TMDL: Northeast Lakeshore nutrient and sediment TMDLs in portions of Brown, Calumet, Door, Fond du Lac, Kewaunee, Manitowoc, Ozaukee and Sheboygan counties in northeastern Wisconsin
Date: October 30, 2023

DECISION DOCUMENT
FOR THE NORTHEAST LAKESHORE TMDLS, IN PORTIONS OF BROWN, CALUMET, DOOR, FOND DU LAC, KEWAUNEE, MANITOWOC, OZAUKEE & SHEBOYGAN COUNTIES IN WISCONSIN

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

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

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

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

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

(1) the spatial extent of the watershed in which the impaired water body is located;
(2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;
(4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and

(5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyll *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

EPA Review of the NELW TMDL:

Location Description/Spatial Extent:

The Northeast Lakeshore Watershed (NELW) on Wisconsin's eastern lakeshore is part of the Lake Michigan basin and encompasses parts of Brown, Calumet, Door, Fond du Lac, Kewaunee, Manitowoc Ozaukee and Sheboygan counties. The NELW is 1,971 square miles in size (approximately 1,261,440 acres) and is comprised of three river subbasins. For the purposes of the Northeast Lakeshore (NEL) Total Maximum Daily Load (TMDL) effort, the Wisconsin Department of Natural Resources (WDNR) subdivided the NELW into three subbasins:

- The Kewaunee River Subbasin – including the Stony, Ahnapee, Kewaunee, and Twin River Watersheds;
- The Manitowoc River Subbasin – composed of the Manitowoc River Watershed; and
- The Sheboygan River Subbasin – including the Sheboygan River Watershed and the Pigeon River Watershed.

All three subbasins include tributaries that drain to the main rivers (e.g., the Kewaunee River in the Kewaunee River Subbasin) and tributaries that drain into Lake Michigan (Figure 1 of the NEL TMDL document). Surface waters in the NELW generally flow in an easternly direction from the headwaters areas in the western parts of the basins toward Lake Michigan. The NELW includes areas of the Northern Lake Michigan Coastal, Central Lake Michigan Coastal and Southeast Glacial Plains ecological landscapes (Figure 4 of the NEL TMDL document).

Tables 1 and 2 of Appendix A of the NEL TMDL document include stream and lake impairment listings from Wisconsin's 2022 Clean Water Act (CWA) List of Impaired Waters that are addressed by the NEL TMDL efforts. The NEL impaired listings include:

- Seventy (70) stream segments impaired due to excessive nutrients with impairment indicators that include: high phosphorus levels, degradation to the biological communities and low dissolved oxygen (DO);
- Four (4) stream segments impaired due to excessive sediment with impairment indicators that include: degradation to stream habitat and low dissolved oxygen; and
- Twelve (12) impaired lakes due to excessive nutrients with impairment indicators that include: high phosphorus levels, eutrophication, excessive algal growth and degradation to the biological communities.

Phosphorus and sediment reductions outlined via the NEL TMDLs are expected to address the list of impairments (i.e., the impairment indicator column in Tables 1 and 2) in Appendix A of the NEL TMDL document and Attachment 1 of this Decision Document including: low dissolved oxygen, excess algal growth, degraded biological community, and habitat degradation.

Attachment 1 of this Decision Document includes stream and lake impairment listings from Wisconsin's 2022 303(d) list that are addressed by the NEL TMDLs.

Attachments 2 and 3 of this Decision Document include the phosphorus and total suspended solids allocations for the NEL TMDLs. EPA notes there is a "DRAFT" watermark behind all of the Appendix K and Appendix L tables. EPA recognizes the tables enclosed in Attachments 2 and 3 as the final NEL total phosphorus and total suspended solids TMDL tables.

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

Problem Identification:
Phosphorus TMDLs: The stream and lake segments in Appendix A of the NEL TMDL document and Attachment 1 of this Decision Document were included on the Wisconsin 2022 303(d) list due to excessive nutrients (phosphorus). WDNR explained that excessive phosphorus can lead to nuisance algae growth, oxygen depletion, fish kills, reduced submerged aquatic vegetation, water clarity problems, and degraded habitat (Section 1.2 of the NEL TMDL document).

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

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

Total Suspended Solid TMDLs: The stream segments in Appendix A of the NEL TMDL document and Attachment 1 of this Decision Document were included on the Wisconsin 2022 303(d) list due to excessive sediment within the water column. WDNR cited that excessive sediment in surface waters can scatter and absorb sunlight that reduces the amount of light available for submerged aquatic vegetation and potentially increases surface water temperatures (Section 1.2 of the NEL TMDL document). Excessive sediment inputs can: stress aquatic vegetation, potentially impacting the release of dissolved oxygen to the water column, can impact fish and macroinvertebrate communities that rely on aquatic vegetation for food and habitat, can lead to destabilization of stream and lake bottom sediments which can lead to erosion and aquatic vegetation uses nutrients in the water column that would otherwise be available for nuisance algal growth.

Excessive amounts of fine sediment in stream environments can degrade aquatic communities. Sediment can reduce spawning and rearing areas for certain fish species. Excess suspended sediment can clog the gills of fish, stress certain sensitive species by abrading their tissue, and thus reduce fish health. When in suspension, sediment can limit visibility and light penetration which may impair foraging and predation activities by certain species.

Excessive fine sediment also may degrade aquatic habitats, alter natural flow conditions in stream environments and add organic materials to the water column. The potential addition of fine organic materials may lead to nuisance algal blooms which can negatively impact aquatic life and recreation (e.g., swimming, boating, fishing, etc.). Additionally, excess sediment and organic material may create turbid conditions within the water column and may increase the costs of treating surface waters used for drinking water or other industrial purposes (e.g., food processing).

Priority Ranking:
The Wisconsin 2022 303(d) list includes a TMDL Priority column where stream and/or lake segments can be designated as a high, medium or low priority. WDNR identified the waters in Appendix A of the NEL TMDL document and Attachment 1 of this Decision Document as high priority waters for TMDL development.

Pollutants of Concern:
The pollutants of concern are phosphorus and sediment (i.e., total suspended solids (TSS)).

Source Identification (point and nonpoint sources):

Point Source Identification: The potential point sources to the NELW are:

<u>Phosphorus TMDLs:</u>
National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: NPDES permitted facilities may contribute phosphorus loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. WDNR determined that there are publicly owned treatment works (POTWs) as well as industrial facilities (e.g., cheesemaking facilities, power generation facilities, equipment manufacturing facilities and/or canning facilities) in the NELW that can contribute phosphorus from treated wastewater releases (Section 3.5.1 of the NEL TMDL document). WDNR assigned certain facilities a portion of the phosphorus wasteload allocation (WLA) and those values are summarized in Appendix K (Table K.K.3, Table K.M.3 and Table K.S.3 of Appendix K of the NEL TMDL document).

Municipal Separate Storm Sewer System (MS4) communities: Stormwater from MS4s can transport phosphorus to surface water bodies during or shortly after storm events. WDNR identified MS4 permittees in the NELW that were assigned a portion of the WLA for the phosphorus TMDLs. See Table K.K.4, Table K.M.4 and Table K.S.4 of Appendix K of the NEL TMDL document for WLAs assigned to MS4 communities.

Stormwater contributions from construction and/or industrial sites: Construction and industrial sites may contribute phosphorus via sediment runoff during stormwater events. Additionally, WDNR identified discharges from: construction site pits, trench dewatering areas, seepage systems and any discharges from facilities that wash equipment as potential sources of phosphorus to the surface waters of the NELW. Phosphorus contributions from these point sources were addressed via a general permit allocation in Tables K.K.1 and K.K.2, Tables K.M.1 and K.M.2 and Tables K.S.1 and K.S.2 of Appendix K of the NEL TMDL document.

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

Concentrated Animal Feedlot Operations (CAFOs): WDNR discusses CAFOs in Sections 3.5.1.4 and 3.6.5 of the NEL TMDL document. WDNR explained that CAFOs are agricultural operations that raise 1,000 or more animal units in a confined area (Section 3.5.1.4 of the NEL TMDL document). WDNR acknowledged that wastewater derived from CAFO operations can have elevated phosphorus concentrations. CAFOs are required to have a WPDES CAFO permit. WPDES CAFO permits are designed to ensure that CAFO operations use proper planning, construction and manure management to protect water quality (Section 3.5.1.4 of the NEL TMDL document). WPDES permits for CAFO facilities cover CAFO production areas, ancillary storage areas, storage areas and land application areas.

WDNR determined that there are 69 CAFOs in the NELW (Table 6 of the NEL TMDL document). WDNR explained that, for the purposes of calculating TMDLs, CAFOs are covered under a WPDES General Permit for CAFOs (Section 3.6.5 of the NEL TMDL document). CAFO WLAs were set to zero (WLA = 0) because CAFO must comply with all authorized discharge and overflow requirements described in the WPDES CAFO General and Individual Permits (Section 5.3 of the NEL TMDL document).

<u>Total Suspended Solid TMDLs:</u>
NPDES permitted facilities: NPDES permitted facilities may contribute sediment loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. WDNR determined that there are POTWs as well as industrial facilities (e.g., cheesemaking facilities, power generation facilities, equipment manufacturing facilities and/or canning facilities) in the NELW that can contribute sediment from treated wastewater releases (Section 3.5.1 of the NEL TMDL document). WDNR assigned certain facilities a portion of the phosphorus WLA those values are summarized in Appendix K (Table L.K.3, Table L.M.3 and Table L.S.3 of Appendix L of the NEL TMDL document).

MS4 communities: Stormwater from MS4s can transport sediment to surface water bodies during or shortly after storm events. WDNR identified MS4 permittees in the NELW that were assigned a portion of the WLA for the sediment TMDLs. See Table L.K.4, Table L.M.4 and Table L.S.4 of Appendix L of the NEL TMDL document for WLAs assigned to MS4 communities.

Stormwater contributions from construction and/or industrial sites: Construction and industrial sites may contribute sediment via runoff during stormwater events. Additionally, WDNR identified discharges from: construction site pits, trench dewatering areas, seepage systems and any discharges from facilities that wash equipment as potential sources of sediment to the surface waters of the NELW. Sediment contributions from these point sources were addressed via a general permit allocation in Tables L.K.1 and L.K.2, Tables L.M.1 and L.M.2 and Tables L.S.1 and L.S.2 of Appendix L of the NEL TMDL document.

WDNR regulates stormwater discharges from certain industries and construction sites under WPDES permits issued pursuant to Chapter NR 216 Wis. Adm. Code and also via established construction site and post-construction performance standards under NR 151 Wis. Adm. Code (Section 6.2 of the NEL TMDL document).

Concentrated Animal Feedlot Operations (CAFOs): WDNR acknowledged that wastewater derived from CAFO operations can have elevated sediment concentrations. CAFOs are required to have a WPDES CAFO permit. WPDES CAFO permits are designed to ensure that CAFO operations use proper planning, construction and manure management to protect water quality (Section 3.5.1.4 of the NEL TMDL document). WPDES permits for CAFO facilities cover CAFO production areas, ancillary storage areas, storage areas and land application areas.

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

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

Phosphorus contributions from oversaturated soils due to prior nutrient application practices: There may be areas of the NELW that have had excess nutrients applied from prior fertilization efforts and the soils in these areas have become oversaturated with available phosphorus. Precipitation events may mobilize nutrient-laden erodible soils via overland stormwater runoff events. Eroding streambanks and channelization efforts may also add phosphorus and other nutrients, organic material and organic-rich sediment to local surface waters, especially if there is particulate phosphorus bound to eroding soils.

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

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

Phosphorus contributions from atmospheric deposition: Phosphorus and organic material may be added via particulate deposition. Particles from the atmosphere may fall onto lake surfaces or other surfaces within the NELW. Phosphorus can be bound to these particles which may add to the phosphorus inputs to surface water environments.

Phosphorus contributions from internal loading: The release of phosphorus from lake sediments, the release of phosphorus from lake sediments via physical disturbance from benthic fish (i.e., rough fish (e.g., carp)), the release of phosphorus from wind mixing the water column, and the release of phosphorus from decaying plants may all contribute internal phosphorus loading to the lakes of the NELW. 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.

Phosphorus contributions from wetland and/or forest sources: Phosphorus, organic material and organic-rich sediment may be added to surface waters by stormwater flows through wetland and forested areas in the NELW. The NEL TMDL document refers to these nonpoint sources as "background sources" (Section 3.5.2.3 of the NEL TMDL document). Storm events may mobilize phosphorus through the transport of suspended solids and other organic debris.

Total Suspended Solid TMDLs:

Sediment contributions from stream channelization and streambank erosion: Eroding streambanks and channelization efforts may add sediment to local surface waters. Eroding riparian areas may be linked to soil inputs within the water column and potentially to changes in flow patterns. Changes in flow patterns may also encourage down-cutting of the streambed and streambanks. Stream channelization efforts can increase the velocity of flow (via the removal of the sinuosity of a natural channel) and disturb the natural sedimentation processes of the streambed. Unrestricted livestock access to streams and streambank areas may lead to streambank degradation and sediment additions to stream environments.

Sediment contributions from stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of sediment which may lead to impairments in the

NELW. Sediment inputs to surface waters can be exacerbated by tile drainage lines, which channelize the stormwater flows. Tile lined fields and channelized ditches enable particles to move more efficiently into surface waters.

Sediment contributions from wetland and/or forest sources: Sediment may be added to surface waters by stormwater flows through wetland or forested areas in the NELW. Storm events may mobilize decomposing vegetation, organic soil particles through the transport of suspended solids and other organic debris.

Sediment contributions from atmospheric deposition: Sediment may be added via particulate deposition. Particles from the atmosphere may fall onto surface waters within the NELW.

Margin of Safety:
WDNR used an implicit margin of safety (MOS) for the phosphorus and total suspended solid NEL TMDLs. WDNR's rationale for employing a implicit MOS is explained in Section 6 of this Decision Document.

Future Growth:
WDNR reserved a portion of the overall TMDL loading capacity, the reserve capacity (RC), to be potentially used by future discharges to the NELW. Examples include, providing wasteload allocation for new or expanding wastewater (industrial or municipal) discharges) or for permittees under general permits that may be given individual allocations and/or CAFOs that add a surface water outfall as a result of a manure treatment system (Section 5.6 of the NEL TMDL document). WDNR calculated a RC for each TMDL subbasin by subtracting the natural background load and general permit baseline loads from the total allowable load, this value was referred to as the remaining controllable load. The calculated RC was set as 5% of the remaining controllable load (see Appendix K for the total phosphorus TMDLs and Appendix L for the total suspended solids TMDLs of the NEL TMDL document).

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

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

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

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

EPA Review of the NEL TMDL:

Narrative Water Quality Criteria

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

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

WDNR determined that due to the excessive phosphorus and sediment loading, the segments in Appendix A of the NEL TMDL document and Attachment 1 of this Decision Document were not attaining Wisconsin's narrative water quality criteria (Section 2.1 of the NEL TMDL document). Excess phosphorus loading in the NELW can cause algal blooms, that may be considered as floating scum, producing a green color, with a strong odor and an unsightly condition. Additionally, algal blooms may contain toxins that can impact the recreational accessibility of the water bodies and also may pose a public health concern. WDNR explained that excess sediment can be considered as objectionable deposits.

Designated Uses:

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

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

WDNR explained that the waters in the NELW drain to Lake Michigan, a drinking water source for communities in the nearshore Lake Michigan area. Currently, WDNR does not have an assessment approach for determining whether Lake Michigan is impaired due to excessive algae (e.g., via guidance documentation, the Wisconsin Consolidated Assessment and Listing Methodology (WisCALM), nor the State of Wisconsin, via rules). Additionally, WDNR determined that there is not, currently, a nearshore water quality model that would integrate with the water quality modeling conducted for the subbasins of the NEL TMDL efforts. WDNR stated that NEL TMDL implementation efforts to reduce phosphorus and sediment sources to Lake Michigan and reduce the likelihood of excessive algal growth that can lead to contamination and potential impairment of drinking water resources (Section 2.3 of the NEL TMDL document).

Phosphorus Standards:
Section NR 102.06 of the Wis. Adm. Code defines the numeric criteria for phosphorus (Table 1 of the NEL TMDL document and Table 1 of this Decision Document). The numeric criteria are based on relationships between phosphorus and designated use attainment in surface waters.[1]

Table 1: Wisconsin's numeric criteria for Total Phosphorus by water body type

Water Type	Total Phosphorus Criteria (µg/L)
Large Rivers	100
Other Rivers and Streams	75
Non-stratified reservoirs (hydraulic residence time ≥ 14 days)	30
Stratified reservoirs (hydraulic residence time ≥ 14 days)	40
Stratified two-story fishery lakes	15
Stratified seepage lakes	20
Stratified drainage lakes	30
Non-stratified lakes	40

The total phosphorus criterion applicable to each of the impaired segments in Table 1 and Table 2 of Appendix A is included in the 'TP Criterion' column of these Tables (Attachment 1 of this Decision Document). WDNR explained that the numeric criteria for each individual impaired water body segment applies at the outlet of the individual TMDL subbasin (Section 2.2 of the NEL TMDL document). The total phosphorus criterion for each individual TMDL subbasin is included in Appendix B of the NEL TMDL document in the 'TP Criterion' column.

WDNR explained that the attainment of the total phosphorus criteria is based on:

- The median total phosphorus concentration (µg/L) measured during the growing season (May 1 through October 31) in streams; and
- The mean total phosphorus concentration (µg/L) measured during the summer season (June 1 through September 15) in lakes.

These attainment criteria are consistent with the WisCALM assessment methodologies.

[1] Wisconsin Department of Natural Resources. (2010). Wisconsin Phosphorus Water Quality Standards Criteria: Technical Support Document.

Total Suspended Solid standards:

Wisconsin does not have total suspended solid criteria, thus, WDNR employed a numeric water quality target for the total suspended solid TMDLs of the NELW. WDNR's selection of the numeric water quality target for TSS was expected to be protective of the narrative criteria described in NR 102.04(1) of Wis. Adm. Code and to control conditions in the water column that may result in deleterious impacts to fish and macroinvertebrate species. WDNR set the numeric water quality target for TSS at **12 mg/L**. The numeric TSS water quality target value of 12 mg/L is expressed as the median of monthly samples collected during the growing season between May 1 through October 31 (Section 2.4.2 of the NEL TMDL document).

WDNR explained at the numeric target of 12 mg/L of TSS would address the effects of excessive sediment loading and was intended to meet the narrative criteria, "no objectionable deposits…" and "…nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life" in NR 102.04(1) of Wis. Adm. Code. WDNR provided its rationale for selecting the numeric TSS water quality target value of 12 mg/L in Section 2.4.2 of the NEL TMDL document.

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

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

EPA Review of the NEL TMDL:

WDNR calculated that loading capacities for each impaired water body for total phosphorus (Appendix K of the NEL TMDL document) and total suspended solids (Appendix L of the NEL TMDL document). WDNR's TMDL development approach quantified the magnitude of phosphorus and sediment loading by source. The TMDL equation in Appendices K and L of the NEL TMDL document include point and nonpoint sources divided into the following TMDL allocations:

- WLA – Allocations for individual WPDES permittees (IP) (e.g., POTWs, wastewater dischargers);
- WLA – Allocations addressed by General Permits (GP) (wastewater dischargers covered via a General Permit, stormwater covered via a General Permit, CAFOs);
- WLA – Allocations for individual MS4 permittees (MS4);
- LA – Allocations for background nonpoint source contributions (BG) (e.g., forests and wetlands);
- LA – Allocations for agricultural nonpoint source contributions (Agric); and
- LA – Allocations for non-permitted urban nonpoint source contributions (NPU).

