Upper	Rib
Black Creek	0	14.65	Marathon	12474	1458200	Total Phosphorus	Impairment Unknown	75	Default FAL	102, 215	Upper	Rib
Black Creek	14.65	19.64	Marathon	12475	1458200	Total Phosphorus	Impairment Unknown	75	Cold	104	Upper	Rib
Brewer Creek	0	6.7	Juneau	18447	1305000	Total Phosphorus	Degraded Biological Community, Impairment Unknown	75	Cold	43, 44	Lower	Lemonweir
Brewer Creek	6.7	8.78	Juneau	13069	1305000	Total Phosphorus	Impairment Unknown	75	Cold	44	Lower	Lemonweir
Cat Creek	0	2	Wood	12232	1370700	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	65	Central	Yellow
Cazenovia Branch	0	0.66	Richland, Sauk	13010	1283100	Total Phosphorus	Impairment Unknown	75	Default FAL	310	Lower	Baraboo

Table 1. Total phosphorus impaired river and stream segments

Waterbody	Start Mile	End Mile	Counties	Assessment Unit	WBIC	Pollutants	Impairments[2]	Phosphorus Criteria[3] (µg/L)	Fish & Aquatic Life Designated Use *(proposed DU, if different)*[4]	TMDL Subbasin(s)	Figure Region	Tributary Watershed
Cleaver Creek	0	5	Juneau	13031	1292500	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	26	Lower	Baraboo
Copper Creek	0	6	Sauk	12999	1278400	Total Phosphorus	Degraded Biological Community	75	Default FAL	8	Lower	Baraboo
Council Creek	0	3.58	Monroe	13110	1341600	Total Phosphorus	Degraded Biological Community	75	Default FAL	55	Lower	Lemonweir
Crossman Creek	0	6.43	Juneau, Sauk	13019	1286700	Total Phosphorus	Impairment Unknown	75	Default FAL	17	Lower	Baraboo
Crossman Creek	6.42	12.01	Juneau	13020	1286700	Total Phosphorus	Impairment Unknown	75	Default FAL	19	Lower	Baraboo
Dawes Creek	0	7.75	Wood	12226	1367400	Total Phosphorus	Impairment Unknown	75	Default FAL	62	Central	Yellow
Deer Creek	0	7.15	Taylor	12414	1433400	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	98	Upper	Big Eau Pleine
Dell Creek	1.84	7.56	Sauk	18439	1295200	Total Phosphorus	Impairment Unknown	75	Default FAL	31	Lower	Lower WI
Dell Creek	7.55	15.82	Sauk	13045	1295200	Total Phosphorus	Impairment Unknown	75	Cold	32	Lower	Lower WI
Dell Creek	15.82	19.25	Sauk	6897810	1295200	Total Phosphorus	Impairment Unknown	75	Cold	32	Lower	Lower WI
Dell Creek	19.25	23.35	Juneau	946824	1295200	Total Phosphorus	Impairment Unknown	75	Default FAL	33	Lower	Lower WI
Dill Creek	0	8	Marathon	12402	1430700	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	93	Upper	Big Eau Pleine
Dill Creek	8	20	Clark, Marathon	12403	1430700	Total Phosphorus	Water Quality Use Restrictions	75	LFF	95	Upper	Big Eau Pleine

Table 1. Total phosphorus impaired river and stream segments

Waterbody	Start Mile	End Mile	Counties	Assessment Unit	WBIC	Pollutants	Impairments[2]	Phosphorus Criteria[3] (µg/L)	Fish & Aquatic Life Designated Use *(proposed DU, if different)*[4]	TMDL Subbasin(s)	Figure Region	Tributary Watershed
Duck Creek	0	12	Columbia	13523	1266300	Total Phosphorus	Impairment Unknown	75	Default FAL	3	Lower	Lower WI
E Br Big Eau Pleine River	0	11	Marathon	12411	1432300	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	99	Upper	Big Eau Pleine
East Br Big Creek	0	7	Juneau, Sauk	13006	1280500	Total Phosphorus	Degraded Biological Community	75	Default FAL	15	Lower	Baraboo
Fenwood Creek	0	1.5	Marathon	12393	1428700	Total Phosphorus	Impairment Unknown	75	Default FAL	89, 326	Upper	Big Eau Pleine
Fenwood Creek	1.5	17	Marathon	12394	1428700	Total Phosphorus	Impairment Unknown	75	Default FAL	90	Upper	Big Eau Pleine
Hamann Creek	0	10	Marathon	18334	1429900	Total Phosphorus	Impairment Unknown	75	Default FAL	92	Upper	Big Eau Pleine
Hay Creek	0	5.42	Sauk	13001	1279000	Total Phosphorus	Degraded Biological Community	75	Cold	9	Lower	Baraboo
Hemlock Creek	0	28.1	Wood	12224	1366300	Total Phosphorus	Degraded Biological Community, Impairment Unknown	75	Default FAL/LFF for section from Vesper Dam to Dawes Creek.	62, 201	Central	Yellow
Hills Creek	0	10	Juneau, Vernon	18434	1288800	Total Phosphorus	Degraded Biological Community	75	Default FAL	21	Lower	Baraboo
Hulbert Creek	0	1.55	Sauk	13050	1298500	Total Phosphorus	Impairment Unknown	75	Cold	243	Lower	Lower WI
Lemonweir River	0	25.8	Juneau	13059	1301700	Total Phosphorus	Impairment Unknown	100	Default FAL	36, 244, 245	Lower	Lemonweir
Lemonweir River	25.8	30.64	Juneau	13060	1301700	Total Phosphorus	Impairment Unknown	100	Default FAL	45	Lower	Lemonweir

Table 1. Total phosphorus impaired river and stream segments

Waterbody	Start Mile	End Mile	Counties	Assessment Unit	WBIC	Pollutants	Impairments[2]	Phosphorus Criteria[3] (µg/L)	Fish & Aquatic Life Designated Use *(proposed DU, if different)*[4]	TMDL Subbasin(s)	Figure Region	Tributary Watershed
Lemonweir River	30.64	55.88	Juneau, Monroe	201397	1301700	Total Phosphorus	Impairment Unknown	100	Default FAL	195, 197, 306	Lower	Lemonweir
Little Baraboo River	0	11.93	Richland, Sauk	13007	1282500	Total Phosphorus	Degraded Biological Community	75	Default FAL	14, 301	Lower	Baraboo
Little Bear Creek	0	1.5	Wood	12359	1416900	Total Phosphorus	Degraded Biological Community, Impairment Unknown	75	Default FAL	79	Upper	Little Eau Pleine
Little Bear Creek	1.5	8	Wood	12360	1416900	Total Phosphorus	Impairment Unknown	75	Default FAL with portions listed as LFF and LAL in NR. 104	82, 211	Upper	Little Eau Pleine
Little Eau Pleine River	0	28.6	Marathon, Portage	12354	1412600	Total Phosphorus	Degraded Biological Community	75	Default FAL	80, 150	Upper	Little Eau Pleine
Little Eau Pleine River	28.6	57	Clark, Marathon	12355	1412600	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	85, 212, 213	Upper	Little Eau Pleine
Little Hemlock Creek	0	10.39	Wood	12225	1367100	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	62	Central	Yellow
Little Hoten Creek	0	2.23	Juneau	13100	1307000	Total Phosphorus	Impairment Unknown	75	Cold	48	Lower	Lemonweir
Little Hoton Creek	2.23	3.93	Juneau	1442012	1307000	Total Phosphorus	Impairment Unknown	75	Cold	48	Lower	Lemonweir
Little Lemonweir River	0	4.62	Juneau	18456	1306100	Total Phosphorus	Impairment Unknown	75	Default FAL	47	Lower	Lemonweir
Little Lemonweir River	4.62	12.36	Juneau	948033	1306100	Total Phosphorus	Impairment Unknown	75	Default FAL	47, 48, 196	Lower	Lemonweir

Table 1. Total phosphorus impaired river and stream segments

Waterbody	Start Mile	End Mile	Counties	Assessment Unit	WBIC	Pollutants	Impairments[2]	Phosphorus Criteria[3] (µg/L)	Fish & Aquatic Life Designated Use *(proposed DU, if different)*[4]	TMDL Subbasin(s)	Figure Region	Tributary Watershed
Little Lemonweir River	12.36	22.86	Juneau, Monroe	948058	1306100	Total Phosphorus	Impairment Unknown	75	Cold	49	Lower	Lemonweir
Little Lemonweir River	22.86	24.81	Monroe	948085	1306100	Total Phosphorus	Impairment Unknown	75	Cold	50	Lower	Lemonweir
Lyndon Creek	0	6	Juneau	13054	1300700	Total Phosphorus	Impairment Unknown	75	Default FAL*	34, 192	Lower	Lower WI
Lyndon Creek	6	8.73	Juneau	13055	1300700	Total Phosphorus	Impairment Unknown	75	Default FAL*	35	Lower	Lower WI
Mill Creek	0	16.01	Portage	12318	1398600	Total Phosphorus	Low DO	75	Default FAL	78, 146	Central	Mill
Mill Creek	16.01	32.82	Wood, Portage	12319	1398600	Total Phosphorus	Low DO	75	Default FAL	207, 332	Central	Mill
Mill Creek	5.81	8.24	Monroe	18452	1326700	Total Phosphorus	Impairment Unknown	75	Cold	58, 305	Lower	Lemonweir
Mink Creek	0	5.78	Taylor	12498	1463300	Total Phosphorus	Impairment Unknown	75	Cold	276	Upper	Rib
Narrows Creek	0	23	Sauk	12996	1276400	Total Phosphorus	Impairment Unknown	75	Default FAL	7, 181, 183	Lower	Baraboo
North Br Duck Creek	0	20.6	Columbia	13526	1267500	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	2, 177	Lower	Lower WI
Onemile Creek	0	0.69	Juneau	18445	1303400	Total Phosphorus	Impairment Unknown	75	Default FAL	38	Lower	Lemonweir
Onemile Creek	0.7	3.6	Juneau	13063	1303400	Total Phosphorus	Impairment Unknown	75	Default FAL*	39	Lower	Lemonweir
Onemile Creek	3.6	5.99	Juneau	947890	1303400	Total Phosphorus	Impairment Unknown	75	Cold	40	Lower	Lemonweir
Onemile Creek	5.99	7.23	Juneau	1517524	1303400	Total Phosphorus	Impairment Unknown	75	Cold	41	Lower	Lemonweir

Table 1. Total phosphorus impaired river and stream segments

Waterbody	Start Mile	End Mile	Counties	Assessment Unit	WBIC	Pollutants	Impairments[2]	Phosphorus Criteria[3] (µg/L)	Fish & Aquatic Life Designated Use *(proposed DU, if different)*[4]	TMDL Subbasin(s)	Figure Region	Tributary Watershed
Onemile Creek	7.23	13	Juneau	947914	1303400	Total Phosphorus	Impairment Unknown	75	Cold	42	Lower	Lemonweir
Plum Creek	0	8	Sauk	13021	1287700	Total Phosphorus	Impairment Unknown	75	Default FAL	18	Lower	Baraboo
Puff Creek	0	7.72	Wood	12236	1371500	Total Phosphorus	Degraded Biological Community	75	Default FAL	307	Central	Yellow
Raeder Creek	0	3	Marathon	18335	1430800	Total Phosphorus	Impairment Unknown	75	Default FAL	96	Upper	Big Eau Pleine
Randall Creek	9	10	Marathon	12407	1431800	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	97	Upper	Big Eau Pleine
Randall Creek	0	9	Marathon	18336	1431800	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL?	94	Upper	Big Eau Pleine
Rocky Creek	0	12.22	Wood	12233	1370800	Total Phosphorus	Impairment Unknown	75	Default FAL	66	Central	Yellow
Scotch Creek	0	3.8	Marathon	12460	1455600	Total Phosphorus	Impairment Unknown	75	Default FAL	101	Upper	Rib
Scotch Creek	3.8	10	Marathon	18354	1455600	Total Phosphorus	Impairment Unknown	75	LFF	106	Upper	Rib
Scotch Creek	10	18	Marathon	12461	1455600	Total Phosphorus	Impairment Unknown	75	Default FAL	105	Upper	Rib
Seeley Creek	0	13.12	Sauk	12990	1275300	Total Phosphorus	Impairment Unknown	75	Default FAL	6	Lower	Baraboo
Sevenmile Creek	0	15	Juneau	13061	1302400	Total Phosphorus	Impairment Unknown	75	Default FAL	37	Lower	Lemonweir
Seymour Creek	0	2.63	Juneau	13024	1291400	Total Phosphorus	Impairment Unknown	75	Default FAL*	23	Lower	Baraboo