WDNR also calculated a reserve capacity (RC) (5% of the calculated controllable load, see discussion at the end of Section 3 of this Decision Document for further detail) for each TMDL. The loading capacity calculations summed the WLA (GP + MS4 + IP) plus LA (BG + Agric + NPU) plus RC which equaled the TMDL for each impaired water body. WDNR calculated loading capacities on the annual scale (i.e., pounds (lbs) per year (lbs/year)) and also on the daily scale (i.e., lbs/day) both units are presented in Appendices K (total phosphorus) and L (total suspended solids) of the NEL TMDL document.

The NELW is 1,971 square miles in size that WDNR subdivided into 321 subbasins (Figure 1 of Appendix D of the NEL TMDL document). WDNR used these 321 subbasins to calculate phosphorus and total suspended solid TMDLs via the Soil and Water Assessment Tool (SWAT). WDNR explained that the SWAT model used information on weather, land cover, soils, slope and land management activities in the NELW to generate estimates of runoff volumes, phosphorus loads and sediment loads in stream channels in the NELW (Appendix D of the NEL TMDL document). The main outputs of the SWAT modeling effort that informed the setting of point and nonpoint source allocations were:

- Average annual streamflow in stream and river reaches for the period 2008 through 2019;
- Average annual nonpoint source phosphorus and sediment loads for 2008 through 2019; and
- The relative magnitude of phosphorus and sediment loads from different land cover types (i.e., agriculture, urban, natural/background, etc.).

In Section 3.6 of the NEL TMDL document, WDNR explained that the NEL SWAT model was configured to simulate geographic differences in runoff and pollutant loading due to variation in land use, soil attributes, weather, topography, and agricultural practices for each individual subbasin. SWAT represents a basin as a collection of subbasins (i.e., small subwatersheds) and Hydrologic Response Units (HRUs). HRUs are land areas with unique combinations of land use, soil, and slope. For the NEL TMDL, WDNR set-up the NEL SWAT model to simulate individual HRUs with eight major land use types: forest, wetland, pasture/grassland, continuous corn agriculture, cash grain agriculture (corn and soybean), dairy farm agriculture (corn and forage crops), non-permitted urban, and MS4 permitted urban. The NEL SWAT model was calibrated to measurements of streamflow and phosphorus and sediment water quality data collected in multiple streams and rivers in the basin (Table 2 and Figure 6 of the NEL TMDL document).

WDNR referred to "baseline" load as the current phosphorus and/or sediment loads that were used by WDNR to determine point and nonpoint source TMDL allocations and the necessary reductions for attaining the water quality standards/targets. A summary of the baseline phosphorus and sediment loading conditions for the NELW is found in Section 3.7, Table 7 and Figure 14 of the NEL TMDL document. The appropriateness of WDNR's baseline phosphorus and sediment loads were assessed via the NEL SWAT model. The NEL SWAT model was used to estimate nonpoint source delivery, namely, investigating the outgoing and incoming loads for a given subbasin and using those computations to determine whether individual subbasins were sources or sinks of the pollutant. Appendix D of the NEL TMDL document report provided a discussion of SWAT model inputs, configuration, and calibration results.

WDNR's calculation of the loading capacities for the phosphorus and total suspended solid impairments were based on whether the impaired water body included a river or stream reach at the outlet of the subbasin or whether the impaired water body had a lake or reservoir at the outlet of the subbasin (Section 4.1 of the NEL TMDL document). In order to calculate pollutant loading estimates for attaining the water quality standards (phosphorus) or water quality targets (total suspended sediment), WDNR used growing season median (GSM) concentrations[2] and flow weighted mean (FWM) values[3] to create FWM to GSM ratios. FWM/GSM ratios assisted WDNR in calculating assimilative loading capacity values for the subbasins in the NELW. WDNR started TMDL calculations in the headwater subbasins of the Kewaunee River Subbasin, the Manitowoc River Subbasin and the Sheboygan River Subbasin and then systematically calculated TMDLs for the subbasins downstream of those headwater areas.

WDNR used the same approach for the calculation of sediment TMDLs, except for two adjustments, FWM/GSM rations were calculated at only three locations within the NELW and watershed boundaries were aggregated in order to reduce the complexity of instream sediment dynamics (Section 4.2 of the NEL TMDL document).

WDNR used a version of the Wisconsin Lake Modeling Suite (WiLMS) to calculate loading capacities for the impaired lakes of the NEL TMDL. The WiLMS model provided estimates of in-lake phosphorus concentrations using information on lake morphology, water inflows, and phosphorus loading. In the WiLMS model a lake is represented as a completely mixed body of water with no horizontal or vertical variability in water quality and is modeled on an annual time step. WDNR explained that water and phosphorus inputs derived from SWAT model estimates were utilized as part of the WiLMS model set-up, namely that SWAT modeling outputs helped establish annual phosphorus amounts. Predicted lake phosphorus concentrations were calculated as summer averages for the years being modeled (Section 4.1.2 of the NEL TMDL document). Appendix I of the NEL TMDL document includes the loading capacities for the lakes modeled in the NEL TMDL (Tables 7, 8, 10, 11 and 12 of Appendix I of the NEL

[2] For phosphorus, GSM concentrations (µg/L) were estimated from the WDNR PhosMER model (Table 8 of the NEL TMDL document). For total suspended solids, GSM concentrations (µg/L) were calculated from sample data collected between May to October (Section 4.2.1 and Table 10 of the NEL TMDL document).
[3] For phosphorus, FWM concentrations (µg/L) were derived from NEL SWAT modeling efforts, the total phosphorus load divided by the total water load (Table 8 of the NEL TMDL document). For total suspended solids, FWM concentrations (µg/L) were derived from NEL SWAT modeling efforts, the total phosphorus load divided by the total water load (Table 10 of the NEL TMDL document).

TMDL document). The loading capacities for the individual lakes were incorporated into the corresponding subbasin allocations of Appendix K of the NEL TMDL document.

WDNR provided explanation of its allocation approach in Section 5 of the NEL TMDL document.

Attachment 2 of this Decision Document includes phosphorus TMDL allocations for the subbasins of the NEL TMDL.

Attachment 3 of this Decision Document includes total suspended solid TMDL allocations for the subbasins of the NEL TMDL.

Attachment 4 of this Decision Document includes phosphorus TMDL allocations for the impaired lakes of the NEL TMDL.

Reserve Capacity: WDNR included a reserve capacity for the phosphorus and total suspended solid TMDLs that is intended to be used for new or expanding NPDES permittees that may discharge phosphorus or sediment to the NELW at some point in the future. WDNR noted that the RC could also be used for potential future changes to current WLA and or LA and or other sources not defined through TMDL development (Section 5.6 of the NEL TMDL document). WDNR calculated a RC for each TMDL subbasin by subtracting the natural background load and general permit baseline loads from the total allowable load, this value was referred to as the remaining controllable load. The calculated RC was set as 5% of the remaining controllable load (see Appendix K for the total phosphorus TMDLs and Appendix L for the total suspended solids TMDLs of the NEL TMDL document).

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

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

4. Load Allocations (LA)

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

<u>EPA Review of the NEL TMDL:</u>
WDNR determined load allocations for three individual nonpoint sources in the NEL TMDLs: background nonpoint source contributions (e.g., phosphorus contributions from wetland and/or forest sources), agricultural nonpoint source contributions (e.g., phosphorus contributions from stormwater

runoff from agricultural land use practices) and non-permitted urban nonpoint source contributions (e.g., phosphorus contributions from impervious surfaces in urban areas) (Section 5.3 of the NEL TMDL document). Each individual nonpoint source contribution was determined via SWAT modeling results and the assumptions and decision-making employed to derive those three nonpoint source calculations are found in Appendix D of the NEL TMDL document. The total annual and daily phosphorus allocations for background nonpoint source contributions, agricultural nonpoint source contributions and non-permitted urban nonpoint source contributions are found in Appendix K of the NEL TMDL document. The total annual and daily total suspended solid allocations for background nonpoint source contributions, agricultural nonpoint source contributions and non-permitted urban nonpoint source contributions are found in Appendix L of the NEL TMDL document.

EPA finds WDNR's approach for calculating the LA for phosphorus and total suspended solid TMDLs to be reasonable and consistent with EPA guidance.

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

5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to individual existing and future point source(s) (40 C.F.R. §130.2(h), 40 C.F.R. §130.2(i)). In some cases, WLAs may cover more than one discharger, e.g., if the source is contained within a general permit.

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs 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.

EPA Review of the NEL TMDL:

NPDES permitted facilities (municipal and industrial wastewater discharges): WDNR calculated WLAs for WPDES permits. The individual phosphorus WLAs are found in Appendix K of the NEL TMDL document and Attachment #5 of this Decision Document:

- Table K.K.3 – Allocations by individual point source for the Door/Kewaunee Region of the NELW;
- Table K.M.3 - Allocations by individual point source for the Manitowoc Region of the NELW; and

- Table K.S.3 - Allocations by individual point source for the Sheboygan Region of the NELW.

The individual total suspended solid WLAs are found in Appendix L of the NEL TMDL document and Attachment #5 of this Decision Document:

- Table L.K.3 – Allocations by individual point source for the Door/Kewaunee Region of the NELW;
- Table L.M.3 - Allocations by individual point source for the Manitowoc Region of the NELW; and
- Table L.S.3 - Allocations by individual point source for the Sheboygan Region of the NELW.

Baseline phosphorus and/or sediment loads for facilities in the NELW that have individual WPDES discharge permits were calculated based on the individual facility's design flow, phosphorus and/or total suspended sediment discharge limit and effluent monitoring data (Table 4 of the NEL TMDL document). Facility flow rate (see decision tree of Figure 10 of the NEL TMDL document) and concentration estimates were based on facility type: POTW, industrial, non-contact cooling water (NCCW) and/or NCCW plus contact cooling water (CCW) (i.e., secondary containment water).

Baseline phosphorus loads were calculated by multiplying the facility's flow rate (see decision tree of Figure 10 of the NEL TMDL document) by the technology-based effluent limit (TBEL), 1.0 mg/L, that is defined in Chapter NR 217 of the Wis. Adm. Code.

Baseline total suspended solid loads were calculated by multiplying the facility's flow rate (see decision tree of Figure 10 of the NEL TMDL document) by one of three approaches:

- If the permittee was a municipal or industrial facility, then, the load was calculated as the facility's flow rate multiplied by the monthly average of the concentration limits for the outfall in the facility's permit;
- If the permittee was a facility that discharged seasonally, then the load was calculated as the facility's flow rate multiplied by the monthly average of the seasonal concentration limits for the outfall in the facility's permit; and/or
- If the permittee was operated as a NCCW, then the load was calculated as the facility's flow rate multiplied by the average of effluent monitoring concentration samples taken between 2015 and 2020.

MS4s: WDNR noted that ten municipalities with WPDES MS4 stormwater permits have all or a portion of their permitted/jurisdictional area within the NELW (Figure 12 of the NEL TMDL document). WDNR used the SWAT model to calculate phosphorus and sediment loading from urban sources (i.e., sources regulated under a WPDES MS4 permit). Baseline loading estimates for phosphorus and sediment, attributed to MS4 areas, were made in the SWAT model based on HRU urban land coverages. WDNR explained that SWAT loads for permitted MS4 urban HRUs were reduced by 20% for total suspended solid and by 15% for total phosphorus to define baseline conditions used in the allocation process. These reductions were applied to be consistent with performance standards for existing development defined in WPDES MS4 permits and required under Chapters NR 216 and NR 151 of Wis. Adm. Code (Section 3.6.3 of the NEL TMDL document). Baseline phosphorus and/or sediment loads for stormwater general permittees located within an MS4 boundary were included in the MS4 baseline load.

Allocations for MS4 permittees are found in Appendix K (Tables K.K.4, K.M.4 and K.S.4) and Appendix #5 of this Decision Document for total phosphorus.

Allocations for MS4 permittees are found in Appendix L (Tables L.K.4, L.M.4 and L.S.4) and Appendix #6 of this Decision Document for total suspended solids.

General permits: The WLAs for the general permit covers stormwater discharges from industrial facilities and construction sites and wastewater discharges that are deemed, by WDNR, to not be significant contributors of phosphorus and/or sediment (Section 5.4.2 of the NEL TMDL document). WDNR explained that baseline phosphorus and/or sediment loads for all other stormwater and wastewater general permittees were set to 1% of the reducible (i.e., anthropogenic sources, everything besides natural background) allowable loads in the subbasin (Section 3.6.4 of the NEL TMDL document). The assumption of 1% of the reducible allowable load was based on the number and typical types of facilities present within the NELW and the best professional judgment of the WDNR TMDL writers. WDNR notes that its approach of using the 1% value of the reducible allowable loads provided a more consistent result across the NELW than using a percentage of the nonpermitted urban load. General permit baseline loads are reported by subbasin in Appendix H for phosphorus and total suspended solids.

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

EPA finds the WDNR's approach for calculating the WLA for the NEL phosphorus and total suspended solid TMDLs to be reasonable and consistent with EPA guidance.

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

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL 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.

EPA Review of the NEL TMDL:

WDNR incorporated an implicit margin of safety for the phosphorus and total suspended solid NEL TMDLs. WDNR explained that the implicit MOS was based on its assimilative loading capacity approach and various assumptions made during WDNR's allocation analysis. One of the main tenets of the implicit MOS was the ratio of the flow weighted mean (FWM) to growing season mean (GSM) (Section 4.1.1 of the NEL TMDL document).

WDNR explained that it calculated FWM/GSM ratios at 32 stream monitoring sites in the NELW. At each of these 32 locations, WDNR utilized a FWM from the SWAT model and GSM values from monitoring data that was adjusted to control for the influence of antecedent precipitation on phosphorus concentrations (via the PhosMER model) (Appendix N, p. 17 of the NEL TMDL document). WDNR outlined that it employed the PhosMER model for estimating GSMs because:

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

The PhosMER model has the capacity to estimate uncertainty in long-term GSM via "bootstrapping", that WDNR explained was a statistical procedure that resamples a single dataset to create many simulated samples for the purpose of estimating uncertainty (Appendix N, p. 17 of the NEL TMDL document). The bootstrapping statistical effort was run approx. 200 times in order to simulate different conditions (e.g., each iteration generated a new set of daily total phosphorus estimates) and produced a statistical distribution of GSM at each steam monitoring site. From this statistical distribution, WDNR choose the higher bound of the 90% confidence interval (i.e., the 95th percentile rank value) to represent the GSM for that stream monitoring site. The use of the 90% confidence interval resulted in WDNR's confidence, a 90% certainty, that phosphorus and sediment loading estimates derived from the SWAT modeling efforts would result in the attainment of water quality criteria.

The primary means of applying an implicit MOS was by setting FWM/GSM ratios used for assimilative loading capacity analysis (Section 4.1.1) to conservative values as described above. GSM concentrations were estimated using the PhosMER model that predicts daily phosphorus concentrations. WDNR explored using higher and lower growing season median values in order to fine-tune allowable load and wasteload allocations and increase percent reductions.

Additionally, WDNR cited that phosphorus and sediment loading attributed to streambank erosion was not explicitly modeled in the NEL TMDL development efforts but was factored into baseline loading estimates for other nonpoint source categories (e.g., contributions from agriculture nonpoint sources, urban nonpoint sources) (Section 3.6.9 of the NEL TMDL document). This also represents an implicit MOS for the consideration of nonpoint source allocations as WDNR's implementation approach will encourage practices specifically aimed at reducing streambank erosion while also attaining allocations for land-based sources.

EPA finds the WDNR's approach for calculating the MOS to be reasonable and consistent with EPA guidance.

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

7. Seasonal Variation

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

<u>EPA Review of the NEL TMDL:</u>
Seasonal variation was considered by WDNR as described in Section 5.7 of the NEL TMDL document. WDNR explained that critical conditions for phosphorus impairments generally occur during the growing season (i.e., May 1 to October 31) and summer months (i.e., June through September) when water temperature, flow, and sunlight conditions are conducive for plant growth. Phosphorus loading throughout the entire year to stream channels and to lake sediments can contribute to high phosphorus concentrations during the growing/summer season since phosphorus stored in stream bottoms or lake sediments can be released and reintroduced into the water column during the summer months. High streamflow conditions may scour stream bottom sediments or erode riparian areas, thus, introducing phosphorus throughout the water column. In lakes, seasonal mixing events (i.e., lake water turnover) can introduce phosphorus from lake sediments throughout the water column.

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

Sediment loading in the NELW varies depending on surface water flow, land cover and climate/season. Spring is typically associated with large flows from snowmelt, the summer is associated with periodic wet weather events that can create flashy flow conditions in streams but overall, summer is typically when streamflows will recede across the season. The fall season typically brings increasing precipitation and rapidly changing agricultural landscapes. In all seasons, sediment inputs to surface waters typically occur primarily through wet weather events. Critical conditions that impact the response of NELW water bodies to sediment inputs may typically occur during periods of low flow. During low flow periods, sediment can accumulate within the impacted water bodies, there is less assimilative capacity within the water body, and generally sediment is not transported through the water body at the same rate it is under normal flow conditions.

Critical conditions that impact loading, or the rate that sediment is delivered to the water body, were identified as those periods where large precipitation events coincide with periods of minimal vegetative cover on fields. Large precipitation events and minimally covered land surfaces can lead to large runoff volumes, especially to those areas which drain agricultural fields. The conditions generally occur in the spring and early summer seasons.

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

8. Reasonable Assurance

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

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, 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.

EPA Review of the NEL TMDL:

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

Pollutant allocations assigned to point sources (i.e., wasteload allocations) are generally implemented through EPA's National Pollutant Discharge Elimination System permits under CWA section 402. If, after analyzing the effect of a discharge on the receiving water, a permit writer finds that technology-based permit limits are not sufficiently stringent to meet water quality standards, the CWA and EPA regulations require the development of water quality-based effluent limits (WQBELs) that are more stringent and designed to ensure that water quality standards are met.[4] Under EPA's permitting regulations, water quality-based discharge limits in NPDES permits must be "consistent with the assumptions and requirements" of wasteload allocations in EPA-approved TMDLs. 40 C.F.R. § 122.44(d)(1)(vii)(B).

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

[4] Clean Water Act § 301 (b)(1)(C) and 40 C.F.R. § 122.55(d)(1).

Program[5] provides grant money to states, territories and Tribes to fund specific projects aimed at reducing the nonpoint source pollution.

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

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

Point sources:
NPDES permitted facilities: WDNR regulates point sources via it WPDES permit program. For any new or reissued WPDES permit, the discharge limits of those permits must be consistent with the WLAs of the NEL TMDLs. WDNR and WPDES will consult with the expectations described in Chapter NR 217, Wis. Adm. Code for total phosphorus and Chapter NR 210, Wis. Adm. Code for total suspended solids when considering permitting conditions for new or revised permits. Individual facilities may also consider different optimization efforts to reduce phosphorus and/or sediment in their effluent (e.g., consideration of phosphorus and/or sediment in pretreatment evaluations, continued enhancement of new and existing treatment technologies, etc.) and or water quality trading or adaptive management approaches.

MS4 and point sources addressed under general permit contributions: WDNR regulates stormwater discharges from certain MS4s, industries, and construction sites under WPDES permits issued pursuant to Chapter NR 216, Wis. Adm. Code. WDNR also established developed urban area, construction site, and post-construction performance standards under NR 151, Wis. Adm. Code, that are implemented through stormwater MS4 and construction site permits (Section 6.2 of the NEL TMDL document). WDNR anticipates that it will incorporate permit conditions into stormwater permits consistent with the NEL TMDL WLAs.