Table 1. Total phosphorus impaired river and stream segments

Waterbody	Start Mile	End Mile	Counties	Assessment Unit	WBIC	Pollutants	Impairments[2]	Phosphorus Criteria[3] (µg/L)	Fish & Aquatic Life Designated Use *(proposed DU, if different)*[4]	TMDL Subbasin(s)	Figure Region	Tributary Watershed
Seymour Creek	2.63	6.48	Juneau, Vernon	946527	1291400	Total Phosphorus	Impairment Unknown	75	Default FAL	24	Lower	Baraboo
Seymour Creek	6.48	11.49	Monroe, Vernon	946550	1291400	Total Phosphorus	Impairment Unknown	75	Default FAL*	25	Lower	Baraboo
Silver Creek	0	4.4	Sauk	13004	1280000	Total Phosphorus	Low DO, Degraded Habitat	75	Default FAL	12	Lower	Baraboo
South Br Creek (S Br Baraboo)	0	1.25	Vernon	13029	1289800	Total Phosphorus	Impairment Unknown	75	Default FAL	22	Lower	Baraboo
South Fork Lemonweir River	6.21	12.2	Monroe	888023	1338500	Total Phosphorus	Low DO, Degraded Biological Community	75	Default FAL	54	Lower	Lemonweir
South Fork Lemonweir River	13.28	22.03	Monroe	3870704	1338500	Total Phosphorus	Impairment Unknown	75	Default FAL	56, 57	Lower	Lemonweir
Spring Brook Creek	0	10.27	Langlade, Marathon	12431	1440800	Total Phosphorus	Degraded Biological Community	75	Default FAL (Cold)	107, 216	Upper	Eau Claire
Spring Brook Creek	10.26	12.65	Langlade	12432	1440800	Total Phosphorus	Low DO	75	Default FAL	216	Upper	Eau Claire
Squaw Creek	0	9	Marathon, Wood	12363	1420700	Total Phosphorus	Impairment Unknown	75	LFF (FAL)	84	Upper	Little Eau Pleine
Tributary to the South Branch of Yellow River	0	1.07	Clark	1516846	1372800	Total Phosphorus	Water Quality Use Restrictions	75	LAL (FAL)	71	Central	Yellow
Twin Creek	0	9	Sauk	18426	1279400	Total Phosphorus	Impairment Unknown	75	Default FAL	11	Lower	Baraboo
Unnamed Creek	5	7.91	Wood	5533601	1371200	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	72	Central	Yellow
Unnamed Creek (T23N,R3E,S10,SESW,72)	0	3	Wood	12234	1371200	Total Phosphorus	Impairment Unknown	75	Default FAL	67, 72	Central	Yellow

Table 1. Total phosphorus impaired river and stream segments

Waterbody	Start Mile	End Mile	Counties	Assessment Unit	WBIC	Pollutants	Impairments[2]	Phosphorus Criteria[3] (µg/L)	Fish & Aquatic Life Designated Use *(proposed DU, if different)*[4]	TMDL Subbasin(s)	Figure Region	Tributary Watershed
Unnamed Creek (T23N,R3E,S10,SESW,72)	3	5	Wood	12235	1371200	Total Phosphorus	Impairment Unknown	75	Default FAL	72, 313	Central	Yellow
Unnamed Stream	0	1.94	Wood	3987535	5016277	Total Phosphorus	Degraded Biological Community	75	Default FAL	67	Central	Yellow
Unnamed Stream	0	2.33	Clark	3987619	5015142	Total Phosphorus	Degraded Biological Community	75	Default FAL	70	Central	Yellow
Unnamed Trib to Yellow River	0	1.25	Wood	4699046	1372500	Total Phosphorus	Impairment Unknown	75	Default FAL	68	Central	Yellow
Unnamed Trib to Yellow River	0	0.84	Clark	5533738	1374000	Total Phosphorus	Water Quality Use Restrictions	75	Default FAL	275	Central	Yellow
W Br Eau Claire River	2.01	32.01	Langlade	1496996	1445700	Total Phosphorus	Degraded Biological Community	75	Cold	108	Upper	Eau Claire
W Branch Big Eau Pleine River	0	8.7	Marathon, Taylor	12412	1432700	Total Phosphorus	Water Quality Use Restrictions	75	LFF	98	Upper	Big Eau Pleine
W Branch Big Eau Pleine River	8.7	12	Taylor	12413	1432700	Total Phosphorus	Degraded Biological Community	75	Default FAL	100	Upper	Big Eau Pleine
West Br Baraboo River	0	7.24	Juneau, Vernon	13026	1288400	Total Phosphorus	Low DO	75	Default FAL	20, 138, 188	Lower	Baraboo
West Br Big Creek	0	8	Juneau, Sauk	18427	1281200	Total Phosphorus	Impairment Unknown	75	Default FAL	13, 16	Lower	Baraboo
Wild Creek	0	10	Marathon	12361	1420400	Total Phosphorus	Water Quality Use Restrictions	75	FAL	83, 328	Upper	Little Eau Pleine
Wisconsin River (At Castle Rock Lake)	158.68	173.27	Adams/Juneau	885667	1179900	Total Phosphorus	Low DO	40	WWSF	59	Central	Central WI
Wisconsin River (At Petenwell Lake)	173.27	187.81	Adams/Juneau	885864	1179900	Total Phosphorus	Eutrophication, Degraded	40	WWSF	74	Central	Central WI

Table 1. Total phosphorus impaired river and stream segments

Waterbody	Start Mile	End Mile	Counties	Assessment Unit	WBIC	Pollutants	Impairments[2]	Phosphorus Criteria[3] (µg/L)	Fish & Aquatic Life Designated Use *(proposed DU, if different)*[4]	TMDL Subbasin(s)	Figure Region	Tributary Watershed
Yellow River	39.1	50.01	Clark, Juneau, Wood	12205	1352800	Total Phosphorus	Water Quality Use Restrictions Biological Community	75	FAL Warmwater	61, 140	Central	Yellow
Yellow River	0	8.43	Juneau	12230	1352800	Total Phosphorus	Degraded Biological Community	75	Default FAL	60, 199	Central	Yellow
Yellow River	8.43	39.1	Juneau, Wood	5541128	1352800	Total Phosphorus	Impairment Unknown	75	Default FAL	61,199	Central	Yellow
Yellow River	53.01	57.3	Wood	5541350	1352800	Total Phosphorus	Water Quality Use Restrictions	75	FAL Warmwater	64, 200	Central	Yellow
Yellow River	57.3	74.48	Wood	5541396	1352800	Total Phosphorus	Water Quality Use Restrictions	75	FAL Warmwater	250, 307	Central	Yellow
Yellow River	74.48	83.08	Clark, Wood	5541476	1352800	Total Phosphorus	Water Quality Use Restrictions	75	FAL Warmwater	275	Central	Yellow
Yellow River	83.08	97.59	Clark	5541562	1352800	Total Phosphorus	Water Quality Use Restrictions	75	FAL Warmwater	275	Central	Yellow
Yellow River-E. Branch	0	8.78	Marathon, Wood	12239	1373200	Total Phosphorus	Impairment Unknown	75	Default FAL	275	Central	Yellow
Yellow River-S. Branch	0	18	Clark, Wood	12238	1372600	Total Phosphorus	Degraded Biological Community	75	Default FAL	69, 71	Central	Yellow

Table 2. Phosphorus impaired lakes addressed by the TMDL

Waterbody	Size (Acres)	Counties	Assessment Unit	WBIC	Pollutants	Impairments	Classification	Phosphorus Criteria (µg/L)	Fish & Aquatic Life Designated Use	Recreational Use	TMDL Subbasin	Figure Region	Tributary Watershed
Big Eau Pleine Reservoir	4,909	Marathon	352690	1427400	Total Phosphorus	Low DO, Eutrophication, Excess Algal Growth	Reservoir Deep Lowland	30	Default FAL	Full body contact	87	Upper	Big Eau Pleine
Castle Rock Reservoir	12,386	Adams, Juneau	424081	1345700	Total Phosphorus	Eutrophication, Water Quality Use Restrictions	Reservoir Shallow Lowland	40	Default FAL	Full body contact	59	Central	Central WI
Petenwell Reservoir	23,001	Adams, Juneau	424132	1377100	Total Phosphorus	Low DO, Water Quality Use Restrictions	Reservoir Shallow Lowland	40	Default FAL	Full body contact	74	Central	Central WI
Kawaguesaga Lake	700	Oneida	128163	1542300	Total Phosphorus	Impairment Unknown	Two-Story	15	Default FAL	Full body contact	135	Headwaters	Tomahawk
Minocqua Lake	1,339	Oneida	128227	1542400	Total Phosphorus	Impairment Unknown	Two-Story	15	Default FAL	Full body contact	134	Headwaters	Tomahawk
Redstone Lake	612	Sauk	13542	1280400	Total Phosphorus	Excess Algal Growth	Reservoir Deep Lowland	30	Default FAL	Full body contact	13	Lower	Baraboo
Lake Delton	249	Columbia	13546	1295400	Total Phosphorus	Eutrophication, Water Quality Use Restrictions, Excess Algal Growth	Reservoir	40	Default FAL	Full body contact	30	Lower	Lower WI
Lake DuBay (1)	4,045	Marathon, Portage	3900358	1412200	Total Phosphorus	Excess Algal Growth	Reservoir Shallow Lowland	100	Default FAL	Full body contact	81	Upper	Upper WI

Waterbodies without approved TMDLs [2]

Lake Wisconsin [3]	7,197	Sauk, Columbia	13500	1260600	Total Phosphorus	Low DO, Eutrophication, Recreational Restrictions - Blue Green Algae	Impounded Flowing Water	100	Default FAL	Full body contact	1	Lower	Lower WI

[1] While the 100 µg/L phosphorus criterion for Lake DuBay of is not sufficient to remove the impairment of excessive algal growth (monitoring data indicates that the lake averages 90 µg/L and is still impaired), the TMDL analysis shows that resulting loads from the attainment of water quality criteria for Big Eau Pleine (criteria of 30 µg/L) coupled with reductions needed to meet downstream reservoirs will result in a phosphorus concertation for Lake DuBay sufficient to address the impairment of excessive algal growth (see Appendix C for details). Lake DuBay is predicted to have a summer mean concentration of 37 µg/L under the TMDL allocations and 45 µg/L under the site-specific allocations proposed in Appendix K.

[2] See Section 3 for further discussion

[3] The current phosphorus criterion for Lake Wisconsin is not adequate to address the listed impairments; however, the allocations found in Appendix K corresponding with a SSC of 47 µg/L, as discussed in Appendix C, addresses the impairments. See Section 3 of this Decision Document for further discussion.

Table 3: Daily and Annual WLAs by Permitted Point Sources under Current Criteria

Facility Name	Permit Number	TMDL Reach	TP Wasteload Allocation (lbs./year)	TP Wasteload Allocation (lbs./day)
ABBOTSFORD WASTEWATER TREATMENT FACILITY	0023141	323	160	0.438
ABBYLAND FOODS INC ABBOTSFORD PLANT	0057436	323	198	0.542
ADAMS WASTEWATER TREATMENT FACILITY	0023159	202	1,328	3.64
ANTIGO CITY OF	0022144	216	1,051	2.88
ARPIN WASTEWATER TREATMENT FACILITY	0031267	314	42	0.115
ATHENS WASTEWATER TREATMENT FACILITY	0022365	215	117	0.32
AUBURNDALE WASTEWATER TREATMENT FACILITY	0022411	211	108	0.296
BARABOO WASTEWATER TREATMENT FACILITY	0020605	179	6,793	18.6
BLENKER SHERRY SANITARY DISTRICT WWTF	0031950	207	18	0.0493
BROKAW WASTEWATER TREATMENT FACILITY	0022136	217	23	0.063
CAMBRIA WASTEWATER TREATMENT FACILITY	0023523	176	164	0.449
CAZENOVIA WASTEWATER TREATMENT FACILITY	0031801	14	36	0.0986
CHILI WASTEWATER TREATMENT FACILITY	0030961	71	46	0.126
COLBY CITY WWTF	0023655	95	168	0.46
CROCKETT'S RESORT	0061263	193	26	0.0712
DOMTAR - NEKOOSA	0003620	204	10,102	27.7
DOMTAR PAPER CO LLC	0026042	154	5,168	14.1
EAGLE RIVER CITY OF	0022004	224	323	0.884
EDGAR WASTEWATER TREATMENT FACILITY	0021784	105	313	0.857
ELROY WASTEWATER TREATMENT FACILITY	0023931	274	344	0.942
ERCO WORLDWIDE (USA) INC - PORT EDWARDS	0003565	204	1,998	5.47
EXCEPTIONAL LIVING CENTERS - BETHEL	0031313	313	20	0.0548
EXPERA SPECIALTY SOLUTIONS, LLC-MOSINEE	0003671	262	6,754	18.5
EXPERA SPECIALTY SOLUTIONS, LLC-RHINELANDER	0003026	221	4,308	11.8
FENWOOD WASTEWATER TREATMENT FACILITY	0031411	90	7	0.0192
FOREMOST FARMS USA COOP PLOVER	0003859	208	343	0.939
FOREMOST FARMS USA REEDSBURG	0000035	184	45	0.123
GOETZ CO. INC (PORTAGE PETRO TRAVEL P)	0035998	4	125	0.342
GRANDE CHEESE COMPANY, CUSTOM INGREDIENT DIV.	0050547	202	25	0.0684
GRANDE CHEESE CORP WYOCENA	0051764	173	62	0.17
HEWITT SANITARY DISTRICT WWTP	0031275	331	71	0.194
HILL POINT SANITARY DISTRICT WWTF	0035483	182	11	0.0301
HILLSBORO WASTEWATER TREATMENT FACILITY	0020583	188	128	0.35
HUSTLER WASTEWATER TREATMENT FACILITY	0032085	196	10	0.0274