CAFOs: Section 6.2 of the NEL TMDL document explained that WDNR and appropriate state agencies would monitor and enforce CAFO permit requirements to ensure that CAFOs are operated and maintained to prevent discharges as required by their WPDES permit. In Appendix N of the NEL TMDL document, p. 13, WDNR explained that:

> *Wasteload allocations cannot exceed established regulations and are not assigned to sources to cover violations of permit conditions. Wasteload allocations for CAFO production areas are set*

[5] EPA webpage, https://www.epa.gov/nps/319-grant-program-states-and-territories, (last visited 10/30/23).

to zero because CAFOs must comply with all authorized discharge and overflow requirements described in the WPDES CAFO General Permit or Individual Permit, whichever is applicable to a particular facility. In accordance with the CAFO 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; however, discharges from such overflows are allowable only if they do not cause or contribute to a violation of water quality criteria and standards. In addition, a CAFO may not discharge any pollutants from the production area to a 303(d)-listed surface water if the pollutants discharged are related to the cause of the impairment. For this TMDL study, these pollutants include TP and TSS; however, surface waters may be listed as impaired for additional pollutants such as bacteria. This effectively results in WLA of zero.

Conditions of noncompliance are not covered by wasteload allocations but are addressed through the permit and enforcement process.

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

NR 151 of the Wis. Adm. Code: NR 151 includes nonpoint source performance standards and manure management prohibitions. Methods include using a tillage setback, the use of the Phosphorus Index to limit amount of phosphorus runoff from croplands and pastures, executing a prohibition against excess process wastewater handling, meeting load allocations of a TMDL via implementation of targeted performance standards (BMPs specified in ATCP 50 Wis. Adm. Code), meeting tolerable soil erosion rates for sheet, rill and wind erosion, maintaining manure storage facilities, diverting runoff away from feedlots, manure storage areas and/or barnyards, and utilizing nutrient management planning to manage soil nutrient concentrations.

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

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

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

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

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

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

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

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

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

- Including a multi-year work plan to achieve soil and water conservation objectives.

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

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

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

CRP is a program which provides funding to producers that remove environmentally sensitive land from agricultural production areas and install conservation practices (e.g., riparian buffers, wetlands, etc.). The goals of the CRP are to improve water quality, prevent soil erosion and reduce loss of wildlife habitat. WDNR advocates the deployment of BMPs that reduce phosphorus and sediment sources/promote nutrient retention, reduce erosion and improve water quantity storage on the landscape in critical subwatersheds the NELW. Conservation programming that aligns with these goals should be leveraged and expanded as much as possible in the watershed.

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

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

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

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

The EPA finds that this criterion has been adequately addressed.

9. Monitoring Plan to Track TMDL Effectiveness

EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions and, such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

EPA Review of the NEL TMDL:

Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation efforts utilized in the NELW. Water quality monitoring information will aid watershed managers in understanding how BMP pollutant removal efforts are impacting water quality throughout the watershed. Water quality monitoring combined with reviews of BMP efficiency will provide information on the success or failure of BMP systems designed to reduce phosphorus and sediment loading events to the water bodies of the NELW. Watershed managers will have the opportunity to reflect on the progress or lack of progress made by implementation efforts, and will have the opportunity to revise/alter their existing implementation strategy if they deems that progress is unsatisfactory. Review of BMP efficiency is expected to be completed by local implementing partners (e.g., County LWCDs).

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

Certain water quality monitoring sites in the NELW may also be monitored, on a rotational basis, as part of Wisconsin's statewide water quality monitoring strategy. Wisconsin's statewide water quality monitoring strategy collects data in order to assess current water quality conditions, to track water quality trends over time and monitor metrics for habitat and biota. WDNR will also work with citizen monitoring groups to assist and supplement WDNR data. Section 6.4 of the NEL TMDL document includes information on long-term trend (LTT) river locations, long-term wadable stream locations and twelve long-term volunteer surface water monitoring program locations in the NELW. All of these water quality monitoring locations will augment the existing water quality data set in the NELW and provide watershed managers with additional water quality data to better track implementation progress.

The EPA finds that this criterion has been adequately addressed.

10. Implementation

EPA policy encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. In addition, EPA policy recognizes that other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.

EPA Review of the NEL TMDL:

WDNR explained in Section 6.1 of the NEL TMDL document, that its implementation approach will build off of previous and ongoing planning and implementation efforts to mitigate phosphorus and sediment inputs to the surface waters of the NELW. WDNR and its implementing partners (e.g., LWCDs) will determine the most effective mix of federal, state and county-based programming to maximize the available implementation resources to generate the greatest water quality improvements in the NELW. Local implementing partners have access to a variety of programs and grant opportunities to assist in selecting and siting BMPs to critical areas of the NELW in order to amplify phosphorus and sediment reductions and attain the pollutant reduction goals of the NEL TMDL. Implementation may occur across multiple sectors (e.g., individual permittees, general permits, nonpoint sources) and in different settings (e.g., urban land use areas and agricultural land use areas). The diversity of implementation approaches helps ensure that point and nonpoint source reductions efforts will occur in the watershed.

WDNR provided baseline loads per source type (i.e., background, agricultural nonpoint, non-regulated urban, general permits, regulated MS4 urban, and individual permits) in Appendices K and L of the NEL TMDL document. Additionally, WDNR estimated percent reductions of phosphorus (e.g., Table K.K.5 of Appendix K of the NEL TMDL document) and sediment (e.g., Table L.K.5 of Appendix L of the NEL TMDL document) for each individual subbasin in the NELW. Providing these reduction estimates for individual subbasins will help inform local planning efforts to enable the attainment of the water quality goals of the NEL TMDLs.

WDNR acknowledged that implementation efforts to reduce phosphorus and sediment sources to the NELW will involve both point source and nonpoint source reduction activities.

Approaches to address point source contributions:

NPDES permitted facilities: WDNR regulates point sources via it WPDES permit program. For any new or reissued WPDES permit, the discharge limits of those permits must be consistent with the WLAs of the NEL TMDLs. WDNR and WPDES will consult with the expectations described in Chapter NR 217, Wis. Adm. Code for total phosphorus and Chapter NR 210, Wis. Adm. Code for total suspended solids when considering permitting conditions for new or revised permits. Individual facilities may also consider different optimization efforts to reduce phosphorus and/or sediment in their effluent (e.g., consideration of phosphorus and/or sediment in pretreatment evaluations, continued enhancement of new and existing treatment technologies, etc.) and or water quality trading or adaptive management approaches.

MS4 and point sources addressed under general permit contributions: WDNR regulates stormwater discharges from certain MS4s, industries, and construction sites under WPDES permits issued pursuant to Chapter NR 216, Wis. Adm. Code. WDNR also established developed urban area, construction site, and post-construction performance standards under NR 151, Wis. Adm. Code, that are implemented through stormwater MS4 and construction site permits (Section 6.2 of the NEL TMDL document). WDNR anticipates that it will incorporate permit conditions into stormwater permits consistent with the NEL TMDL WLAs.

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

<u>Approaches to address nonpoint source contributions:</u>

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

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

Livestock feedlot runoff controls: Slowing and holding surface stormwater runoff from feedlot areas via diversion structures, holding and/or storage areas, and treating the stormwater runoff via stream buffers or settling/sediment traps can reduce the transmission of nutrients derived from manure to surface waters. Additionally, landowners can consider diverting potential stormwater runoff from non-feedlot areas away from feedlot areas to minimize the introduction of additional stormwater runoff to feedlot areas. Additionally, introducing rotational grazing to increase grass coverage in pastures, and maintaining appropriate numbers of livestock per acre for grazing, can also aid in the reduction of phosphorus inputs.

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

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

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

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

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

Urban/residential nutrient reduction strategies: These strategies involve reducing stormwater runoff from urban/suburban areas and lakeshore homes in the NELW. These practices would include; rain gardens, lawn fertilizer reduction, lake shore buffer strips, vegetation management and replacement of failing septic systems. Water quality educational programs could also be utilized to inform the general public on phosphorus and sediment reduction efforts and their impact on water quality.

Municipal activities: Municipal programs, such as street sweeping in urban/suburban areas, can also aid in the reduction of phosphorus to surface water bodies within the NELW. Municipal partners can team with local watershed groups or LWCD partners to assess how best to utilize their monetary resources for installing new stormwater BMPs (e.g., vegetated swales) or retrofitting existing stormwater BMPs.

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

- *Management of fish populations:* Monitor and manage fish populations to maintain healthy game fish populations and reduce rough fish (i.e., carp, bullheads, fathead minnows) populations.

- *Vegetation management:* Improved management of in-lake vegetation in order to limit phosphorus loading and to increase water clarity. For example, controlling the vitality of curly-leaf pondweeds via chemical treatments (i.e., herbicide applications) can reduce a potential source of internal loading, the senescence of curly-leaf plants in the summer months.
- *Chemical treatment:* The addition of chemical reactants (e.g., aluminum sulfate) to lakes of the NELW in order for those reactants to permanently bind phosphorus into the lake bottom sediments. This effort could decrease phosphorus releases from sediment into the lake water column during anoxic conditions.

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.

EPA Review of the NEL TMDL:
Section 7 of the NEL TMDL outlines Wisconsin's public participation process during the development and drafting of the NEL TMDL. WDNR held multiple webinars and hosted meetings throughout the NEL TMDL process to describe the TMDL effort, the analytical and modeling methods and to share draft modeling results. The first webinar was held in June 2020 and the final public information meeting and hearing was hosted by WDNR on August 2, 2023. Throughout the meetings and webinars hosted by WDNR during this time period, WDNR updated its NEL TMDL website (https://dnr.wisconsin.gov/topic/TMDLs/NELakeshore.html) with presentation slides and recordings of the webinars/presentations. The public was given various opportunities to learn about the NEL TMDL and to submit questions and comments to WDNR. WDNR's motivation was to create civic engagement and discussion with the public that would enhance the overall understanding of the TMDL process, TMDL goals and improve the content of the NEL TMDL document.

WDNR held comment periods for the draft NEL TMDL. WDNR accepted comments on the draft NEL TMDL during a comment period that was started on January 31, 2023 and ended on March 3, 2023. Additionally, WDNR accepted comments on the draft NEL TMDL during a comment period that was started on August 2, 2023 and concluded on September 1, 2023.

Earlier in the NEL TMDL development process, WDNR held comment periods for:

- The draft lake modeling report and allocation tables – WDNR accepted comments from December 17, 2021 through January 21, 2022;
- The SWAT watershed modeling report – WDNR accepted comments from March 2021 through April 15, 2021;
- A portion of the draft SWAT watershed modeling report, including information on baseline streamflows and pollutant loads – WDNR accepted comments from September 2023 through October 16, 2020; and
- The NEL subbasin map, listing of impaired waters to be addressed by the NEL TMDL, point source information and MS4 maps (including the geographic extent of MS4 areas) - WDNR accepted comments from June 2019 through July 12, 2019.

WDNR received public comments throughout its NEL TMDL development process (i.e., 2019 to 2023). WDNR's responses to public comments from the draft NEL TMDL comment period (January 31, 2023 to March 3, 2023) are included in Appendix N of the NEL TMDL document. WDNR also adequately addressed EPA comments throughout the course of the NEL TMDL development. The comments are addressed within the text as appropriate, within tables in appendices, and in responses to comments (Appendix N) included in the final NEL TMDL document.

In Appendix N, WDNR provided detailed responses to individual questions and comments that were presented to WDNR in the January – March 2023 comment period. Appendix N also includes WDNR's explanation for any revisions it made to the NEL TMDL document in response to comments. Some of these additions include: climate change considerations (Section 5.8 of the NEL TMDL document), additional reasonable assurance discussion (Sections 6.2 and 6.3 of the NEL TMDL document), additional explanation for the margin of safety (Section 5.5 of the NEL TMDL document), updated edge-of-field targets (Appendix M of the NEL TMDL document) and information regarding WDNR's consideration of CAFOs (Sections 3.6.5 and 5.4.4 of the NEL TMDL document).

EPA carefully reviewed the comments submitted during the public notice period, as well as the responses from WDNR. EPA agrees that WDNR appropriately addressed the comments and requests for additional clarification within the NEL TMDL document and where appropriate, revised the NEL TMDL document.

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

12. Submittal Letter

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

EPA Review of the NEL TMDL:

The EPA received the final Northeast Lakeshore TMDL document, submittal letter and accompanying documentation on October 3, 2023. In the submittal letter, WDNR stated that the final NEL TMDLs and supporting Appendices (with phosphorus and total suspended solid allocations) were submitted to EPA pursuant to Section 303(d) of the Clean Water Act and 40 C.F.R. §130 for EPA review and approval.

The EPA finds that the TMDL submittal letter for the Northeast Lakeshore TMDL by WDNR satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the 70 stream phosphorus TMDLs, the 12 lake phosphorus TMDLs and the 4 stream total suspended solid TMDLs satisfy all elements for approvable TMDLs. This TMDL approval is for **eighty-six TMDLs**, addressing segments for: degraded habitat, degraded biological communities, low dissolved oxygen, eutrophication and excessive algal growth (Appendix A of the final TMDL document and Attachment 1 of this Decision Document).

The EPA's approval of these TMDLs extends to the water bodies which are identified in Attachment 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.

ATTACHMENTS

Attachment #1: Stream and lake impairment listings from Wisconsin's 2022 303(d) list that are addressed by the NEL TMDLs

- Appendix A – Table 1: Streams and impairment listings on the WDNR 2022 303(d) list addressed in this TMDL report
- Appendix A – Table 2: Lakes and impairment listings on the WDNR 2022 303(d) list addressed in this TMDL report

Attachment #2: Phosphorus TMDL results for the subbasins of the NELW

- Appendix K – Table K.K.1: Annual (pounds/year) total phosphorus load allocations by TMDL reach for the Kewaunee River Subbasin
- Appendix K – Table K.K.2: Daily (lbs/day) total phosphorus load allocations by TMDL reach for the Kewaunee River Subbasin
- Appendix K – Table K.K.5: Total phosphorus (lbs/yr) reductions from baseline conditions by TMDL reach for the Kewaunee River Subbasin
- Appendix K – Table K.M.1: Annual (lbs/yr) total phosphorus load allocations by TMDL reach for the Manitowoc River Subbasin
- Appendix K – Table K.M.2: Daily (lbs/day) total phosphorus load allocations by TMDL reach for the Manitowoc River Subbasin
- Appendix K – Table K.M.5: Total phosphorus (lbs/yr) reductions from baseline conditions by TMDL reach for the Manitowoc River Subbasin
- Appendix K – Table K.S.1: Annual (lbs/yr) total phosphorus load allocations by TMDL reach for the Sheboygan River Subbasin
- Appendix K – Table K.S.2: Daily (lbs/day) total phosphorus load allocations by TMDL reach for the Sheboygan River Subbasin
- Appendix K – Table K.S.5: Total phosphorus (lbs/yr) reductions from baseline conditions by TMDL reach for the Sheboygan River Subbasin

Attachment #3: Total Suspended Solid TMDL results for the subbasins of the NELW

- Appendix L – Table L.K.1: Annual (ton/year) total suspended solids load allocations by TMDL reach for the Kewaunee River Subbasin
- Appendix L – Table L.K.2: Daily (ton/day) total suspended solids load allocations by TMDL reach for the Kewaunee River Subbasin
- Appendix L – Table L.K.5: Total suspended solids (tons/yr) reductions from baseline conditions by TMDL reach for the Kewaunee River Subbasin
- Appendix L – Table L.M.1: Annual (tons/yr) total suspended solids load allocations by TMDL reach for the Manitowoc River Subbasin
- Appendix L – Table L.M.2: Daily (tons/day) total suspended solids load allocations by TMDL reach for the Manitowoc River Subbasin

- Appendix L – Table L.M.5: Total suspended solids (tons/yr) reductions from baseline conditions by TMDL reach for the Manitowoc River Subbasin
- Appendix L – Table L.S.1: Annual (tons/yr) total suspended solids load allocations by TMDL reach for the Sheboygan River Subbasin
- Appendix L – Table L.S.2: Daily (tons/day) total suspended solids load allocations by TMDL reach for the Sheboygan River Subbasin
- Appendix L – Table L.S.5: Total suspended solids (tons/yr) reductions from baseline conditions by TMDL reach for the Sheboygan River Subbasin

Attachment #4: Phosphorus TMDL results for the impaired lakes of the NELW

- Appendix I - Table 7, Table 9 and Table 10: Individual lake loading capacities for lake phosphorus TMDLs in the NELW

Attachment #5: Phosphorus WLAs for individual permittees (WPDES) in the NELW

- Appendix K – Table K.K.3: Total phosphorus wasteload allocations for individual permitted point sources in the Kewaunee River Subbasin
- Appendix K – Table K.K.4: Total phosphorus wasteload allocations for MS4 permittees in the Kewaunee River Subbasin
- Appendix K – Table K.M.3: Total phosphorus wasteload allocations for individual permitted point sources in the Manitowoc River Subbasin
- Appendix K – Table K.M.4: Total phosphorus wasteload allocations for MS4 permittees in the Manitowoc River Subbasin
- Appendix K – Table K.S.3: Total phosphorus wasteload allocations for individual permitted point sources in the Sheboygan River Subbasin
- Appendix K – Table K.S.4: Total phosphorus wasteload allocations for MS4 permittees in the Sheboygan River Subbasin

Attachment #6: Total suspended solid WLAs for individual permittees (WPDES) in the NELW

- Appendix L – Table L.K.3: Total suspended solid wasteload allocations for individual permitted point sources in the Kewaunee River Subbasin
- Appendix L – Table L.K.4: Total suspended solid wasteload allocations for MS4 permittees in the Kewaunee River Subbasin
- Appendix L – Table L.M.3: Total suspended solid wasteload allocations for individual permitted point sources in the Manitowoc River Subbasin
- Appendix L – Table L.M.4: Total suspended solid wasteload allocations for MS4 permittees in the Manitowoc River Subbasin
- Appendix L – Table L.S.3: Total suspended solid wasteload allocations for individual permitted point sources in the Sheboygan River Subbasin
- Appendix L – Table L.S.4: Total suspended solid wasteload allocations for MS4 permittees in the Sheboygan River Subbasin

<u>Attachment #1:</u> Stream and lake impairment listings from Wisconsin's 2022 303(d) list that are addressed by the NEL TMDLs

Appendix A – Table 1: Streams and impairment listings on the WDNR 2022 303(d) list addressed in this TMDL report

Appendix A – Table 2: Lakes and impairment listings on the WDNR 2022 303(d) list addressed in this TMDL report

Table 1. Streams and impairment listings on the WDNR 2022 303(d) list addressed in this TMDL report.