JUNCTION CITY WASTEWATER TREATMENT FACILITY	0028070	146	68	0.186
KERRY BIOFUNCTIONAL INGREDIENTS INC	0003875	263	363	0.994
KENDALL WASTEWATER TREATMENT FACILITY	0020516	189	53	0.145
LA VALLE WASTEWATER TREATMENT FACILITY	0028878	186	174	0.476
LAKE TOMAHAWK TOWNSHIP SANITARY DISTRICT 1	0036374	167	34	0.0931
LAKELAND SANITARY DISTRICT	0022837	300	469	1.28
LAKESIDE FOODS INC. - REEDSBURG	0057738	185	494	1.35
LIGNOTECH USA, INC.	0003450	154	185	0.507
LIME RIDGE WASTEWATER TREATMENT FACILITY	0036447	183	8	0.0219
LODI CANNING CO	0002658	171	2	0.0055
LODI WASTEWATER TREATMENT FACILITY	0022918	170	1,427	3.91
LOGANVILLE WASTEWATER TREATMENT FACILITY	0029114	181	101	0.277
LYNDON STATION WTF	0060488	192	170	0.465
MARATHON WATER & SEWER DPT WWTP	0020273	214	220	0.602
MARSHFIELD WASTEWATER TREATMENT FACILITY	0021024	331	2,896	7.93
MAUSTON WASTEWATER TREATMENT FACILITY	0024635	194	4,570	12.5
MCCAIN FOODS USA, INC., PLOVER	0054518	145	1,087	2.98
MERRILL CITY OF	0020150	321	1,914	5.24
MILAN S D WASTEWATER TREATMENT FACILITY	0031500	94	148	0.405
MILLADORE WASTEWATER TREATMENT FACILITY	0022381	332	88	0.241
MULLINS CHEESE INC	0054127	81	751	2.06
MULLINS CHEESE INC MARSHFIELD	0053694	85	131	0.359
NASONVILLE DAIRY INC	0040312	68	67	0.183
NECEDAH WASTEWATER TREATMENT FACILITY	0020133	199	762	2.09
NEENAH PAPER INC WHITING MILL	0003611	208	1,589	4.35
NEKOOSA WASTEWATER TREATMENT FACILITY	0020613	203	268	0.734
NEW LISBON WASTEWATER TREATMENT FACILITY	0020699	195	1,161	3.18
NEWPAGE CORPORATION - WATER QUALITY CENTER	0037991	144	18,070	49.5
NORTH FREEDOM WASTEWATER TREATMENT FACILITY	0028011	180	213	0.583
OAKDALE WASTEWATER TREATMENT FACILITY	0031259	312	176	0.482
O'DELL'S BAY SANITARY DISTRICT NO. 1	0036536	59	192	0.526
PACKAGING CORPORATION OF AMERICA	0002810	161	5,331	14.6
PHELPS SANITARY DISTRICT #1	0029050	225	72	0.197
PITTSVILLE WATER AND SEWER DEPT WWTF	0020494	200	49	0.134
PLOVER WASTEWATER TREATMENT FACILITY	0027995	208	1,125	3.08
PORT EDWARDS WASTEWATER TREATMENT FACILITY	0020451	204	335	0.917
PORTAGE WASTEWATER TREATMENT FACILITY	0020427	190	6,404	17.5
POYNETTE WASTEWATER TREATMENT FACILITY	0021091	172	914	2.5