Waterbody Name	WATERS ID	WBIC	COUNTY	Start Mile	End Mile	Source Category	Impairment Indicator(s)	POLLUTANT	TP Criterion	Basin	TMDL Subbasin	TMDL ID	EPA ID305B
Black Creek	11346	50300	Sheboygan	0	5.99	NPS	Degraded Biological Community	Total Phosphorus	75	Black River	S10, S11, S19	2014-20	8112897
	9960	88300	Kewaunee, Manitowoc	0	9.49	NPS	Impairment Unknown	Total Phosphorus	75	West Twin River	K21, K7	2018-037	10000201
Branch River	9899	71300	Manitowoc	0	12.42	PS/NPS	Impairment Unknown	Total Phosphorus	75	Branch River	M12, M13, M32	2020-007	10000158
	482183	71300	Manitowoc	12.41	20.15	NPS	Impairment Unknown	Total Phosphorus	75	Branch River	M32	2020-045	10008814
Calvin Creek	18027	66900	Manitowoc	0	5.83	NPS	Degraded Biological Community	Total Phosphorus	75	Sevenmile and Silver Creeks	M6	2018-031	10006069
Casco Creek	10178	91600	Kewaunee	0	0.47	NPS	Impairment Unknown	Total Phosphorus	75	Kewaunee River	K34, K36	2018-039	10000345
Centerville Creek	3999071	65400	Manitowoc	0	5.54	NPS	High Phosphorus Levels	Total Phosphorus	75	Sevenmile and Silver Creeks	M1, M95	2020-051	10029121
Devils River	10138	89900	Manitowoc	0	6	NPS	Impairment Unknown	Total Phosphorus	75	West Twin River	K13, K14, K5, K6	2020-010	10000312
East Twin River	18071	84000	Manitowoc	0	10.49	NPS	Impairment Unknown	Total Phosphorus	75	East Twin River	K2, K4, K87	2018-034	10006105
	4700226	84000	Kewaunee, Manitowoc	10.49	26.4	NPS	Impairment Unknown	Total Phosphorus	75	East Twin River	K16, K20, K24, K25, K4	2018-035	10030100
	10205	84000	Kewaunee	26.4	34.18	NPS	Impairment Unknown	Total Phosphorus	75	East Twin River	K24, K26, K28, K29	2014-23	10000368

Waterbody Name	WATERS ID	WBIC	COUNTY	Start Mile	End Mile	Source Category	Impairment Indicator(s)	POLLUTANT	TP Criterion	Basin	TMDL Subbasin	TMDL ID	EPA ID305B
	10206	84000	Kewaunee	34.18	40.91	NPS	Degraded Biological Community	Total Phosphorus	75	East Twin River	K29	2014-24	10000369
Fischer Creek	18021	62500	Sheboygan	0	4.4	NPS	Degraded Biological Community	Total Phosphorus	75	Pigeon River	S41, S42	2016-016	10006065
	9863	65800	Manitowoc	0	8.78	NPS	Impairment Unknown	Total Phosphorus	75	Sevenmile and Silver Creeks	M2	2020-004	6970300
Jambo Creek	10146	84300	Kewaunee	8.1	10.1	NPS	Impairment Unknown	Total Phosphorus	75	East Twin River	K15, K17, K18, K69	2018-036	10000318
Johnson Creek	10143	84100	Manitowoc	0	4.43	NPS	Impairment Unknown	Total Phosphorus	75	East Twin River	K4	2022-073	10000316
Kewaunee River	10169	90700	Kewaunee	0.37	2.63	PS/NPS	Impairment Unknown	Total Phosphorus	75	Kewaunee River	K31	2016-026	10025677
	18061	90700	Kewaunee	2.63	13.51	NPS	Impairment Unknown	Total Phosphorus	75	Kewaunee River	K31, K32	2020-039	10026146
	482871	90700	Brown, Kewaunee	16.36	27.89	PS/NPS	High Phosphorus Levels	Total Phosphorus	75	Kewaunee River	K37, K39, K40, K41, K43	2020-046	10008821
Killsnake River	18043	78200	Calumet	0	19.73	NPS	High Phosphorus Levels	Total Phosphorus	75	South Branch Manitowoc River	M16, M21, M45, M85	2018-033	10006083
King Creek	10133	89400	Brown, Kewaunee	0	5.65	NPS	Impairment Unknown	Total Phosphorus	75	West Twin River	K10, K11, K12	2022-056	10000307
Krok Creek	10162	86700	Kewaunee	0	0.68	NPS	Degraded Biological Community	Total Phosphorus	75	East Twin River	K26, K27	2012-38	10000334
	903433	86700	Kewaunee	0.68	3.33	NPS	Degraded Biological Community	Total Phosphorus	75	East Twin River	K27	2012-39	10010003

Waterbody Name	WATERS ID	WBIC	COUNTY	Start Mile	End Mile	Source Category	Impairment Indicator(s)	POLLUTANT	TP Criterion	Basin	TMDL Subbasin	TMDL ID	EPA ID305B
Luxemburg Creek	18072	92100	Kewaunee	0	4.25	NPS	Degraded Biological Community	Total Phosphorus	75	Kewaunee River	K39	2020-040	10006106
Manitowoc River	482064	71000	Manitowoc	2.03	20.74	PS/NPS	Degraded Biological Community	Total Phosphorus	100	Lower Manitowoc River	M10, M11, M12, M13, M14, M80, M81	2012-23	10026294
Meeme River	207459	62900	Manitowoc	0	11.67	PS/NPS	Impairment Unknown	Total Phosphorus	75	Pigeon River	S50, S51, S52, S61	2012-39	10026355
Molash Creek	10164	90100	Manitowoc	0	7.76	NPS	Impairment Unknown	Total Phosphorus	75	East Twin River	K23, K95	2012-3	10000336
Mud Creek	9888	73600	Manitowoc	0	9.26	PS/NPS	Impairment Unknown	Total Phosphorus	75	Lower Manitowoc River	M23	2018-032	10000148
Mullet River	9839	53400	Sheboygan	0	17.76	PS/NPS	Impairment Unknown	Total Phosphorus	75	Mullet River, Sheboygan River	S29, S31, S33, S34, S35	2012-1	10008041
	9842	53400	Sheboygan	17.76	23.67	PS/NPS	Impairment Unknown	Total Phosphorus	75	Mullet River	S35, S36, S89	2020-083	10026236
Neshota River	9959	88200	Brown, Kewaunee, Manitowoc	0	3	NPS	High Phosphorus Levels	Total Phosphorus	75	West Twin River	K6, K8	2020-009	10000200
	18054	88200	Brown, Kewaunee	3	17.22	NPS	High Phosphorus Levels	Total Phosphorus	75	West Twin River	K10, K11, K61, K62, K8	2012-971	10006091

Waterbody Name	WATERS ID	WBIC	COUNTY	Start Mile	End Mile	Source Category	Impairment Indicator(s)	POLLUTANT	TP Criterion	Basin	TMDL Subbasin	TMDL ID	EPA ID305B
North Branch Manitowoc River	9911	75900	Calumet	0	7.35	PS/NPS	Degraded Habitat, Low DO	Sediment/Total Suspended Solids	75	North Branch Manitowoc River, South Branch Manitowoc River	M26, M27, M31	265	10000163
Onion River	3987353	51200	Sheboygan	0	31.8	PS/NPS	Degraded Biological Community	Total Phosphorus	75	Mullet River, Onion River, Sheboygan River	S104, S13, S15, S21, S22, S25, S28, S94, S95	2012-018	10028120
Pigeon River	1496062	62300	Manitowoc, Sheboygan	0	18.1	PS/NPS	High Phosphorus Levels	Total Phosphorus	75	Pigeon River	S105, S106, S40, S41, S42, S51, S86	2012-44	10024946
Pine Creek	9931	79900	Calumet	0	5.54	NPS	Impairment Unknown	Total Phosphorus	75	South Branch Manitowoc River	M19, M20, M44	2020-008	10000180
	9932	79900	Calumet	5.54	9.12	NPS	High Phosphorus Levels	Total Phosphorus	75	South Branch Manitowoc River	M44	2016-022	10000181
Point Creek	9864	66000	Manitowoc	0	13.74	PS/NPS	Impairment Unknown	Total Phosphorus	75	Sevenmile and Silver Creeks	M3	2020-005	10036460
Rio Creek	10215	95200	Kewaunee	0	8.77	NPS	Impairment Unknown	Total Phosphorus	75	Ahnapee River	K48, K49, K50	2020-012	10000374

Waterbody Name	WATERS ID	WBIC	COUNTY	Start Mile	End Mile	Source Category	Impairment Indicator(s)	POLLUTANT	TP Criterion	Basin	TMDL Subbasin	TMDL ID	EPA ID305B
Sauk Creek	11342	49500	Ozaukee	0	15.9	NPS	High Phosphorus Levels	Total Phosphorus	75	Sauk and Sucker Creeks	S1, S110, S2, S4, S5, S8	2012-909	10001213
School Creek	10184	92200	Brown, Kewaunee	0	5.6	NPS	High Phosphorus Levels	Total Phosphorus	75	Kewaunee River	K40, K42, K97, K98	2018-041	10000350
Sevenmile Creek	9861	65100	Sheboygan	0	5	NPS	Impairment Unknown	Total Phosphorus	75	Sevenmile and Silver Creeks	M38, M39, M95	2020-084	10000124
Sheboygan River	11354	50700	Sheboygan	0	13.58	PS/NPS	Impairment Unknown	Total Phosphorus	100	Sheboygan River	S24, S26, S27	2014-21	10008190
	11356	50700	Calumet, Manitowoc, Sheboygan	33.91	54.1	PS/NPS	Degraded Biological Community	Total Phosphorus	100	Sheboygan River	S44, S45, S46	2020-014	10038520
	5753343	50700	Fond Du Lac, Sheboygan	56.03	76.85	PS/NPS	High Phosphorus Levels	Total Phosphorus	75	Sheboygan River	S101, S47, S48, S92	2020-108	10038540
Silver Creek	9872	67300	Manitowoc	0	8.44	NPS	Impairment Unknown	Total Phosphorus	75	Sevenmile and Silver Creeks	M7, M8, M92, M99	2014-22	8106633
	8106635	67300	Manitowoc	8.7	17.98	PS/NPS	Impairment Unknown	Total Phosphorus	75	Sevenmile and Silver Creeks	M63, M8, M9	2014-22	8106636
	10212	94900	Kewaunee	1.5	7	NPS	Impairment Unknown	Total Phosphorus	75	Ahnapee River	K45, K47, K49	2018-040	10026815
Silver Stream	3994857	5020832	Manitowoc	0	6.37	PS/NPS	Degraded Biological Community	Total Phosphorus	75	East Twin River	K22	2016-188	10028752
South Branch Manitowoc River	9924	77900	Calumet, Manitowoc	0	12.64	PS/NPS	High Phosphorus Levels	Total Phosphorus	75	South Branch Manitowoc River	M17, M20, M21, M27	2012-2006	10000174

Waterbody Name	WATERS ID	WBIC	COUNTY	Start Mile	End Mile	Source Category	Impairment Indicator(s)	POLLUTANT	TP Criterion	Basin	TMDL Subbasin	TMDL ID	EPA ID305B
	3990110	77900	Calumet, Fond Du Lac	12.64	36.58	NPS	Degraded Biological Community	Total Phosphorus	75	South Branch Manitowoc River	M20, M22, M43, M49, M82	2016-020	10028420
Stony Brook	5735506	81500	Calumet	0	1.84	NPS	Impairment Unknown	Total Phosphorus	75	South Branch Manitowoc River	M83	2022-054	10037981
	18047	81500	Calumet	1.84	6.23	NPS	Impairment Unknown	Total Phosphorus	75	South Branch Manitowoc River	M83	2020-038	10026145
Stony Creek	10219	96100	Door, Kewaunee	0	8.26	NPS	Degraded Habitat	Sediment/Total Suspended Solids	75	Stony Creek	K54, K55	470	10025681
	10220	96100	Door	8.27	16.02	NPS	Impairment Unknown	Total Phosphorus	75	Stony Creek	K55	2018-042	10000378
Sucker Creek	11343	50100	Ozaukee, Sheboygan	0	10.19	NPS	Degraded Biological Community	Total Phosphorus	75	Sauk and Sucker Creeks	S18, S3	2012-41	10027605
Twin Hill Creek	10135	89600	Brown	0	5.95	NPS	High Phosphorus Levels	Total Phosphorus	75	West Twin River	K61	2020-061	10000309
Unnamed	1489156	52600	Sheboygan	0.4	4.13	NPS	Degraded Habitat	Sediment/Total Suspended Solids	75	Onion River	S54	652	10024806
Unnamed	480998	62400	Sheboygan	0	4.82	NPS	Low DO	Total Phosphorus	75	Pigeon River	S43, S86	624	10008796
Unnamed	6853227	64800	Sheboygan	0	1.52	NPS	Impairment Unknown	Total Phosphorus	75	Sevenmile and Silver Creeks	M41	2018-030	10039796

Waterbody Name	WATERS ID	WBIC	COUNTY	Start Mile	End Mile	Source Category	Impairment Indicator(s)	POLLUTANT	TP Criterion	Basin	TMDL Subbasin	TMDL ID	EPA ID305B
Unnamed	18037	71600	Manitowoc	0	3	NPS	High Phosphorus Levels	Total Phosphorus	75	Branch River	M33, M34	2012-970	10006077
Unnamed	10131	89100	Brown	0	4.65	PS/NPS	Degraded Biological Community	Total Phosphorus	75	West Twin River	K9	2016-025	10000305
Unnamed	10134	89500	Brown	0	9.01	NPS	High Phosphorus Levels	Total Phosphorus	75	West Twin River	K62	2018-038	10000308
Unnamed	482551	3000057	Calumet	0	2.92	PS/NPS	Degraded Habitat	Sediment/Total Suspended Solids	75	South Branch Manitowoc River	M48	649	10008817
Unnamed	5534458	3000211	Kewaunee	0	3.38	PS/NPS	High Phosphorus Levels	Total Phosphorus	75	East Twin River	K26, K28, K89, K90	2018-176	10033561
Unnamed	5500551	3000212	Kewaunee	0	1.93	NPS	Degraded Biological Community	Total Phosphorus	75	East Twin River	K89, K90, K91, K92	2016-184	10031700
Unnamed	5500585	3000213	Kewaunee	0	0.38	PS/NPS	High Phosphorus Levels	Total Phosphorus	75	East Twin River	K91	2018-177	10031701
Unnamed	5690951	5020187	Brown	0	3.94	NPS	High Phosphorus Levels	Total Phosphorus	75	West Twin River	K13	2020-075	10036133
Unnamed	481039	5025264	Manitowoc	0	1.16	NPS	Low DO	Total Phosphorus	75	Pigeon River	S49, S50, S52	653	10008797
West Twin River	18050	87000	Manitowoc	0	5.9	NPS	Low DO	Total Phosphorus	75	East Twin River, West Twin River	K1, K87	513	10006087

Waterbody Name	WATERS ID	WBIC	COUNTY	Start Mile	End Mile	Source Category	Impairment Indicator(s)	POLLUTANT	TP Criterion	Basin	TMDL Subbasin	TMDL ID	EPA ID305B
	9948	87000	Manitowoc	5.9	15.41	NPS	Low DO	Total Phosphorus	75	West Twin River	K1, K3, K93, K94	513	10000191
	9949	87000	Manitowoc	15.41	15.76	NPS	Low DO	Total Phosphorus	75	West Twin River	K93	513	10026863
	9950	87000	Manitowoc	15.77	17.12	NPS	Low DO	Total Phosphorus	75	West Twin River	K93	513	10008818
	18051	87000	Manitowoc	17.13	18.44	NPS	Low DO	Total Phosphorus	75	West Twin River	K6, K93	513	10006088

Table 2. Lakes and impairment listings on the WDNR 2022 303(d) list addressed in this TMDL report.

Waterbody Name	WATERS ID	WBIC	COUNTY	Source Category	Impairment Indicator(s)	POLLUTANT	TP Criterion	Basin	TMDL Subbasin	TMDL Reach	EPA ID305B
Becker Lake	9920	77300	Calumet	NPS	Eutrophication, Excess Algal Growth	Total Phosphorus	30	North Branch Manitowoc River	M61, M62	2016-198	10000172
Boot Lake	9921	77600	Calumet, Manitowoc	NPS	Eutrophication, Excess Algal Growth	Total Phosphorus	30	North Branch Manitowoc River	M59	2016-199	10000173
Bullhead Lake	9881	68300	Manitowoc	NPS	Eutrophication, Excess Algal Growth, Impairment Unknown	Total Phosphorus	30	Lower Manitowoc River	M57	2012-2012	10000142
Carstens Lake	9869	66800	Manitowoc	NPS	Eutrophication, Excess Algal Growth	Total Phosphorus	30	Sevenmile and Silver Creeks	M5, M55	2014-222	10000132
English Lake	9878	68100	Manitowoc	NPS	Impairment Unknown	Total Phosphorus	20	Sevenmile and Silver Creeks	M56	2018-242	10000141
Gass Lake	9870	67100	Manitowoc	NPS	Excess Algal Growth, High Phosphorus Levels	Total Phosphorus	30	Sevenmile and Silver Creeks	M54	2016-194	10000133
Harpt Lake	10149	84600	Manitowoc	NPS	High Phosphorus Levels	Total Phosphorus	20	East Twin River	K68	2016-200	10000321
Hartlaub Lake	9871	67200	Manitowoc	NPS	Excess Algal Growth, Impairment Unknown	Total Phosphorus	30	Sevenmile and Silver Creeks	M53, M6	2016-195	10000134

Waterbody Name	WATERS ID	WBIC	COUNTY	Source Category	Impairment Indicator(s)	POLLUTANT	TP Criterion	Basin	TMDL Subbasin	TMDL Reach	EPA ID305B
Long Lake	18042	77500	Manitowoc	NPS	Degraded Biological Community, Eutrophication, Excess Algal Growth	Total Phosphorus	30	North Branch Manitowoc River	M60, M61	2010-7	10006082
Round Lake	9910	68600	Calumet	NPS	Eutrophication, Excess Algal Growth	Total Phosphorus	30	North Branch Manitowoc River	M58	2016-197	10000162
Shea Lake	10154	85400	Kewaunee	NPS	Excess Algal Growth, High Phosphorus Levels	Total Phosphorus	20	East Twin River	K70	2020-011	10000326
Weyers Lake	9859	49400	Manitowoc	NPS	Excess Algal Growth, High Phosphorus Levels	Total Phosphorus	20	Sevenmile and Silver Creeks	M52	2018-241	10000122

Attachment #2: Phosphorus TMDL results for the subbasins of the NELW

Appendix K – Table K.K.1: Annual (pounds/year) total phosphorus load allocations by TMDL reach for the Kewaunee River Subbasin

Appendix K – Table K.K.2: Daily (lbs/day) total phosphorus load allocations by TMDL reach for the Kewaunee River Subbasin

Appendix K – Table K.K.5: Total phosphorus (lbs/yr) reductions from baseline conditions by TMDL reach for the Kewaunee River Subbasin

Appendix K – Table K.M.1: Annual (lbs/yr) total phosphorus load allocations by TMDL reach for the Manitowoc River Subbasin

Appendix K – Table K.M.2: Daily (lbs/day) total phosphorus load allocations by TMDL reach for the Manitowoc River Subbasin

Appendix K – Table K.M.5: Total phosphorus (lbs/yr) reductions from baseline conditions by TMDL reach for the Manitowoc River Subbasin

Appendix K – Table K.S.1: Annual (lbs/yr) total phosphorus load allocations by TMDL reach for the Sheboygan River Subbasin

Appendix K – Table K.S.2: Daily (lbs/day) total phosphorus load allocations by TMDL reach for the Sheboygan River Subbasin

Appendix K – Table K.S.5: Total phosphorus (lbs/yr) reductions from baseline conditions by TMDL reach for the Sheboygan River Subbasin

NOTE: *There is a "DRAFT" watermark behind all of the Appendix K Tables. EPA recognizes the Appendix K tables enclosed in Attachment #2 as the final NEL total phosphorus TMDL tables.*

Total Phosphorus Annual Allocations

Table K.K.1. Annual total phosphorus load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
K1	**1,354**	**1,239**	230	985	24	**59**	11	47	0	**56**
K2	**3,392**	**3,162**	219	2,921	22	**72**	32	40	0	**159**
K3	**2,595**	**2,455**	269	2,169	18	**23**	23	0	0	**116**
K4	**2,799**	**2,653**	357	2,268	28	**24**	24	0	0	**122**
K5	**1,354**	**1,292**	317	968	7	**10**	10	0	0	**52**
K6	**271**	**257**	40	216	2.1	**2.3**	2.3	0	0	**12**
K7	**1,750**	**1,652**	113	1,532	7.1	**16**	16	0	0	**82**
K8	**1,845**	**1,753**	312	1,426	15	**15**	15	0	0.13	**77**
K9	**611**	**140**	39	90	11	**442**	5.7	0	436	**29**
K10	**2,095**	**1,987**	296	1,680	12	**18**	18	0	0	**90**
K11	**69**	**66**	14	51	0.16	**0.54**	0.54	0	0	**2.7**
K12	**1,928**	**1,831**	315	1,512	4.1	**16**	16	0	0	**81**
K13	**4,231**	**3,998**	348	3,641	9.2	**39**	39	0	0	**194**
K14	**1,101**	**1,043**	134	903	5.7	**9.7**	9.7	0	0	**48**
K15	**3,275**	**3,098**	366	2,725	7	**30**	30	0	0	**148**
K16	**1,053**	**1,000**	169	825	6	**8.8**	8.8	0	0	**44**
K17	**386**	**364**	21	341	1.7	**3.7**	3.7	0	0	**18**
K18	**860**	**812**	53	758	0.52	**8.1**	8.1	0	0	**40**
K19	**2,531**	**2,388**	155	2,226	7.2	**24**	24	0	0	**119**
K20	**2,975**	**2,815**	307	2,501	6.8	**27**	27	0	0	**133**
K21	**2,728**	**2,583**	321	2,260	2	**24**	24	0	0	**120**
K22	**312**	**298**	81	217	0.61	**2.3**	2.3	0	0	**12**
K23	**144**	**132**	66	61	4.5	**7.7**	0.77	6.9	0	**3.9**
K24	**925**	**874**	76	795	3.4	**8.5**	8.5	0	0	**42**
K25	**1,492**	**1,409**	104	1,303	2.3	**14**	14	0	0	**69**
K26	**510**	**481**	14	467	0.37	**5**	5	0	0	**25**
K27	**1,035**	**976**	46	927	2.4	**9.9**	9.9	0	0	**49**
K28	**82**	**77**	6.8	70	0.32	**0.75**	0.75	0	0	**3.8**
K29	**2,025**	**1,914**	183	1,728	3.5	**18**	18	0	0	**92**
K30	**460**	**436**	59	376	1	**4**	4	0	0	**20**
K31	**2,189**	**971**	142	797	32	**1,116**	20	0	1,095	**102**
K32	**4,529**	**4,288**	516	3,757	15	**40**	40	0	0	**201**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
K33	**2,487**	**2,348**	166	2,177	4.2	**23**	23	0	0	**116**
K34	**192**	**182**	21	157	3.9	**1.7**	1.7	0	0	**8.5**
K35	**3,457**	**3,271**	362	2,905	3.8	**31**	31	0	0	**155**
K36	**1,440**	**1,358**	69	1,275	13	**14**	14	0	0	**69**
K37	**104**	**99**	16	80	2.6	**0.88**	0.88	0	0	**4.4**
K38	**1,923**	**1,813**	96	1,712	5.2	**18**	18	0	0	**91**
K39	**982**	**931**	137	783	11	**8.4**	8.4	0	0	**42**
K40	**198**	**188**	37	149	2.5	**1.6**	1.6	0	0	**8**
K41	**1,402**	**1,330**	206	1,119	5.2	**12**	12	0	0	**60**
K42	**1,912**	**1,809**	203	1,595	10	**17**	17	0	0	**85**
K43	**773**	**733**	113	613	7.4	**6.6**	6.6	0	0	**33**
K44	**3,276**	**31**	0.33	0.09	31	**3,081**	33	0	3,048	**164**
K45	**222**	**210**	32	149	30	**1.9**	1.9	0	0	**9.5**
K46	**464**	**441**	75	352	14	**3.9**	3.9	0	0	**19**
K47	**455**	**432**	66	355	11	**3.9**	3.9	0	0	**19**
K48	**992**	**938**	99	832	7.2	**8.9**	8.9	0	0	**45**
K49	**2,219**	**2,097**	189	1,896	12	**20**	20	0	0	**101**
K50	**1,397**	**1,321**	135	1,181	4.7	**13**	13	0	0	**63**
K51	**574**	**543**	59	473	11	**5.1**	5.1	0	0	**26**
K52	**1,602**	**1,150**	127	1,013	10	**379**	15	0	364	**74**
K53	**3,707**	**3,502**	291	3,167	44	**34**	34	0	0	**171**
K54	**690**	**655**	109	541	5.3	**5.8**	5.8	0	0	**29**
K55	**797**	**759**	160	588	11	**6.4**	6.4	0	0	**32**
K56	**303**	**289**	67	219	2.2	**2.4**	2.4	0	0	**12**
K57	**326**	**309**	51	256	1.8	**2.7**	2.7	0	0	**14**
K58	**523**	**500**	139	351	9.9	**3.8**	3.8	0	0	**19**
K59	**581**	**551**	79	470	2.7	**5**	5	0	0	**25**
K60	**121**	**116**	34	81	1.1	**0.87**	0.87	0	0	**4.4**
K61	**2,204**	**2,096**	409	1,678	8.8	**18**	18	0	0	**90**
K62	**1,404**	**1,337**	287	1,040	10	**11**	11	0	0	**56**
K63	**280**	**55**	6	48	0.46	**211**	2.7	0	209	**14**
K64	**380**	**359**	31	326	1.9	**3.5**	3.5	0	0	**17**
K65	**810**	**694**	56	633	4.6	**79**	7.5	0	71	**38**
K66	**1,966**	**1,857**	144	1,702	11	**18**	18	0	0	**91**
K67	**533**	**506**	78	419	8.7	**4.6**	4.6	0	0	**23**
K68	**93**	**89**	24	65	0	**0.69**	0.69	0	0	**3.5**
K69	**39**	**37**	5.4	31	0.17	**0.34**	0.34	0	0	**1.7**
K70	**76**	**72**	16	55	0.55	**0.59**	0.59	0	0	**3**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
K71	**27**	**25**	3	22	0.11	**0.24**	0.24	0	0	**1.2**
K72	**21**	**20**	1.8	18	0.14	**0.19**	0.19	0	0	**0.96**
K73	**13**	**13**	4.8	6.1	1.8	**0.08**	0.08	0	0	**0.42**
K74	**9.2**	**9.1**	8.2	0	0.91	**0.01**	0.01	0	0	**0.05**
K75	**1.2**	**1.2**	1.2	0	0	**0**	0	0	0	**0**
K76	**14**	**14**	5.7	7.7	0.06	**0.08**	0.08	0	0	**0.41**
K77	**40**	**39**	12	24	2.2	**0.28**	0.28	0	0	**1.4**
K78	**53**	**50**	8.7	41	0.51	**0.44**	0.44	0	0	**2.2**
K79	**4.8**	**4.7**	3.7	0	1	**0.01**	0.01	0	0	**0.05**
K80	**99**	**94**	20	75	0.24	**0.8**	0.8	0	0	**4**
K81	**6.3**	**6.2**	4.4	1.8	0	**0.02**	0.02	0	0	**0.1**
K82	**25**	**23**	1.4	21	1.1	**0.23**	0.23	0	0	**1.2**
K83	**21**	**20**	1	19	0	**0.2**	0.2	0	0	**1**
K84	**30**	**28**	4.2	24	0.18	**0.26**	0.26	0	0	**1.3**
K85	**6.1**	**5.7**	0.76	1.5	3.5	**0.05**	0.05	0	0	**0.27**
K86	**791**	**747**	57	684	5.9	**7.3**	7.3	0	0	**37**
K87	**2**	**0**	0	0	0	**1.9**	0.02	1.9	0	**0.1**
K88	**1,246**	**1,124**	151	956	17	**67**	11	0	56	**55**
K89	**161**	**152**	12	138	2.3	**1.5**	1.5	0	0	**7.4**
K90	**74**	**70**	6.3	63	0.54	**0.68**	0.68	0	0	**3.4**
K91	**233**	**8.9**	3.6	5	0.38	**213**	2.3	0	211	**11**
K92	**51**	**48**	5.1	43	0	**0.46**	0.46	0	0	**2.3**
K93	**2,502**	**2,376**	406	1,956	15	**21**	21	0	0	**105**
K94	**3,315**	**3,135**	311	2,795	29	**30**	30	0	0	**150**
K95	**781**	**746**	206	536	3.9	**5.8**	5.7	0.06	0	**29**
K96	**1,358**	**735**	67	655	13	**559**	13	0	546	**65**
K97	**1,051**	**996**	136	856	4.5	**9.2**	9.2	0	0	**46**
K98	**314**	**297**	24	257	16	**2.9**	2.9	0	0	**15**
K99	**1,752**	**1,669**	367	1,295	6.2	**14**	14	0	0	**69**
K100	**624**	**591**	65	523	3.3	**5.6**	5.6	0	0	**28**
K101	**719**	**685**	151	527	7.2	**5.7**	5.7	0	0	**28**
K102	**110**	**105**	29	74	2	**0.81**	0.81	0	0	**4.1**
K103	**76**	**73**	25	47	1.1	**0.51**	0.51	0	0	**2.6**
K104	**171**	**162**	21	129	11	**1.5**	1.5	0	0	**7.5**
K105	**21**	**20**	3	2.7	15	**0.18**	0.18	0	0	**0.92**
K106	**487**	**460**	38	419	3.4	**4.5**	4.5	0	0	**22**
K107	**229**	**218**	37	178	2.9	**1.9**	1.9	0	0	**9.6**
K108	**368**	**350**	63	282	5.1	**3.1**	3.1	0	0	**15**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
K109	**498**	**478**	164	311	4.3	**3.3**	3.3	0	0	**17**
K110	**14**	**13**	4.9	8.3	0.05	**0.09**	0.09	0	0	**0.44**
K111	**309**	**297**	111	182	5	**2**	2	0	0	**9.9**
K112	**18**	**6.5**	2.7	0	3.8	**11**	0.15	11	0	**0.77**

Total Phosphorus Daily Allocations

Table K.K.2. Daily total phosphorus allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (lbs/day)**	**LA (BG+Ag+NPU) (lbs/day)**	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	**WLA (GP+MS4+IP) (lbs/day)**	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	**RC (lbs/day)**
K1	**3.7067**	**3.3924**	0.6284	2.6978	0.0662	**0.1604**	0.0308	0.1296	0	**0.1539**
K2	**9.2867**	**8.6559**	0.5986	7.9983	0.0590	**0.1964**	0.0869	0.1095	0	**0.4344**
K3	**7.1043**	**6.7222**	0.7359	5.9380	0.0483	**0.0637**	0.0637	0	0	**0.3184**
K4	**7.6641**	**7.2628**	0.9770	6.2105	0.0753	**0.0669**	0.0669	0	0	**0.3344**
K5	**3.7076**	**3.5373**	0.8688	2.6493	0.0192	**0.0284**	0.0284	0	0	**0.1419**
K6	**0.7423**	**0.7043**	0.1083	0.5903	0.0057	**0.0063**	0.0063	0	0	**0.0317**
K7	**4.7926**	**4.5236**	0.3091	4.1950	0.0195	**0.0448**	0.0448	0	0	**0.2242**
K8	**5.0515**	**4.7993**	0.8538	3.9054	0.0400	**0.0423**	0.0420	0	0.0004	**0.2099**
K9	**1.6717**	**0.3837**	0.1067	0.2463	0.0307	**1.2097**	0.0157	0	1.1941	**0.0783**
K10	**5.7371**	**5.4415**	0.8094	4.5991	0.0330	**0.0493**	0.0493	0	0	**0.2464**
K11	**0.1884**	**0.1794**	0.0393	0.1397	0.0004	**0.0015**	0.0015	0	0	**0.0075**
K12	**5.2782**	**5.0133**	0.8637	4.1385	0.0112	**0.0441**	0.0441	0	0	**0.2207**
K13	**11.5842**	**10.9462**	0.9518	9.9692	0.0252	**0.1063**	0.1063	0	0	**0.5316**
K14	**3.0150**	**2.8561**	0.3671	2.4734	0.0156	**0.0265**	0.0265	0	0	**0.1324**
K15	**8.9668**	**8.4819**	1.0028	7.4598	0.0192	**0.0808**	0.0808	0	0	**0.4041**
K16	**2.8824**	**2.7372**	0.4632	2.2576	0.0164	**0.0242**	0.0242	0	0	**0.1210**
K17	**1.0565**	**0.9965**	0.0569	0.9348	0.0048	**0.0100**	0.0100	0	0	**0.0500**
K18	**2.3557**	**2.2232**	0.1461	2.0757	0.0014	**0.0221**	0.0221	0	0	**0.1105**
K19	**6.9286**	**6.5384**	0.4246	6.0939	0.0198	**0.0650**	0.0650	0	0	**0.3252**
K20	**8.1453**	**7.7069**	0.8397	6.8486	0.0186	**0.0731**	0.0731	0	0	**0.3653**
K21	**7.4684**	**7.0731**	0.8794	6.1881	0.0056	**0.0659**	0.0659	0	0	**0.3295**
K22	**0.8552**	**0.8171**	0.2204	0.5950	0.0017	**0.0063**	0.0063	0	0	**0.0317**
K23	**0.3934**	**0.3617**	0.1817	0.1677	0.0123	**0.0211**	0.0021	0.0190	0	**0.0106**
K24	**2.5329**	**2.3934**	0.2070	2.1772	0.0092	**0.0233**	0.0233	0	0	**0.1163**
K25	**4.0848**	**3.8567**	0.2837	3.5668	0.0062	**0.0380**	0.0380	0	0	**0.1901**
K26	**1.3976**	**1.3159**	0.0373	1.2777	0.0010	**0.0136**	0.0136	0	0	**0.0680**
K27	**2.8348**	**2.6723**	0.1268	2.5390	0.0064	**0.0271**	0.0271	0	0	**0.1354**
K28	**0.2241**	**0.2118**	0.0186	0.1923	0.0009	**0.0021**	0.0021	0	0	**0.0103**
K29	**5.5441**	**5.2415**	0.5013	4.7306	0.0096	**0.0504**	0.0504	0	0	**0.2521**
K30	**1.2588**	**1.1929**	0.1605	1.0297	0.0028	**0.0110**	0.0110	0	0	**0.0549**
K31	**5.9937**	**2.6591**	0.3886	2.1819	0.0886	**3.0544**	0.0561	0	2.9983	**0.2803**
K32	**12.3993**	**11.7401**	1.4133	10.2853	0.0414	**0.1099**	0.1099	0	0	**0.5493**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/day)**	**LA (BG+Ag+NPU) (lbs/day)**	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	**WLA (GP+MS4+IP) (lbs/day)**	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	**RC (lbs/day)**
K33	**6.8087**	**6.4275**	0.4550	5.9611	0.0114	**0.0635**	0.0635	0	0	**0.3177**
K34	**0.5264**	**0.4984**	0.0587	0.4289	0.0108	**0.0047**	0.0047	0	0	**0.0234**
K35	**9.4652**	**8.9569**	0.9924	7.9541	0.0103	**0.0847**	0.0847	0	0	**0.4236**
K36	**3.9419**	**3.7168**	0.1898	3.4917	0.0354	**0.0375**	0.0375	0	0	**0.1876**
K37	**0.2853**	**0.2708**	0.0432	0.2203	0.0072	**0.0024**	0.0024	0	0	**0.0121**
K38	**5.2651**	**4.9650**	0.2621	4.6886	0.0143	**0.0500**	0.0500	0	0	**0.2502**
K39	**2.6875**	**2.5487**	0.3745	2.1449	0.0294	**0.0231**	0.0231	0	0	**0.1157**
K40	**0.5414**	**0.5150**	0.1012	0.4068	0.0069	**0.0044**	0.0044	0	0	**0.0220**
K41	**3.8389**	**3.6425**	0.5652	3.0629	0.0143	**0.0327**	0.0327	0	0	**0.1637**
K42	**5.2338**	**4.9531**	0.5565	4.3680	0.0287	**0.0468**	0.0468	0	0	**0.2339**
K43	**2.1162**	**2.0078**	0.3099	1.6778	0.0202	**0.0181**	0.0181	0	0	**0.0903**
K44	**8.9694**	**0.0858**	0.0009	0.0002	0.0847	**8.4352**	0.0897	0	8.3455	**0.4484**
K45	**0.6072**	**0.5759**	0.0866	0.4066	0.0827	**0.0052**	0.0052	0	0	**0.0260**
K46	**1.2707**	**1.2067**	0.2044	0.9626	0.0397	**0.0107**	0.0107	0	0	**0.0533**
K47	**1.2466**	**1.1826**	0.1808	0.9711	0.0307	**0.0107**	0.0107	0	0	**0.0533**
K48	**2.7162**	**2.5695**	0.2711	2.2787	0.0197	**0.0245**	0.0245	0	0	**0.1223**
K49	**6.0746**	**5.7411**	0.5169	5.1917	0.0325	**0.0556**	0.0556	0	0	**0.2779**
K50	**3.8239**	**3.6166**	0.3697	3.2342	0.0127	**0.0345**	0.0345	0	0	**0.1727**
K51	**1.5709**	**1.4864**	0.1620	1.2937	0.0307	**0.0141**	0.0141	0	0	**0.0704**
K52	**4.3861**	**3.1476**	0.3474	2.7723	0.0279	**1.0366**	0.0404	0	0.9962	**0.2019**
K53	**10.1500**	**9.5888**	0.7968	8.6718	0.1203	**0.0935**	0.0935	0	0	**0.4677**
K54	**1.8897**	**1.7941**	0.2978	1.4817	0.0146	**0.0159**	0.0159	0	0	**0.0796**
K55	**2.1830**	**2.0783**	0.4378	1.6104	0.0301	**0.0175**	0.0175	0	0	**0.0873**
K56	**0.8293**	**0.7906**	0.1846	0.6001	0.0059	**0.0064**	0.0064	0	0	**0.0322**
K57	**0.8913**	**0.8463**	0.1410	0.7004	0.0049	**0.0075**	0.0075	0	0	**0.0375**
K58	**1.4315**	**1.3685**	0.3812	0.9602	0.0271	**0.0105**	0.0105	0	0	**0.0525**
K59	**1.5916**	**1.5090**	0.2155	1.2862	0.0073	**0.0138**	0.0138	0	0	**0.0688**
K60	**0.3313**	**0.3170**	0.0930	0.2209	0.0031	**0.0024**	0.0024	0	0	**0.0119**
K61	**6.0338**	**5.7390**	1.1200	4.5950	0.0240	**0.0491**	0.0491	0	0	**0.2457**
K62	**3.8442**	**3.6607**	0.7852	2.8475	0.0279	**0.0306**	0.0306	0	0	**0.1529**
K63	**0.7667**	**0.1503**	0.0164	0.1327	0.0012	**0.5789**	0.0075	0	0.5714	**0.0375**
K64	**1.0391**	**0.9818**	0.0841	0.8926	0.0051	**0.0096**	0.0096	0	0	**0.0478**
K65	**2.2178**	**1.8987**	0.1534	1.7327	0.0127	**0.2159**	0.0206	0	0.1952	**0.1032**
K66	**5.3837**	**5.0843**	0.3938	4.6604	0.0301	**0.0499**	0.0499	0	0	**0.2495**
K67	**1.4596**	**1.3849**	0.2139	1.1471	0.0239	**0.0125**	0.0125	0	0	**0.0623**
K68	**0.2547**	**0.2434**	0.0653	0.1780	0	**0.0019**	0.0019	0	0	**0.0095**
K69	**0.1065**	**0.1010**	0.0148	0.0858	0.0005	**0.0009**	0.0009	0	0	**0.0046**
K70	**0.2070**	**0.1973**	0.0448	0.1510	0.0015	**0.0016**	0.0016	0	0	**0.0081**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/day)**	**LA (BG+Ag+NPU) (lbs/day)**	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	**WLA (GP+MS4+IP) (lbs/day)**	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	**RC (lbs/day)**
K71	**0.0737**	**0.0697**	0.0081	0.0613	0.0003	**0.0007**	0.0007	0	0	**0.0033**
K72	**0.0574**	**0.0542**	0.0048	0.0490	0.0004	**0.0005**	0.0005	0	0	**0.0026**
K73	**0.0364**	**0.0350**	0.0132	0.0168	0.0051	**0.0002**	0.0002	0	0	**0.0012**
K74	**0.0251**	**0.0250**	0.0225	0	0.0025	**0**	0	0	0	**0.0001**
K75	**0.0033**	**0.0033**	0.0033	0	0	**0**	0	0	0	**0**
K76	**0.0383**	**0.0370**	0.0157	0.0211	0.0002	**0.0002**	0.0002	0	0	**0.0011**
K77	**0.1105**	**0.1058**	0.0327	0.0670	0.0061	**0.0008**	0.0008	0	0	**0.0039**
K78	**0.1442**	**0.1370**	0.0239	0.1118	0.0014	**0.0012**	0.0012	0	0	**0.0060**
K79	**0.0131**	**0.0129**	0.0101	0	0.0028	**0**	0	0	0	**0.0001**
K80	**0.2713**	**0.2582**	0.0536	0.2040	0.0007	**0.0022**	0.0022	0	0	**0.0109**
K81	**0.0172**	**0.0169**	0.0120	0.0049	0	**0.0001**	0.0001	0	0	**0.0003**
K82	**0.0680**	**0.0641**	0.0038	0.0573	0.0030	**0.0006**	0.0006	0	0	**0.0032**
K83	**0.0588**	**0.0554**	0.0029	0.0526	0	**0.0006**	0.0006	0	0	**0.0028**
K84	**0.0815**	**0.0773**	0.0115	0.0653	0.0005	**0.0007**	0.0007	0	0	**0.0035**
K85	**0.0166**	**0.0157**	0.0021	0.0041	0.0095	**0.0001**	0.0001	0	0	**0.0007**
K86	**2.1650**	**2.0444**	0.1562	1.8720	0.0163	**0.0201**	0.0201	0	0	**0.1004**
K87	**0.0056**	**0**	0	0	0	**0.0053**	0.0001	0.0053	0	**0.0003**
K88	**3.4111**	**3.0785**	0.4144	2.6176	0.0466	**0.1827**	0.0300	0	0.1527	**0.1498**
K89	**0.4413**	**0.4169**	0.0342	0.3765	0.0062	**0.0041**	0.0041	0	0	**0.0204**
K90	**0.2022**	**0.1911**	0.0172	0.1725	0.0015	**0.0019**	0.0019	0	0	**0.0093**
K91	**0.6390**	**0.0244**	0.0097	0.0136	0.0010	**0.5831**	0.0063	0	0.5768	**0.0315**
K92	**0.1395**	**0.1320**	0.0140	0.1180	0	**0.0013**	0.0013	0	0	**0.0063**
K93	**6.8507**	**6.5064**	1.1109	5.3543	0.0412	**0.0574**	0.0574	0	0	**0.2870**
K94	**9.0768**	**8.5833**	0.8515	7.6537	0.0781	**0.0823**	0.0823	0	0	**0.4113**
K95	**2.1371**	**2.0425**	0.5637	1.4682	0.0106	**0.0159**	0.0157	0.0002	0	**0.0787**
K96	**3.7180**	**2.0122**	0.1846	1.7928	0.0347	**1.5292**	0.0353	0	1.4938	**0.1767**
K97	**2.8774**	**2.7271**	0.3722	2.3425	0.0124	**0.0251**	0.0251	0	0	**0.1253**
K98	**0.8606**	**0.8130**	0.0664	0.7026	0.0440	**0.0079**	0.0079	0	0	**0.0397**
K99	**4.7962**	**4.5687**	1.0050	3.5468	0.0169	**0.0379**	0.0379	0	0	**0.1896**
K100	**1.7097**	**1.6177**	0.1775	1.4311	0.0091	**0.0153**	0.0153	0	0	**0.0766**
K101	**1.9698**	**1.8763**	0.4124	1.4442	0.0198	**0.0156**	0.0156	0	0	**0.0779**
K102	**0.3016**	**0.2883**	0.0797	0.2030	0.0055	**0.0022**	0.0022	0	0	**0.0111**
K103	**0.2072**	**0.1988**	0.0675	0.1283	0.0030	**0.0014**	0.0014	0	0	**0.0070**
K104	**0.4669**	**0.4423**	0.0582	0.3536	0.0306	**0.0041**	0.0041	0	0	**0.0204**
K105	**0.0588**	**0.0558**	0.0082	0.0075	0.0401	**0.0005**	0.0005	0	0	**0.0025**
K106	**1.3342**	**1.2605**	0.1052	1.1458	0.0094	**0.0123**	0.0123	0	0	**0.0614**
K107	**0.6274**	**0.5958**	0.1010	0.4868	0.0080	**0.0053**	0.0053	0	0	**0.0263**
K108	**1.0084**	**0.9582**	0.1721	0.7721	0.0140	**0.0084**	0.0084	0	0	**0.0418**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/day)**	**LA (BG+Ag+NPU) (lbs/day)**	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	**WLA (GP+MS4+IP) (lbs/day)**	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	**RC (lbs/day)**
K109	**1.3646**	**1.3096**	0.4478	0.8501	0.0117	**0.0092**	0.0092	0	0	**0.0458**
K110	**0.0376**	**0.0361**	0.0134	0.0226	0.0001	**0.0002**	0.0002	0	0	**0.0012**
K111	**0.8459**	**0.8133**	0.3027	0.4970	0.0136	**0.0054**	0.0054	0	0	**0.0272**
K112	**0.0497**	**0.0178**	0.0074	0	0.0105	**0.0297**	0.0004	0.0293	0	**0.0021**