REEDSBURG WASTEWATER TREATMENT FACILITY	0020371	184	8,073	22.1
RHINELANDER CITY OF	0020044	222	965	2.64
RIB LAKE VILLAGE OF	0029017	218	125	0.342
RIB MOUNTAIN METRO SEWAGE DISTRICT WWTF	0035581	263	2,759	7.55
RIO WASTEWATER TREATMENT FACILITY	0020117	174	350	0.958
ROCK SPRINGS WASTEWATER TREATMENT FACILITY	0029041	180	232	0.635
ROZELLVILLE SANITARY DISTRICT NO 1	0029076	328	8	0.0219
RUSSELL SANITARY DISTRICT #1 TOWN OF	0029319	219	30	0.0821
SAPUTO CHEESE USA INC REEDSBURG	0059404	184	14	0.0383
SARTORI COMPANY	0032794	216	9	0.0246
SENECA FOODS CORPORATION CAMBRIA	0003891	175	36	0.0986
SPENCER WASTEWATER TREATMENT FACILITY	0021521	212	280	0.767
STETSONVILLE, VILLAGE OF	0060216	100	44	0.12
STEVENS POINT WASTEWATER TREATMENT FACILITY	0029572	210	2,846	7.79
STRATFORD WASTEWATER TREATMENT FACILITY	0025569	91	116	0.318
THREE LAKES SANITARY DISTRICT #1	0022853	284	42	0.115
TOMAH WASTEWATER TREATMENT FACILITY	0021318	54	1,185	3.24
TOMAHAWK CITY OF	0021946	160	375	1.03
UNION CENTER WASTEWATER TREATMENT FACILITY	0025640	187	55	0.151
UNITED WISCONSIN GRAIN PRODUCERS LLC	0062502	176	123	0.337
UNITY WASTEWATER TREATMENT FACILITY	0060526	213	16	0.0438
VERSO MINNESOTA WISCONSIN LLC - WATER RENEWAL CENTER	0003468	210	1,794	4.91
VESPER WASTEWATER TREATMENT FACILITY	0030309	201	59	0.162
WARRENS WASTEWATER TREATMENT FACILITY	0060259	198	241	0.66
WAUSAU WATER WORKS WW TREATMENT FACILITY	0025739	154	5,127	14
WHITING WASTEWATER TREATMENT FACILITY	0021636	210	419	1.15
WI AIR NATIONAL GUARD	0023078	197	609	1.67
WI DELLS LK DELTON SEWERAGE COMMISSION WWTF	0031402	191	8,317	22.8
WI DNR ART OEHMCKE STATE FISH HATCHERY	0058271	226	128	0.35
WISCONSIN POWER & LIGHT CO COLUMBIA	0002780	241	*	*
WISCONSIN PUBLIC SERVICE CORP WESTON 1 & 2	0003131	263	*	*
WISCONSIN PUBLIC SERVICE CORP WESTON 3 & 4	0042765	263	*	*
WI DNR DEVILS LAKE STATE PARK	0060241	29	1,043	2.86
WI DOC LINCOLN HILLS SCHOOL	0026701	220	47	0.129
WISCONSIN DAIRY STATE CHEESE, INC.	0055751	259	156	0.427
WISCONSIN RAPIDS WWTF	0025844	205	2,215	6.06
WONEWOC WASTEWATER TREATMENT FACILITY	0029688	187	182	0.498

* Pass through systems: Background phosphorus is present in the effluent from the source water. The point source is not contributing phosphorus beyond that which is present in the intake, therefore no phosphorus reductions are necessary to meet TMDL targets.

Table 4: Daily and Annual Phosphorus WLAs by MS4 under Current Criteria

Municipality	TMDL Reach	Area (acres)	TP Wasteload Allocation (lbs./year)	TP Wasteload Allocation (lbs./day)	Reduction from Baseline (%)	Reduction from No-controls (%)
Baraboo	5	547	455	1.25	0%	15.0%
Baraboo	137	391	326	0.893	0%	15.0%
Baraboo	179	2,672	2,231	6.11	0%	15.0%
Baraboo	230	119	80	0.219	19%	31.2%
Baraboo	234	3	2	0.0055	0%	15.0%
Kronenwetter	81	41	5	0.0137	79%	82.2%
Kronenwetter	153	1,061	111	0.304	79%	82.2%
Kronenwetter	263	2,413	236	0.646	79%	82.2%
Marshfield	84	2,359	340	0.931	79%	82.2%
Marshfield	85	186	28	0.0767	79%	82.2%
Marshfield	275	1,709	331	0.906	73%	77.1%
Marshfield	307	291	45	0.123	78%	81.3%
Marshfield	331	4,004	583	1.6	79%	82.2%
Merrill	158	2,343	282	0.772	79%	82.2%
Merrill	269	621	75	0.205	79%	82.2%
Merrill	321	1,621	188	0.515	79%	82.2%
Mosinee	81	1,185	155	0.424	79%	82.2%
Mosinee	153	1,513	173	0.474	79%	82.2%
Mosinee	262	1,150	136	0.372	79%	82.2%
Portage	190	579	343	0.939	0%	15.0%
Rib Mountain	154	2,312	252	0.69	79%	82.2%
Rib Mountain	263	128	16	0.0438	79%	82.2%
Rothschild	154	821	93	0.255	79%	82.2%
Rothschild	263	3,246	339	0.928	79%	82.2%
Schofield	154	604	61	0.167	79%	82.2%
Schofield	290	432	43	0.118	79%	82.2%

Stevens Point	145	234	30	0.0821	79%	82.2%
Stevens Point	148	1,466	188	0.515	79%	82.2%
Stevens Point	149	1,359	137	0.375	79%	82.2%
Stevens Point	210	4,310	487	1.33	79%	82.2%
Stevens Point	260	1,905	191	0.523	79%	82.2%
Wausau	154	4,114	452	1.24	79%	82.2%
Wausau	156	3,793	452	1.24	79%	82.2%
Wausau	265	609	75	0.205	79%	82.2%
Wausau	290	688	73	0.2	79%	82.2%
Wausau	291	1,321	161	0.441	79%	82.2%
Wausau	292	691	81	0.222	79%	82.2%
Weston	153	19	3	0.0082	79%	82.2%
Weston	154	2,368	261	0.715	79%	82.2%
Weston	155	3,136	373	1.02	79%	82.2%
Weston	263	934	119	0.326	79%	82.2%
Weston	289	234	24	0.0657	79%	82.2%
Weston	290	476	51	0.14	79%	82.2%
Wisconsin Rapids	144	1,260	143	0.392	79%	82.2%
Wisconsin Rapids	204	159	18	0.0493	80%	83.0%
Wisconsin Rapids	205	3,496	376	1.03	79%	82.2%
Wisconsin Rapids	206	1,051	127	0.348	79%	82.2%
Wisconsin Rapids	256	995	121	0.331	79%	82.2%
Wisconsin Rapids	257	1,381	141	0.386	79%	82.2%

Baseline Assumes Compliance with NR 151 Requirements (20% TSS and 15% TP).

Table 9: Annual Total Phosphorus WLAs by Permitted Point Source for Proposed Site-Specific Criteria.