Total Phosphorus Percent Reductions

Table K.K.5. Total phosphorus reductions from baseline.

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
K1	West Twin River—mile 0.2 to 6.9	0.0	0
K2	East Twin River—mouth to mile 8.2	15.5	546
K3	West Twin River—mile 6.9 to 11.6	27.8	841
K4	East Twin River—mile 8.2 to 13	41.8	1,648
K5	Devils River—mouth to mile 4.9	51.5	1,036
K6	Neshota River—mouth to mile 1.7	56.1	278
K7	Black Creek—mouth to mile 6.4	53.7	1,785
K8	Neshota River—mile 1.7 to 6.4	66.1	2,806
K9	Unnamed tributary to Neshota River	80.3	2,185
K10	Neshota River—mile 6.4 to 10.5	66.3	3,332
K11	Neshota River—mile 10.5 to 11	46.2	44
K12	King Creek	75.5	4,660
K13	Devils River—mile 4.9 to headwaters	40.7	2,502
K14	Unnamed tributary to Devils River	54.0	1,068
K15	Jambo Creek—mouth to mile 8.1	0.0	43
K16	East Twin River—mile 8.2 to 19.4	0.0	0
K17	Jambo Creek—mile 8.1 to 10.1	58.9	492
K18	Unnamed tributary to Jambo Creek	19.6	185
K19	Tisch Mills Creek	15.7	415
K20	East Twin River—mile 19.4 to 26.4	55.3	3,105
K21	Black Creek—mile 6.4 to headwaters	61.9	3,672
K22	Unnamed tributary to Lake Michigan	89.2	1,801
K23	Molash Creek—mouth to mile 1.1	0.0	0
K24	East Twin River—mile 26.4 to 32.1	0.0	0
K25	Unnamed tributary to East Twin River	27.2	488
K26	East Twin River—mile 32.1 to 34.2	19.1	110
K27	Krok Creek	0.0	0
K28	Unnamed tributary to East Twin River	0.0	0
K29	East Twin River—mile 34.2 to headwaters	65.6	3,295
K30	Unnamed tributary to Lake Michigan	86.6	2,445

(continued)

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
K31	Kewaunee River—mouth to mile 6.5	22.6	561
K32	Kewaunee River—mile 6.5 to 15.1	20.2	956
K33	Scarboro Creek—mouth to mile 6	61.6	3,499
K34	Kewaunee River—mile 15.1 to 16.4	0.0	0
K35	Scarboro Creek—mile 6 to headwaters	58.8	4,157
K36	Casco Creek—mouth to mile 1.7	0.0	0
K37	Kewaunee River—mile 16.4 to 18	9.1	8
K38	Casco Creek—mile 6.3 to headwaters	0.0	0
K39	Kewaunee River—mile 18 to 19.5	75.7	2,480
K40	School Creek—mouth to mile 2.1	78.9	564
K41	Kewaunee River—mile 19.5 to 23.2	67.2	2,300
K42	School Creek—mile 5.5 to headwaters	70.2	3,790
K43	Kewaunee River—mile 23.2 to headwaters	69.6	1,422
K44	Ahnapee River—mouth to mile 0.9	0.0	0
K45	Silver Creek (South)—mouth to mile 2.1	0.0	0
K46	Ahnapee River—mile 0.9 to 3.3	0.0	0
K47	Silver Creek (South)—mile 2.1 to 6.9	27.7	140
K48	Rio Creek—mouth to mile 4.2	49.5	823
K49	Silver Creek—mile 6.9 to headwaters	34.8	1,018
K50	Rio Creek—mile 4.2 to headwaters	45.8	1,001
K51	Ahnapee River—mile 3.3 to 7.1	0.0	0
K52	Ahnapee River—mile 7.1 to 7.9	0.0	0
K53	Ahnapee River—mile 11.7 to headwaters	0.0	0
K54	Stony Creek—mouth to mile 8.2	11.8	73
K55	Stony Creek—mile 8.2 to headwaters	0.0	0
K56	Bear Creek	53.7	257
K57	Silver Creek (North)	0.0	0
K58	Threemile Creek—mouth to Krohns Lake	46.2	310
K59	Mashek Creek	56.5	613
K60	Unnamed tributary to Lake Michigan	84.5	447
K61	Neshota River—mile 11 to headwaters	62.1	2,763
K62	Unnamed tributary to Neshota River	50.0	1,049

(continued)

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
K63	Unnamed stream	85.6	1,532
K64	Unnamed stream	30.9	146
K65	Unnamed tributary to Kriwanek Creek	51.3	745
K66	Kriwanek Creek—mile 0.7 to headwaters	35.8	957
K67	Unnamed tributary to West Twin River	14.7	74
K68	Harpt Lake	56.8	86
K69	Jambo Creek—mile 10.1 to 10.7	0.0	0
K70	Jambo Creek—mile 10.7 to headwaters	55.5	69
K71	Heidmann Lake	0.0	0
K72	Chada Lake	0.0	0
K73	East Alaska Lake	0.0	0
K74	Lilly Lake	0.0	0
K75	Middle Lake	0.0	0
K76	Third Lake	0.0	0
K77	West Alaska Lake	6.0	2
K78	Krohns Lake	17.8	9
K79	Hidden Lake	0.0	0
K80	Unnamed lake/pond	0.0	0
K81	Tuma Lake	0.0	0
K82	Seidel Lake	79.8	87
K83	Mott Lake	0.0	0
K84	Silver Lake	63.1	41
K85	Stump Pond	57.4	7
K86	Ahnapee River—mile 9.8 to 11.7	0.0	0
K87	West Twin River—mouth to mile 0.2	0.0	0
K88	Unnamed stream	54.9	1,252
K89	Unnamed stream	56.3	180
K90	Unnamed stream	47.7	58
K91	Unnamed stream	89.8	1,906
K92	Unnamed stream	17.8	9
K93	West Twin River—mile 11.6 to 18.6	0.0	0
K94	Francis Creek	12.7	412
K95	Molash Creek—mile 1.1 to headwaters	68.9	1,197

(continued)

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
K96	Casco Creek—mile 1.7 to 6.3	0.0	0
K97	School Creek—mile 2.1 to 5.5	77.5	2,959
K98	Unnamed tributary to School Creek	61.4	434
K99	Unnamed tributary to Kewaunee River	74.4	3,782
K100	Ahnapee River—mile 7.9 to 9.8	0.0	0
K101	Woodard Creek	62.4	889
K102	Unnamed tributaries to Lake Michigan	44.2	60
K103	Unnamed tributaries to Lake Michigan	42.6	36
K104	Unnamed tributaries to Lake Michigan	0.0	0
K105	Unnamed tributaries to Lake Michigan	0.0	0
K106	Unnamed tributaries to Lake Michigan	75.6	1,306
K107	Unnamed tributaries to Lake Michigan	74.1	517
K108	Unnamed tributaries to Lake Michigan	88.2	2,138
K109	Unnamed tributaries to Lake Michigan	89.7	2,746
K110	Unnamed tributaries to Lake Michigan	93.7	123
K111	Unnamed tributaries to Lake Michigan	78.1	667
K112	Unnamed Pond	0.0	0

Total Phosphorus Annual Allocations

Table K.M.1. Annual total phosphorus load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
M1	**1,146**	**1,092**	238	820	34	**9.1**	9.1	0	0	**45**
M2	**2,034**	**1,928**	256	1,658	14	**18**	18	0	0	**89**
M3	**3,737**	**3,552**	648	2,882	22	**31**	31	0	0	**154**
M4	**219**	**207**	24	179	4.4	**2**	1.9	0	0.05	**9.7**
M5	**983**	**932**	138	786	8	**8.5**	8.5	0	0	**42**
M6	**917**	**870**	127	728	15	**7.9**	7.9	0	0	**40**
M7	**909**	**828**	221	569	38	**47**	6.9	40	0	**34**
M8	**105**	**92**	63	23	6.2	**11**	0.42	2	8.2	**2.1**
M9	**1,227**	**1,160**	122	1,037	1.9	**11**	11	0	0	**55**
M10	**1,365**	**138**	56	66	16	**1,161**	13	119	1,029	**65**
M11	**1,246**	**1,160**	126	983	51	**30**	11	19	0	**56**
M12	**9,535**	**9,012**	817	8,135	60	**87**	87	0	0	**436**
M13	**961**	**922**	299	619	3.7	**6.6**	6.6	0	0	**33**
M14	**1,154**	**1,085**	171	910	4.1	**19**	9.8	0	9.5	**49**
M15	**2,405**	**2,124**	526	1,576	22	**186**	19	0	168	**94**
M16	**1,500**	**1,419**	161	1,255	3.8	**13**	13	0	0	**67**
M17	**656**	**622**	86	532	3.5	**5.7**	5.7	0	0	**28**
M18	**1,441**	**1,374**	328	1,039	6.5	**11**	11	0	0	**56**
M19	**1,955**	**1,856**	308	1,540	8.7	**16**	16	0	0	**82**
M20	**1,206**	**624**	114	483	27	**528**	11	0	517	**55**
M21	**27**	**25**	3.1	22	0	**0.24**	0.24	0	0	**1.2**
M22	**2,715**	**2,566**	232	2,325	9	**25**	25	0	0	**124**
M23	**5,550**	**5,003**	725	4,241	38	**306**	48	0	258	**241**
M24	**1,073**	**1,014**	85	924	4.6	**9.9**	9.9	0	0	**49**
M25	**4,005**	**3,658**	1,474	2,169	15	**220**	25	0	195	**127**
M26	**2,334**	**2,142**	186	1,929	27	**84**	21	0	63	**107**
M27	**534**	**505**	58	445	2.5	**4.8**	4.8	0	0	**24**
M28	**537**	**290**	54	227	9	**223**	4.8	0	218	**24**
M29	**785**	**743**	78	655	10	**7.1**	7.1	0	0	**35**
M30	**21**	**21**	19	1.5	0.87	**0.03**	0.03	0	0	**0.13**
M31	**1,279**	**1,210**	129	1,075	5.5	**11**	11	0	0	**57**
M32	**6,182**	**5,833**	364	5,449	20	**58**	58	0	0	**291**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
M33	**1,004**	**950**	90	855	4.7	**9.1**	9.1	0	0	**46**
M34	**1,659**	**1,572**	209	1,359	2.9	**14**	14	0	0	**72**
M35	**4,209**	**3,995**	641	3,345	9.5	**36**	36	0	0	**178**
M36	**320**	**275**	94	178	3.3	**33**	2.3	31	0	**11**
M37	**391**	**371**	134	232	4.1	**7.5**	2.6	4.9	0	**13**
M38	**760**	**718**	57	656	5.7	**7**	7	0	0	**35**
M39	**710**	**671**	54	605	11	**6.6**	6.6	0	0	**33**
M40	**2.6**	**1.6**	1.6	0	0	**0.93**	0.01	0.92	0	**0.05**
M41	**140**	**93**	9.5	83	0	**40**	1.3	39	0	**6.5**
M42	**718**	**658**	37	601	19	**26**	6.8	19	0	**34**
M43	**1,380**	**1,303**	95	1,202	6.2	**13**	13	0.08	0	**64**
M44	**1,413**	**329**	31	297	0.61	**1,016**	14	0	1,002	**69**
M45	**559**	**530**	71	456	1.9	**4.9**	4.9	0	0	**24**
M46	**1,563**	**1,488**	310	1,128	51	**13**	13	0	0	**63**
M47	**669**	**557**	40	514	2.5	**81**	6.3	0	74	**31**
M48	**433**	**287**	47	237	2.6	**126**	3.9	0	123	**19**
M49	**1,046**	**991**	125	862	4.1	**9.2**	9.2	0	0	**46**
M50	**3,932**	**3,710**	235	3,462	13	**37**	37	0	0	**185**
M51	**688**	**652**	92	545	15	**6**	6	0	0	**30**
M52	**9.7**	**9.7**	9.1	0.22	0.34	**0.01**	0.01	0	0	**0.03**
M53	**144**	**138**	34	100	3.9	**1.1**	1.1	0	0	**5.5**
M54	**31**	**30**	25	4.5	0.38	**0.05**	0.05	0	0	**0.26**
M55	**106**	**102**	44	57	0.99	**0.62**	0.62	0	0	**3.1**
M56	**62**	**59**	16	34	8.4	**0.45**	0.45	0	0	**2.3**
M57	**36**	**35**	31	4.5	0.3	**0.05**	0.05	0	0	**0.26**
M58	**5.4**	**5.3**	3.5	1.7	0	**0.02**	0.02	0	0	**0.09**
M59	**19**	**18**	5.4	12	0.77	**0.13**	0.13	0	0	**0.66**
M60	**74**	**74**	66	7.4	0.84	**0.09**	0.09	0	0	**0.44**
M61	**56**	**54**	17	37	0.32	**0.4**	0.4	0	0	**2**
M62	**323**	**305**	20	285	0	**3**	3	0	0	**15**
M63	**1,720**	**1,630**	281	1,342	7.2	**18**	14	3.7	0	**72**
M64	**115**	**110**	42	67	1.4	**0.73**	0.73	0	0	**3.6**
M65	**62**	**60**	27	33	0.03	**0.35**	0.35	0	0	**1.8**
M66	**1,229**	**1,004**	109	891	4.2	**168**	11	0	157	**56**
M67	**47**	**45**	28	18	0	**0.19**	0.19	0	0	**0.94**
M68	**169**	**162**	38	124	0.35	**1.3**	1.3	0	0	**6.6**
M69	**15**	**15**	6.6	7.5	0.76	**0.09**	0.09	0	0	**0.44**
M70	**96**	**91**	16	74	0.93	**0.79**	0.79	0	0	**4**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
M71	**15**	**14**	2	7.2	4.6	**0.13**	0.13	0	0	**0.63**
M72	**44**	**42**	20	22	0.62	**0.24**	0.24	0	0	**1.2**
M73	**21**	**20**	17	0.36	3.5	**0.04**	0.04	0	0	**0.21**
M74	**30**	**29**	15	14	0	**0.15**	0.15	0	0	**0.74**
M75	**10**	**9.7**	3	6.7	0	**0.07**	0.07	0	0	**0.36**
M76	**29**	**27**	1.4	26	0	**0.28**	0.28	0	0	**1.4**
M77	**347**	**337**	177	159	0.91	**1.7**	1.7	0	0	**8.5**
M78	**65**	**62**	12	50	0.27	**0.6**	0.53	0.07	0	**2.7**
M79	**191**	**130**	13	106	12	**52**	1.8	0	50	**8.9**
M80	**373**	**362**	190	170	1.8	**1.8**	1.8	0	0	**9.1**
M81	**494**	**470**	104	362	4.6	**3.9**	3.9	0	0	**19**
M82	**262**	**248**	26	221	1.2	**2.4**	2.4	0	0	**12**
M83	**1,268**	**1,200**	134	1,064	2.8	**11**	11	0	0	**57**
M84	**523**	**495**	54	438	2.2	**4.7**	4.7	0	0	**23**
M85	**3,283**	**3,105**	309	2,789	6.1	**30**	30	0	0	**149**
M86	**3,132**	**2,958**	225	2,714	18	**29**	29	0	0	**145**
M87	**372**	**352**	30	318	4	**3.4**	3.4	0	0	**17**
M89	**960**	**904**	39	862	4.1	**9.2**	9.2	0	0	**46**
M90	**197**	**160**	41	116	3	**29**	1.6	28	0	**7.8**
M91	**13**	**0**	0	0	0	**12**	0.13	12	0	**0.65**
M92	**218**	**21**	21	0	0	**186**	2	184	0	**9.8**
M93	**231**	**219**	26	189	4.3	**2.1**	2.1	0	0	**10**
M94	**64**	**61**	9.7	48	3.3	**0.55**	0.55	0	0	**2.7**
M95	**625**	**589**	32	543	14	**5.9**	5.9	0	0	**30**
M96	**324**	**307**	39	262	5.9	**2.9**	2.9	0	0	**14**
M97	**22**	**20**	2.3	15	3.3	**0.35**	0.2	0.16	0	**0.98**
M98	**52**	**49**	8.4	40	0.95	**0.43**	0.43	0	0	**2.2**
M99	**15**	**15**	9.6	0	4.9	**0.25**	0.05	0.2	0	**0.27**

Total Phosphorus Daily Allocations

Table K.M.2. Daily total phosphorus load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (lbs/day)**	**LA (BG+Ag+NPU) (lbs/day)**	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	**WLA (GP+MS4+IP) (lbs/day)**	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	**RC (lbs/day)**
M1	**3.1387**	**2.9895**	0.6524	2.2441	0.0930	**0.0249**	0.0249	0	0	**0.1243**
M2	**5.5698**	**5.2777**	0.7015	4.5389	0.0374	**0.0487**	0.0487	0	0	**0.2434**
M3	**10.2321**	**9.7246**	1.7742	7.8893	0.0612	**0.0846**	0.0846	0	0	**0.4229**
M4	**0.5991**	**0.5670**	0.0661	0.4887	0.0122	**0.0055**	0.0053	0	0.0001	**0.0267**
M5	**2.6904**	**2.5515**	0.3767	2.1529	0.0220	**0.0231**	0.0231	0	0	**0.1157**
M6	**2.5111**	**2.3813**	0.3481	1.9925	0.0407	**0.0216**	0.0216	0	0	**0.1082**
M7	**2.4885**	**2.2665**	0.6059	1.5572	0.1034	**0.1279**	0.0188	0.1091	0	**0.0941**
M8	**0.2867**	**0.2519**	0.1728	0.0621	0.0170	**0.0292**	0.0011	0.0056	0.0225	**0.0057**
M9	**3.3581**	**3.1766**	0.3335	2.8381	0.0051	**0.0302**	0.0302	0	0	**0.1512**
M10	**3.7365**	**0.3778**	0.1542	0.1804	0.0432	**3.1796**	0.0358	0.3255	2.8182	**0.1791**
M11	**3.4126**	**3.1763**	0.3456	2.6919	0.1388	**0.0830**	0.0307	0.0523	0	**0.1534**
M12	**26.1068**	**24.6747**	2.2373	22.2724	0.1649	**0.2387**	0.2387	0	0	**1.1935**
M13	**2.6320**	**2.5232**	0.8182	1.6949	0.0102	**0.0181**	0.0181	0	0	**0.0907**
M14	**3.1587**	**2.9711**	0.4684	2.4914	0.0113	**0.0530**	0.0269	0	0.0261	**0.1345**
M15	**6.5841**	**5.8163**	1.4407	4.3159	0.0598	**0.5106**	0.0514	0	0.4591	**0.2572**
M16	**4.1056**	**3.8857**	0.4405	3.4348	0.0105	**0.0367**	0.0367	0	0	**0.1833**
M17	**1.7970**	**1.7034**	0.2366	1.4573	0.0095	**0.0156**	0.0156	0	0	**0.0780**
M18	**3.9446**	**3.7619**	0.8994	2.8448	0.0178	**0.0305**	0.0305	0	0	**0.1523**
M19	**5.3532**	**5.0826**	0.8432	4.2155	0.0239	**0.0451**	0.0451	0	0	**0.2255**
M20	**3.3024**	**1.7085**	0.3131	1.3223	0.0732	**1.4444**	0.0299	0	1.4145	**0.1495**
M21	**0.0737**	**0.0698**	0.0085	0.0613	0	**0.0007**	0.0007	0	0	**0.0033**
M22	**7.4334**	**7.0254**	0.6343	6.3664	0.0248	**0.0680**	0.0680	0	0	**0.3400**
M23	**15.1963**	**13.6979**	1.9837	11.6106	0.1037	**0.8378**	0.1321	0	0.7057	**0.6606**
M24	**2.9374**	**2.7751**	0.2318	2.5306	0.0126	**0.0271**	0.0271	0	0	**0.1353**
M25	**10.9648**	**10.0149**	4.0369	5.9382	0.0398	**0.6035**	0.0693	0	0.5342	**0.3464**
M26	**6.3901**	**5.8657**	0.5098	5.2825	0.0734	**0.2304**	0.0588	0	0.1716	**0.2940**
M27	**1.4621**	**1.3838**	0.1576	1.2193	0.0070	**0.0130**	0.0130	0	0	**0.0652**
M28	**1.4706**	**0.7933**	0.1474	0.6213	0.0245	**0.6112**	0.0132	0	0.5980	**0.0662**
M29	**2.1498**	**2.0336**	0.2132	1.7921	0.0282	**0.0194**	0.0194	0	0	**0.0968**
M30	**0.0580**	**0.0576**	0.0510	0.0042	0.0024	**0.0001**	0.0001	0	0	**0.0003**
M31	**3.5005**	**3.3117**	0.3542	2.9423	0.0152	**0.0315**	0.0315	0	0	**0.1573**
M32	**16.9248**	**15.9691**	0.9963	14.9177	0.0550	**0.1593**	0.1593	0	0	**0.7964**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/day)**	**LA (BG+Ag+NPU) (lbs/day)**	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	**WLA (GP+MS4+IP) (lbs/day)**	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	**RC (lbs/day)**
M33	**2.7500**	**2.5998**	0.2472	2.3398	0.0129	**0.0250**	0.0250	0	0	**0.1251**
M34	**4.5409**	**4.3028**	0.5735	3.7214	0.0080	**0.0397**	0.0397	0	0	**0.1984**
M35	**11.5248**	**10.9386**	1.7550	9.1574	0.0261	**0.0977**	0.0977	0	0	**0.4885**
M36	**0.8756**	**0.7542**	0.2578	0.4874	0.0090	**0.0906**	0.0062	0.0844	0	**0.0309**
M37	**1.0710**	**1.0153**	0.3675	0.6365	0.0113	**0.0206**	0.0070	0.0135	0	**0.0352**
M38	**2.0821**	**1.9665**	0.1555	1.7953	0.0157	**0.0193**	0.0193	0	0	**0.0963**
M39	**1.9442**	**1.8365**	0.1489	1.6564	0.0312	**0.0180**	0.0180	0	0	**0.0898**
M40	**0.0072**	**0.0045**	0.0045	0	0	**0.0025**	0	0.0025	0	**0.0001**
M41	**0.3828**	**0.2542**	0.0260	0.2282	0	**0.1108**	0.0036	0.1072	0	**0.0178**
M42	**1.9653**	**1.8010**	0.1021	1.6461	0.0528	**0.0711**	0.0186	0.0525	0	**0.0932**
M43	**3.7789**	**3.5675**	0.2590	3.2916	0.0169	**0.0354**	0.0352	0.0002	0	**0.1760**
M44	**3.8697**	**0.8998**	0.0846	0.8136	0.0017	**2.7806**	0.0379	0	2.7428	**0.1893**
M45	**1.5298**	**1.4498**	0.1956	1.2490	0.0051	**0.0133**	0.0133	0	0	**0.0667**
M46	**4.2799**	**4.0739**	0.8476	3.0873	0.1390	**0.0343**	0.0343	0	0	**0.1716**
M47	**1.8311**	**1.5244**	0.1093	1.4082	0.0069	**0.2206**	0.0172	0	0.2034	**0.0861**
M48	**1.1842**	**0.7851**	0.1295	0.6485	0.0071	**0.3463**	0.0105	0	0.3358	**0.0527**
M49	**2.8641**	**2.7128**	0.3427	2.3589	0.0112	**0.0252**	0.0252	0	0	**0.1261**
M50	**10.7642**	**10.1570**	0.6431	9.4782	0.0357	**0.1012**	0.1012	0	0	**0.5061**
M51	**1.8827**	**1.7848**	0.2514	1.4932	0.0402	**0.0163**	0.0163	0	0	**0.0816**
M52	**0.0267**	**0.0266**	0.0250	0.0006	0.0009	**0**	0	0	0	**0.0001**
M53	**0.3954**	**0.3773**	0.0933	0.2732	0.0108	**0.0030**	0.0030	0	0	**0.0151**
M54	**0.0839**	**0.0830**	0.0697	0.0123	0.0010	**0.0001**	0.0001	0	0	**0.0007**
M55	**0.2897**	**0.2795**	0.1195	0.1573	0.0027	**0.0017**	0.0017	0	0	**0.0085**
M56	**0.1690**	**0.1615**	0.0445	0.0941	0.0230	**0.0012**	0.0012	0	0	**0.0062**
M57	**0.0978**	**0.0969**	0.0838	0.0123	0.0008	**0.0001**	0.0001	0	0	**0.0007**
M58	**0.0148**	**0.0145**	0.0097	0.0048	0	**0.0001**	0.0001	0	0	**0.0003**
M59	**0.0513**	**0.0491**	0.0149	0.0321	0.0021	**0.0004**	0.0004	0	0	**0.0018**
M60	**0.2034**	**0.2020**	0.1794	0.0203	0.0023	**0.0002**	0.0002	0	0	**0.0012**
M61	**0.1544**	**0.1479**	0.0460	0.1010	0.0009	**0.0011**	0.0011	0	0	**0.0054**
M62	**0.8843**	**0.8345**	0.0553	0.7792	0	**0.0083**	0.0083	0	0	**0.0414**
M63	**4.7097**	**4.4630**	0.7680	3.6752	0.0197	**0.0497**	0.0394	0.0103	0	**0.1971**
M64	**0.3140**	**0.3020**	0.1147	0.1834	0.0039	**0.0020**	0.0020	0	0	**0.0100**
M65	**0.1694**	**0.1636**	0.0729	0.0906	0.0001	**0.0010**	0.0010	0	0	**0.0048**
M66	**3.3636**	**2.7491**	0.2993	2.4383	0.0115	**0.4612**	0.0306	0	0.4306	**0.1532**
M67	**0.1275**	**0.1244**	0.0757	0.0486	0	**0.0005**	0.0005	0	0	**0.0026**
M68	**0.4639**	**0.4422**	0.1031	0.3381	0.0010	**0.0036**	0.0036	0	0	**0.0180**
M69	**0.0421**	**0.0407**	0.0180	0.0206	0.0021	**0.0002**	0.0002	0	0	**0.0012**
M70	**0.2620**	**0.2490**	0.0450	0.2014	0.0026	**0.0022**	0.0022	0	0	**0.0109**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/day)**	**LA (BG+Ag+NPU) (lbs/day)**	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	**WLA (GP+MS4+IP) (lbs/day)**	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	**RC (lbs/day)**
M71	**0.0400**	**0.0379**	0.0056	0.0198	0.0126	**0.0003**	0.0003	0	0	**0.0017**
M72	**0.1196**	**0.1157**	0.0541	0.0599	0.0017	**0.0007**	0.0007	0	0	**0.0033**
M73	**0.0565**	**0.0558**	0.0452	0.0010	0.0096	**0.0001**	0.0001	0	0	**0.0006**
M74	**0.0808**	**0.0784**	0.0404	0.0379	0	**0.0004**	0.0004	0	0	**0.0020**
M75	**0.0277**	**0.0266**	0.0083	0.0183	0	**0.0002**	0.0002	0	0	**0.0010**
M76	**0.0797**	**0.0751**	0.0039	0.0712	0	**0.0008**	0.0008	0	0	**0.0038**
M77	**0.9504**	**0.9225**	0.4847	0.4353	0.0025	**0.0047**	0.0047	0	0	**0.0233**
M78	**0.1786**	**0.1697**	0.0328	0.1362	0.0007	**0.0016**	0.0015	0.0002	0	**0.0073**
M79	**0.5225**	**0.3565**	0.0345	0.2896	0.0325	**0.1416**	0.0049	0	0.1367	**0.0244**
M80	**1.0211**	**0.9910**	0.5204	0.4658	0.0049	**0.0050**	0.0050	0	0	**0.0250**
M81	**1.3513**	**1.2873**	0.2850	0.9898	0.0125	**0.0107**	0.0107	0	0	**0.0533**
M82	**0.7173**	**0.6785**	0.0706	0.6045	0.0033	**0.0065**	0.0065	0	0	**0.0323**
M83	**3.4729**	**3.2864**	0.3660	2.9128	0.0076	**0.0311**	0.0311	0	0	**0.1553**
M84	**1.4312**	**1.3543**	0.1489	1.1993	0.0061	**0.0128**	0.0128	0	0	**0.0641**
M85	**8.9885**	**8.4999**	0.8460	7.6372	0.0167	**0.0814**	0.0814	0	0	**0.4071**
M86	**8.5763**	**8.0988**	0.6167	7.4315	0.0505	**0.0796**	0.0796	0	0	**0.3980**
M87	**1.0188**	**0.9626**	0.0811	0.8706	0.0109	**0.0094**	0.0094	0	0	**0.0469**
M89	**2.6274**	**2.4761**	0.1059	2.3591	0.0111	**0.0252**	0.0252	0	0	**0.1261**
M90	**0.5385**	**0.4368**	0.1114	0.3172	0.0082	**0.0803**	0.0043	0.0761	0	**0.0214**
M91	**0.0357**	**0**	0	0	0	**0.0339**	0.0004	0.0335	0	**0.0018**
M92	**0.5956**	**0.0584**	0.0584	0	0	**0.5103**	0.0054	0.5049	0	**0.0269**
M93	**0.6332**	**0.5994**	0.0710	0.5166	0.0119	**0.0056**	0.0056	0	0	**0.0281**
M94	**0.1765**	**0.1675**	0.0265	0.1320	0.0090	**0.0015**	0.0015	0	0	**0.0075**
M95	**1.7099**	**1.6126**	0.0880	1.4862	0.0384	**0.0162**	0.0162	0	0	**0.0811**
M96	**0.8872**	**0.8403**	0.1059	0.7182	0.0162	**0.0078**	0.0078	0	0	**0.0391**
M97	**0.0596**	**0.0559**	0.0062	0.0406	0.0091	**0.0010**	0.0005	0.0004	0	**0.0027**
M98	**0.1419**	**0.1348**	0.0231	0.1091	0.0026	**0.0012**	0.0012	0	0	**0.0059**
M99	**0.0412**	**0.0398**	0.0263	0	0.0135	**0.0007**	0.0001	0.0005	0	**0.0007**

Total Phosphorus Percent Reductions

Table K.M.5. Total phosphorus reductions from baseline.

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
M1	Centerville Creek	56.6	1,113
M2	Fischer Creek	61.7	2,687
M3	Point Creek	61.6	4,655
M4	Pine Creek (East)—mouth to 2.7	65.0	340
M5	Pine Creek (East)—mile 2.7 to 6.5	70.4	1,893
M6	Calvin Creek—mouth to mile 5.8	52.5	822
M7	Silver Creek—mouth to mile 9.5	35.7	360
M8	Silver Lake	59.1	57
M9	Silver Creek—mile 5 to headwaters	66.1	2,027
M10	Manitowoc River—mouth to mile 6.3	49.9	1,225
M11	Manitowoc River—mile 6.3 to 12.6	0.0	0
M12	Branch River—mouth to mile 12.3	0.0	0
M13	Manitowoc River—mile 12.6 to 16.5	74.0	1,775
M14	Manitowoc River—mile 18.8 to 22.2	82.1	4,233
M15	Manitowoc River—mile 22.2 to 28.2	80.2	7,149
M16	Killsnake River—mouth to mile 3.4	51.8	1,354
M17	South Branch Manitowoc River—mile 3 to 9.2	44.5	429
M18	Cedar Creek—mouth to mile 6	75.5	3,221
M19	Pine Creek (West)—mouth to mile 5	85.5	9,105
M20	South Branch Manitowoc River—mile 9.2 to 14.8	85.7	6,173
M21	South Branch Manitowoc River—mile 1.8 to 3	0.0	0
M22	South Branch Manitowoc River—mile 18.8 to 29.3	77.9	8,217
M23	Mud Creek (South)	57.7	6,194
M24	Manitowoc River—mile 28.2 to 31	0.0	0
M25	Mud Creek (North)	80.7	9,970
M26	North Branch Manitowoc River—mouth to mile 7.3	51.1	2,113
M27	South Branch Manitowoc River—mouth to mile 1.8	25.8	156
M28	Unnamed stream	78.0	1,613
M29	North Branch Manitowoc River—mile 7.3 to 11.2	7.3	53
M30	Spring Creek—mouth to mile 2.6	0.0	0

(continued)

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
M31	Manitowoc River—mile 31 to headwaters	0.0	0
M32	Branch River—mile 12.3 to 23.5	8.2	487
M33	Unnamed tributary to Branch River	39.7	566
M34	Unnamed stream	68.2	2,920
M35	Branch River—mile 23.5 to 28.4	60.9	5,226
M36	Little Manitowoc River—mouth to mile 4.4	76.6	694
M37	Little Manitowoc River—mile 4.4 to headwaters	89.0	1,949
M38	Sevenmile Creek—mile 0.9 to headwaters	67.7	1,386
M39	Sevenmile Creek—mile 6.1 to 6.9	69.6	1,413
M40	Fourmile Creek—mouth to mile 0.4	0.0	0
M41	Unnamed tributary to Fourmile Creek	0.0	0
M42	Fourmile Creek—mile 0.4 to headwaters	54.1	754
M43	South Branch Manitowoc River—mile 29.3 to headwaters	81.1	5,178
M44	Pine Creek (West)—mile 5.1 to 6.3	75.3	3,960
M45	Killsnake River—mile 3.4 to 8.2	64.0	815
M46	Spring Creek—mile 2.6 to headwaters	57.3	1,582
M47	Unnamed tributary to Branch River	53.3	675
M48	Unnamed tributary to South Branch Manitowoc River	85.0	2,056
M49	South Branch Manitowoc River—mile 14.8 to 18.8	77.4	2,970
M50	Branch River—mile 28.4 to headwaters	36.8	2,023
M51	Black Creek	46.2	480
M52	Weyers Lake	0.0	0
M53	Calvin Creek—mile 5.8 to Hartlaub Lake	0.0	0
M54	Gass Lake	77.1	16
M55	Carstens Lake	89.3	487
M56	English Lake	35.2	23
M57	Bullhead Lake	95.1	94
M58	Round Lake	0.0	0
M59	Boot Lake	63.0	21
M60	Long Lake	95.2	165
M61	Becker Lake	82.8	179
M62	Grass Lake	44.9	232

(continued)