Facility Name	Permit Number	TMDL Reach	TP Wasteload Allocation (lbs./year)	TP Wasteload Allocation (lbs./day)
ABBOTSFORD WASTEWATER TREATMENT FACILITY	0023141	323	160	0.438
ABBYLAND FOODS INC ABBOTSFORD PLANT	0057436	323	198	0.542
ADAMS WASTEWATER TREATMENT FACILITY	0023159	202	486	1.33
ANTIGO CITY OF	0022144	216	1,874	5
ARPIN WASTEWATER TREATMENT FACILITY	0031267	314	42	0.115
ATHENS WASTEWATER TREATMENT FACILITY	0022365	215	209	0.572
AUBURNDALE WASTEWATER TREATMENT FACILITY	0022411	211	112	0.307
BARABOO WASTEWATER TREATMENT FACILITY	0020605	179	2,487	7
BLENKER SHERRY SANITARY DISTRICT WWTF	0031950	207	31	0.0849
BROKAW WASTEWATER TREATMENT FACILITY	0022136	217	40	0.11
CAMBRIA WASTEWATER TREATMENT FACILITY	0023523	176	141	0.386
CAZENOVIA WASTEWATER TREATMENT FACILITY	0031801	14	36	0.0986
CHILI WASTEWATER TREATMENT FACILITY	0030961	71	46	0.126
COLBY CITY WWTF	0023655	95	168	0.46
CROCKETT'S RESORT	0061263	193	9	0.0246
DOMTAR - NEKOOSA	0003620	204	18,088	50
DOMTAR PAPER CO LLC	0026042	154	9,218	25
EAGLE RIVER CITY OF	0022004	224	577	1.58
EDGAR WASTEWATER TREATMENT FACILITY	0021784	105	490	1.34
ELROY WASTEWATER TREATMENT FACILITY	0023931	274	344	0.942
ERCO WORLDWIDE (USA) INC - PORT EDWARDS	0003565	204	1,998	5
EXCEPTIONAL LIVING CENTERS - BETHEL	0031313	313	20	0.0548
EXPERA SPECIALTY SOLUTIONS, LLC-MOSINEE	0003671	262	12,043	33
EXPERA SPECIALTY SOLUTIONS, LLC-RHINELANDER	0003026	221	7,681	21
FENWOOD WASTEWATER TREATMENT FACILITY	0031411	90	7	0.0192
FOREMOST FARMS USA COOP PLOVER	0003859	208	576	1.58
FOREMOST FARMS USA REEDSBURG	0000035	184	45	0.123
GOETZ COMPANIES INC (PORTAGE PETRO TRAVEL P)	0035998	4	46	0.126
GRANDE CHEESE CO, CUSTOM INGREDIENT DIV.	0050547	202	10	0.0274
GRANDE CHEESE CORP WYOCENA	0051764	173	26	0.0712
HEWITT SANITARY DISTRICT WWTP	0031275	331	83	0.227
HILL POINT SANITARY DISTRICT WWTF	0035483	182	11	0.0301
HILLSBORO WASTEWATER TREATMENT FACILITY	0020583	188	128	0.35
HUSTLER WASTEWATER TREATMENT FACILITY	0032085	196	10	0.0274

JUNCTION CITY WASTEWATER TREATMENT FACILITY	0028070	146		122	0.334
KERRY BIOFUNCTIONAL INGREDIENTS INC	0003875	263		648	1.77
KENDALL WASTEWATER TREATMENT FACILITY	0020516	189		53	0.145
LA VALLE WASTEWATER TREATMENT FACILITY	0028878	186		64	0.175
LAKE TOMAHAWK TOWNSHIP SANITARY DISTRICT 1	0036374	167		60	0.164
LAKELAND SANITARY DISTRICT	0022837	300		837	2.29
LAKESIDE FOODS INC. - REEDSBURG	0057738	185		181	0.496
LIGNOTECH USA, INC.	0003450	154		185	0.507
LIME RIDGE WASTEWATER TREATMENT FACILITY	0036447	183		8	0.0219
LODI CANNING CO	0002658	171		2	0.0055
LODI WASTEWATER TREATMENT FACILITY	0022918	170		605	1.66
LOGANVILLE WASTEWATER TREATMENT FACILITY	0029114	181		101	0.277
LYNDON STATION WTF	0060488	192		70	0.192
MARATHON WATER & SEWER DPT WWTP	0020273	214		393	1.08
MARSHFIELD WASTEWATER TREATMENT FACILITY	0021024	331		3,356	9
MAUSTON WASTEWATER TREATMENT FACILITY	0024635	194		1,673	5
MCCAIN FOODS USA, INC., PLOVER	0054518	145		1,939	5
MERRILL CITY OF	0020150	321		3,413	9
MILAN S D WASTEWATER TREATMENT FACILITY	0031500	94		148	0.405
MILLADORE WASTEWATER TREATMENT FACILITY	0022381	332		156	0.427
MULLINS CHEESE INC	0054127	81		1,339	4
MULLINS CHEESE INC MARSHFIELD	0053694	85		157	0.43
NASONVILLE DAIRY INC	0040312	68		67	0.183
NECEDAH WASTEWATER TREATMENT FACILITY	0020133	199		279	0.764
NEENAH PAPER INC WHITING MILL	0003611	208		2,834	8
NEKOOSA WASTEWATER TREATMENT FACILITY	0020613	203		477	1.31
NEW LISBON WASTEWATER TREATMENT FACILITY	0020699	195		425	1.16
NEWPAGE CORPORATION - WATER QUALITY CENTER	0037991	144		32,220	88
NORTH FREEDOM WASTEWATER TREATMENT FACILITY	0028011	180		78	0.214
OAKDALE WASTEWATER TREATMENT FACILITY	0031259	312		78	0.214
O'DELL'S BAY SANITARY DISTRICT NO. 1	0036536	59		70	0.192
PACKAGING CORPORATION OF AMERICA	0002810	161		8,118	22
PHELPS SANITARY DISTRICT #1	0029050	225		128	0.35
PITTSVILLE WATER AND SEWER DEPT WWTF	0020494	200		49	0.134
PLOVER WASTEWATER TREATMENT FACILITY	0027995	208		2,007	5
PORT EDWARDS WASTEWATER TREATMENT FACILITY	0020451	204		599	1.64
PORTAGE WASTEWATER TREATMENT FACILITY	0020427	190		2,345	6
POYNETTE WASTEWATER TREATMENT FACILITY	0021091	172		524	1.43
REEDSBURG WASTEWATER TREATMENT FACILITY	0020371	184		2,954	8

RHINELANDER CITY OF	0020044	222	1,721	5
RIB LAKE VILLAGE OF	0029017	218	223	0.611
RIB MOUNTAIN METRO SEWAGE DISTRICT WWTF	0035581	263	4,919	14
RIO WASTEWATER TREATMENT FACILITY	0020117	174	128	0.35
ROCK SPRINGS WASTEWATER TREATMENT FACILITY	0029041	180	85	0.233
ROZELLVILLE SANITARY DISTRICT NO 1	0029076	328	8	0.0219
RUSSELL SANITARY DISTRICT #1 TOWN OF	0029319	219	54	0.148
SAPUTO CHEESE USA INC REEDSBURG	0059404	184	14	0.0383
SARTORI COMPANY	0032794	216	9	0.0246
SENECA FOODS CORPORATION CAMBRIA	0003891	175	28	0.0767
SPENCER WASTEWATER TREATMENT FACILITY	0021521	212	280	0.767
STETSONVILLE, VILLAGE OF	0060216	100	44	0.12
STEVENS POINT WASTEWATER TREATMENT FACILITY	0029572	210	5,075	14
STRATFORD WASTEWATER TREATMENT FACILITY	0025569	91	116	0.318
THREE LAKES SANITARY DISTRICT #1	0022853	284	75	0.205
TOMAH WASTEWATER TREATMENT FACILITY	0021318	54	1,185	3
TOMAHAWK CITY OF	0021946	160	669	1.83
UNION CENTER WASTEWATER TREATMENT FACILITY	0025640	187	48	0.131
UNITED WISCONSIN GRAIN PRODUCERS LLC	0062502	176	105	0.287
UNITY WASTEWATER TREATMENT FACILITY	0060526	213	16	0.0438
VERSO MINNESOTA WISCONSIN LLC - WATER RENEWAL CENTER	0003468	210	3,199	9
VESPER WASTEWATER TREATMENT FACILITY	0030309	201	59	0.162
WARRENS WASTEWATER TREATMENT FACILITY	0060259	198	235	0.643
WAUSAU WATER WORKS WW TREATMENT FACILITY	0025739	154	9,145	25
WHITING WASTEWATER TREATMENT FACILITY	0021636	210	747	2.05
WI AIR NATIONAL GUARD	0023078	197	223	0.611
WI DELLS LK DELTON SEWERAGE COMMISSION WWTF	0031402	191	3,045	8
WI DNR ART OEHMCKE STATE FISH HATCHERY	0058271	226	128	0.35
WI DNR DEVILS LAKE STATE PARK	0060241	29	736	2.02
WI DOC LINCOLN HILLS SCHOOL	0026701	220	84	0.23
WISCONSIN POWER & LIGHT CO COLUMBIA	0002780	241	*	*
WISCONSIN PUBLIC SERVICE CORP WESTON 1 & 2	0003131	263	*	*
WISCONSIN PUBLIC SERVICE CORP WESTON 3 & 4	0042765	263	*	
WISCONSIN DAIRY STATE CHEESE, INC.	0055751	259	279	0.764
WISCONSIN RAPIDS WWTF	0025844	205	3,949	11
WONEWOC WASTEWATER TREATMENT FACILITY	0029688	187	158	0.433

* Pass through systems: Background phosphorus is present in the effluent from the source water. The point source is not contributing phosphorus beyond that which is present in the intake, therefore no phosphorus reductions are necessary to meet TMDL targets.

Table 10: Daily and Annual Total Phosphorus WLAs for MS4 under Proposed Site-Specific Criteria.

Municipality	TMDL Reach	Area (acres)	TP Wasteload Allocation (lbs./year)	TP Wasteload Allocation (lbs./day)	Reduction from Baseline (%)	Reduction from No-controls (%)
Baraboo	5	547	167	0.457	63%	68.6%
Baraboo	137	391	119	0.326	63%	68.6%
Baraboo	179	2672	817	2.24	63%	68.6%
Baraboo	230	119	36	0.0986	63%	68.6%
Baraboo	234	3	1	0.0027	63%	68.6%
Kronenwetter	81	41	10	0.0274	63%	68.6%
Kronenwetter	153	1061	197	0.539	63%	68.6%
Kronenwetter	263	2413	421	1.15	63%	68.6%
Marshfield	84	2359	374	1.02	77%	80.5%
Marshfield	85	186	33	0.0903	75%	78.8%
Marshfield	275	1709	331	0.906	73%	77.1%
Marshfield	307	291	45	0.123	78%	81.3%
Marshfield	331	4004	675	1.85	76%	79.6%
Merrill	158	2343	503	1.38	63%	68.6%
Merrill	269	621	134	0.367	63%	68.6%
Merrill	321	1621	334	0.914	63%	68.6%
Mosinee	81	1185	276	0.756	63%	68.6%
Mosinee	153	1513	309	0.846	63%	68.6%
Mosinee	262	1150	242	0.663	63%	68.6%
Portage	190	579	126	0.345	63%	68.6%
Rib Mountain	154	2312	450	1.23	63%	68.6%
Rib Mountain	263	128	28	0.0767	63%	68.6%
Rothschild	154	821	166	0.454	63%	68.6%
Rothschild	263	3246	605	1.66	63%	68.6%
Schofield	154	604	109	0.298	63%	68.6%
Schofield	290	432	76	0.208	63%	68.6%

Stevens Point	145	234	53	0.145	63%	68.6%
Stevens Point	148	1466	336	0.92	63%	68.6%
Stevens Point	149	1359	244	0.668	63%	68.6%
Stevens Point	210	4310	868	2.38	63%	68.6%
Stevens Point	260	1905	340	0.931	63%	68.6%
Wausau	154	4114	805	2.2	63%	68.6%
Wausau	156	3793	807	2.21	63%	68.6%
Wausau	265	609	134	0.367	63%	68.6%
Wausau	290	688	131	0.359	63%	68.6%
Wausau	291	1321	287	0.786	63%	68.6%
Wausau	292	691	144	0.394	63%	68.6%
Weston	153	19	4	0.011	63%	68.6%
Weston	154	2368	466	1.28	63%	68.6%
Weston	155	3136	666	1.82	63%	68.6%
Weston	263	934	213	0.583	63%	68.6%
Weston	289	234	43	0.118	63%	68.6%
Weston	290	476	91	0.249	63%	68.6%
Wisconsin Rapids	144	1260	254	0.695	63%	68.6%
Wisconsin Rapids	204	159	31	0.0849	63%	68.6%
Wisconsin Rapids	205	3496	670	1.83	63%	68.6%
Wisconsin Rapids	206	1051	226	0.619	63%	68.6%
Wisconsin Rapids	256	995	215	0.589	63%	68.6%
Wisconsin Rapids	257	1381	251	0.687	63%	68.6%

Baseline Assumes Compliance with NR 151 Requirements (20% TSS and 15% TP