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
M63	Silver Creek—mile 5 to 9.3	69.6	3,104
M64	Kellners Lake	0.0	0
M65	Schisel Lake	89.7	287
M66	Hempton Lake	61.0	1,646
M67	Unnamed lakes/ponds	87.8	128
M68	Cedar Creek—mile 8.4 to Mud Lake	83.2	611
M69	Unnamed lakes/ponds	0.0	0
M70	Unnamed lakes/ponds	0.0	0
M71	Lake Oschwald	0.0	0
M72	Glomski Lake	64.9	42
M73	Kasbaum Lake	0.0	0
M74	Unnamed lakes/ponds	66.5	28
M75	Eaton Twin Lakes (South)	0.0	0
M76	Eaton Twin Lakes (North)	33.3	13
M77	Cedar Creek—mile 6 to 8.4	86.7	1,041
M78	Vetting Lake	50.1	50
M79	Unnamed tributary to Lake Michigan	44.2	133
M80	Bergene Lake	91.5	1,842
M81	Manitowoc River—mile 16.5 to 18.8	68.1	781
M82	Unnamed tributary to South Branch Manitowoc River	85.3	1,286
M83	Stony Brook	80.9	4,515
M84	Unnamed tributary to Killsnake River	74.0	1,250
M85	Killsnake River—mile 8.2 to headwaters	74.9	8,329
M86	North Branch Manitowoc River—mile 11.2 to headwaters	67.5	5,687
M87	Unnamed tributary to Pine Creek	66.4	636
M89	Unnamed tributary to Branch River	0.0	0
M90	Unnamed tributary to Lake Michigan	41.3	103
M91	No waterbodies	52.9	14
M92	Unnamed	0.0	0
M93	Unnamed	64.0	344
M94	No waterbodies	0.0	0
M95	Unnamed	23.4	170
M96	Unnamed tributary to Lake Michigan	46.6	234

(continued)

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
M97	Unnamed lake/pond	0.0	0
M98	No waterbodies	63.1	70
M99	No waterbodies	0.0	0

Total Phosphorus Annual Allocations

Table K.S.1. Annual total phosphorus load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
S1	**892**	**714**	159	528	27	**141**	7.3	134	0	**37**
S2	**1,569**	**1,499**	411	1,082	7	**12**	12	0.13	0	**58**
S3	**829**	**790**	176	599	14	**6.5**	6.5	0	0	**33**
S4	**36**	**34**	7.6	26	0.06	**0.28**	0.28	0	0	**1.4**
S5	**556**	**532**	143	388	0.75	**4.1**	4.1	0	0	**21**
S6	**1,136**	**1,082**	238	839	5.3	**9**	9	0	0	**45**
S7	**271**	**259**	59	195	4.3	**2.1**	2.1	0	0	**11**
S8	**232**	**221**	42	174	4.9	**1.9**	1.9	0	0	**9.5**
S9	**486**	**305**	87	200	19	**161**	4	0	157	**20**
S10	**1,009**	**842**	222	617	2.9	**127**	7.9	119	0.03	**39**
S11	**933**	**879**	252	616	11	**20**	6.8	13	0	**34**
S12	**1,220**	**296**	18	278	0	**864**	12	0	852	**60**
S13	**218**	**206**	33	173	0.14	**1.8**	1.8	0	0	**9.2**
S14	**1,940**	**1,861**	621	1,237	2.6	**13**	13	0	0	**66**
S15	**1,481**	**1,404**	187	1,208	8	**13**	13	0	0	**65**
S16	**1,971**	**1,876**	389	1,482	5.4	**16**	16	0	0	**79**
S18	**675**	**647**	204	432	11	**4.7**	4.7	0	0	**24**
S19	**1,216**	**959**	232	711	16	**208**	9.8	0	198	**49**
S20	**154**	**128**	49	77	1.3	**21**	1	0	20	**5.2**
S21	**169**	**163**	63	97	3	**1.1**	1.1	0	0	**5.3**
S22	**1,642**	**1,489**	139	1,341	9.9	**77**	15	0	62	**75**
S23	**1,500**	**1,423**	211	1,160	53	**13**	13	0	0	**64**
S24	**1,637**	**1,035**	161	839	35	**528**	15	513	0	**74**
S25	**644**	**601**	118	478	5.1	**17**	5.3	11	0	**26**
S26	**107**	**13**	8.2	0.3	4.2	**89**	0.98	88	0	**4.9**
S27	**7,149**	**6,489**	457	5,943	89	**325**	67	206	52	**335**
S28	**2,417**	**2,285**	222	2,056	7.4	**22**	22	0.01	0	**110**
S29	**1,195**	**1,116**	112	992	11	**25**	11	14	0	**54**
S30	**1,210**	**1,018**	406	605	8.1	**152**	8	4.5	140	**40**
S31	**960**	**906**	67	838	0.54	**8.9**	8.9	0	0	**45**
S32	**1,601**	**1,513**	140	1,336	37	**15**	15	0	0	**73**
S33	**1,879**	**1,780**	239	1,482	59	**16**	16	0	0	**82**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
S34	**2,209**	**666**	212	373	81	**1,443**	20	0	1,423	**100**
S35	**1,630**	**1,546**	229	1,235	82	**14**	14	0	0	**70**
S36	**146**	**140**	43	88	9.1	**1**	1	0	0	**5.2**
S37	**2,459**	**2,327**	269	1,965	93	**22**	22	0	0	**109**
S38	**834**	**793**	145	639	9.6	**6.9**	6.9	0	0	**34**
S39	**978**	**927**	125	781	21	**8.5**	8.5	0	0	**43**
S40	**74**	**50**	19	31	0	**21**	0.56	21	0	**2.8**
S41	**1,339**	**946**	159	783	3.5	**334**	12	14	308	**59**
S42	**1,710**	**1,620**	311	1,304	4.7	**20**	14	6.2	0	**70**
S43	**1,010**	**950**	126	815	8.7	**16**	8.8	7	0	**44**
S44	**2,600**	**2,201**	741	1,449	11	**306**	19	0	287	**93**
S45	**962**	**913**	141	723	48	**8.2**	8.2	0	0	**41**
S46	**10,067**	**5,137**	549	4,370	219	**4,454**	95	0	4,359	**476**
S47	**4,354**	**4,126**	559	3,530	36	**38**	38	0	0	**190**
S48	**2,937**	**2,692**	232	2,417	43	**109**	27	0	82	**136**
S49	**620**	**587**	84	501	2.1	**5.4**	5.4	0	0	**27**
S50	**1,982**	**1,908**	763	1,139	6.5	**12**	12	0	0	**61**
S51	**3,885**	**3,712**	1,008	2,696	8	**29**	29	0	0	**144**
S52	**912**	**867**	162	702	3.5	**7.5**	7.5	0	0	**38**
S53	**979**	**931**	176	741	14	**8**	8	0	0	**40**
S54	**943**	**893**	122	765	6.3	**8.2**	8.2	0	0	**41**
S55	**300**	**289**	127	99	63	**1.7**	1.7	0	0	**8.6**
S56	**554**	**525**	63	459	2.7	**4.9**	4.9	0	0	**25**
S57	**113**	**109**	60	29	21	**0.56**	0.56	0	0	**2.8**
S58	**56**	**56**	42	0	13	**0.15**	0.15	0	0	**0.74**
S59	**194**	**184**	43	127	15	**1.6**	1.6	0	0	**8**
S60	**68**	**66**	40	11	15	**0.28**	0.28	0	0	**1.4**
S61	**417**	**397**	89	305	2.8	**3.3**	3.3	0	0	**16**
S62	**136**	**130**	35	88	6.6	**1**	1	0	0	**5**
S63	**57**	**56**	39	0.19	16	**0.18**	0.18	0	0	**0.88**
S64	**213**	**202**	33	166	3.6	**1.8**	1.8	0	0	**9**
S65	**4.7**	**4.6**	2.1	2.4	0	**0.03**	0.03	0	0	**0.13**
S66	**79**	**77**	46	32	0	**0.34**	0.34	0	0	**1.7**
S67	**84**	**81**	40	40	1	**0.44**	0.44	0	0	**2.2**
S68	**7.2**	**6.9**	1.2	5.5	0.11	**0.06**	0.06	0	0	**0.3**
S69	**51**	**50**	33	16	0.7	**0.18**	0.18	0	0	**0.91**
S70	**379**	**357**	22	331	4.6	**3.6**	3.6	0	0	**18**
S71	**12**	**12**	8.4	3.3	0.21	**0.04**	0.04	0	0	**0.19**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
S72	**314**	**304**	146	158	0.5	**1.7**	1.7	0	0	**8.4**
S73	**278**	**264**	52	211	0.54	**2.3**	2.3	0	0	**11**
S74	**744**	**703**	66	631	6.3	**6.8**	6.8	0	0	**34**
S75	**46**	**44**	14	29	0.48	**0.32**	0.32	0	0	**1.6**
S76	**17**	**16**	5.8	9.6	0.46	**0.11**	0.11	0	0	**0.54**
S77	**3.9**	**3.9**	3.3	0	0.53	**0.01**	0.01	0	0	**0.03**
S78	**33**	**32**	7.3	20	4.1	**0.26**	0.26	0	0	**1.3**
S79	**26**	**25**	12	12	0.26	**0.14**	0.14	0	0	**0.68**
S80	**6.8**	**6.6**	4.4	1.9	0.31	**0.02**	0.02	0	0	**0.12**
S81	**65**	**61**	12	49	1.2	**0.53**	0.53	0	0	**2.6**
S82	**95**	**91**	30	61	0.1	**0.65**	0.65	0	0	**3.2**
S83	**9.8**	**9.6**	6	3.4	0.15	**0.04**	0.04	0	0	**0.19**
S84	**2.9**	**2.9**	2.9	0	0	**0**	0	0	0	**0**
S85	**13**	**3.4**	3.4	0	0	**8.7**	0.09	8.6	0	**0.46**
S86	**509**	**337**	100	226	11	**152**	4.1	140	8.4	**20**
S87	**11**	**11**	3.2	6.6	0.71	**0.08**	0.08	0	0	**0.39**
S88	**17**	**16**	8.3	8	0	**0.08**	0.08	0	0	**0.42**
S89	**69**	**66**	10	46	9.2	**0.59**	0.59	0	0	**2.9**
S90	**8.9**	**8.5**	0.83	0	7.6	**0.08**	0.08	0	0	**0.41**
S91	**79**	**76**	24	52	0	**0.55**	0.55	0	0	**2.8**
S92	**729**	**708**	373	333	2.1	**3.6**	3.6	0	0	**18**
S93	**744**	**705**	104	588	13	**6.4**	6.4	0	0	**32**
S94	**1,327**	**1,213**	233	972	7.7	**59**	11	0	48	**55**
S95	**1,832**	**1,738**	268	1,453	17	**16**	16	0	0	**78**
S96	**1,553**	**1,481**	351	1,086	44	**12**	12	0	0	**60**
S97	**419**	**101**	32	64	4.3	**298**	3.9	0	295	**19**
S98	**145**	**137**	19	115	3.3	**1.3**	1.3	0	0	**6.3**
S99	**660**	**625**	81	528	16	**5.8**	5.8	0	0	**29**
S100	**3,427**	**3,168**	699	2,446	23	**123**	27	2.9	93	**136**
S101	**4,101**	**3,890**	585	3,273	32	**35**	35	0	0	**176**
S102	**3,732**	**3,520**	194	3,303	23	**35**	35	0	0	**177**
S103	**227**	**216**	47	169	0.42	**1.8**	1.8	0	0	**9**
S104	**100**	**54**	32	20	2	**43**	0.68	0	42	**3.4**
S105	**1,804**	**1,689**	231	1,437	22	**36**	16	20	0	**79**
S106	**421**	**23**	23	0	0	**378**	4	374	0	**20**
S107	**102**	**3.3**	2.9	0	0.41	**94**	0.99	93	0	**5**
S108	**1,163**	**1,100**	209	799	92	**13**	10	2.6	0	**50**
S109	**1,009**	**968**	333	623	13	**6.8**	6.8	0	0	**34**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/year)**	**LA (BG+Ag+NPU) (lbs/year)**	BG (lbs/year)	Agric. (lbs/year)	NPU (lbs/year)	**WLA (GP+MS4+IP) (lbs/year)**	GP (lbs/year)	MS4 (lbs/year)	IP (lbs/year)	**RC (lbs/year)**
S110	**556**	**448**	29	391	28	**82**	5.3	77	0	**26**

Total Phosphorus Daily Allocations

Table K.S.2. Daily total phosphorus load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (lbs/day)**	**LA (BG+Ag+NPU) (lbs/day)**	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	**WLA (GP+MS4+IP) (lbs/day)**	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	**RC (lbs/day)**
S1	**2.4434**	**1.9560**	0.4367	1.4461	0.0732	**0.3871**	0.0201	0.3670	0	**0.1003**
S2	**4.2961**	**4.1054**	1.1244	2.9620	0.0190	**0.0321**	0.0317	0.0004	0	**0.1586**
S3	**2.2690**	**2.1618**	0.4821	1.6405	0.0391	**0.0179**	0.0179	0	0	**0.0893**
S4	**0.0983**	**0.0936**	0.0209	0.0725	0.0002	**0.0008**	0.0008	0	0	**0.0039**
S5	**1.5233**	**1.4554**	0.3909	1.0625	0.0020	**0.0113**	0.0113	0	0	**0.0566**
S6	**3.1106**	**2.9631**	0.6520	2.2967	0.0144	**0.0246**	0.0246	0	0	**0.1229**
S7	**0.7428**	**0.7080**	0.1618	0.5345	0.0117	**0.0058**	0.0058	0	0	**0.0291**
S8	**0.6361**	**0.6048**	0.1155	0.4761	0.0133	**0.0052**	0.0052	0	0	**0.0260**
S9	**1.3320**	**0.8362**	0.2383	0.5463	0.0516	**0.4411**	0.0109	0	0.4302	**0.0547**
S10	**2.7621**	**2.3063**	0.6083	1.6902	0.0078	**0.3481**	0.0215	0.3265	0.0001	**0.1077**
S11	**2.5555**	**2.4070**	0.6889	1.6876	0.0305	**0.0552**	0.0187	0.0365	0	**0.0933**
S12	**3.3409**	**0.8113**	0.0496	0.7617	0	**2.3651**	0.0329	0	2.3321	**0.1646**
S13	**0.5957**	**0.5654**	0.0902	0.4747	0.0004	**0.0051**	0.0051	0	0	**0.0253**
S14	**5.3127**	**5.0960**	1.7015	3.3874	0.0072	**0.0361**	0.0361	0	0	**0.1806**
S15	**4.0557**	**3.8431**	0.5129	3.3082	0.0219	**0.0354**	0.0354	0	0	**0.1771**
S16	**5.3965**	**5.1366**	1.0646	4.0572	0.0148	**0.0433**	0.0433	0	0	**0.2166**
S18	**1.8492**	**1.7717**	0.5582	1.1823	0.0312	**0.0129**	0.0129	0	0	**0.0645**
S19	**3.3292**	**2.6246**	0.6342	1.9456	0.0448	**0.5699**	0.0270	0	0.5429	**0.1348**
S20	**0.4204**	**0.3492**	0.1341	0.2115	0.0035	**0.0569**	0.0029	0	0.0541	**0.0143**
S21	**0.4636**	**0.4462**	0.1737	0.2643	0.0082	**0.0029**	0.0029	0	0	**0.0145**
S22	**4.4949**	**4.0779**	0.3801	3.6707	0.0270	**0.2113**	0.0411	0	0.1702	**0.2057**
S23	**4.1081**	**3.8963**	0.5775	3.1749	0.1438	**0.0353**	0.0353	0	0	**0.1765**
S24	**4.4813**	**2.8337**	0.4402	2.2974	0.0962	**1.4455**	0.0404	1.4051	0	**0.2021**
S25	**1.7628**	**1.6455**	0.3217	1.3097	0.0141	**0.0453**	0.0144	0.0309	0	**0.0721**
S26	**0.2920**	**0.0347**	0.0223	0.0008	0.0115	**0.2438**	0.0027	0.2411	0	**0.0135**
S27	**19.5734**	**17.7665**	1.2516	16.2703	0.2446	**0.8908**	0.1832	0.5639	0.1437	**0.9161**
S28	**6.6171**	**6.2564**	0.6070	5.6292	0.0202	**0.0601**	0.0601	0	0	**0.3005**
S29	**3.2713**	**3.0548**	0.3080	2.7155	0.0313	**0.0683**	0.0296	0.0387	0	**0.1482**
S30	**3.3131**	**2.7878**	1.1104	1.6553	0.0221	**0.4167**	0.0220	0.0122	0.3824	**0.1101**
S31	**2.6272**	**2.4806**	0.1837	2.2954	0.0015	**0.0244**	0.0244	0	0	**0.1222**
S32	**4.3827**	**4.1427**	0.3820	3.6582	0.1025	**0.0400**	0.0400	0	0	**0.2000**
S33	**5.1441**	**4.8747**	0.6547	4.0588	0.1612	**0.0449**	0.0449	0	0	**0.2245**

(continued)

Rch	**Total (LA+WLA+RC) (lbs/day)**	**LA (BG+Ag+NPU) (lbs/day)**	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	**WLA (GP+MS4+IP) (lbs/day)**	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	**RC (lbs/day)**
S34	**6.0479**	**1.8233**	0.5791	1.0225	0.2217	**3.9512**	0.0547	0	3.8965	**0.2734**
S35	**4.4636**	**4.2334**	0.6268	3.3809	0.2257	**0.0384**	0.0384	0	0	**0.1918**
S36	**0.4004**	**0.3834**	0.1183	0.2402	0.0250	**0.0028**	0.0028	0	0	**0.0141**
S37	**6.7317**	**6.3720**	0.7361	5.3808	0.2551	**0.0600**	0.0600	0	0	**0.2998**
S38	**2.2840**	**2.1707**	0.3959	1.7484	0.0264	**0.0189**	0.0189	0	0	**0.0944**
S39	**2.6775**	**2.5374**	0.3419	2.1390	0.0565	**0.0234**	0.0234	0	0	**0.1168**
S40	**0.2030**	**0.1367**	0.0508	0.0858	0	**0.0587**	0.0015	0.0572	0	**0.0076**
S41	**3.6653**	**2.5895**	0.4366	2.1433	0.0097	**0.9143**	0.0323	0.0396	0.8424	**0.1614**
S42	**4.6820**	**4.4352**	0.8520	3.5704	0.0128	**0.0553**	0.0383	0.0170	0	**0.1915**
S43	**2.7644**	**2.6002**	0.3454	2.2310	0.0237	**0.0433**	0.0242	0.0191	0	**0.1210**
S44	**7.1172**	**6.0248**	2.0283	3.9667	0.0298	**0.8379**	0.0509	0	0.7870	**0.2544**
S45	**2.6334**	**2.4985**	0.3856	1.9804	0.1325	**0.0225**	0.0225	0	0	**0.1124**
S46	**27.5628**	**14.0651**	1.5027	11.9636	0.5988	**12.1947**	0.2606	0	11.9341	**1.3030**
S47	**11.9200**	**11.2967**	1.5317	9.6661	0.0989	**0.1039**	0.1039	0	0	**0.5194**
S48	**8.0409**	**7.3698**	0.6347	6.6179	0.1171	**0.2984**	0.0745	0	0.2239	**0.3727**
S49	**1.6965**	**1.6085**	0.2304	1.3724	0.0057	**0.0147**	0.0147	0	0	**0.0733**
S50	**5.4253**	**5.2252**	2.0895	3.1179	0.0178	**0.0334**	0.0334	0	0	**0.1668**
S51	**10.6360**	**10.1634**	2.7588	7.3827	0.0219	**0.0788**	0.0788	0	0	**0.3939**
S52	**2.4982**	**2.3748**	0.4423	1.9229	0.0096	**0.0206**	0.0206	0	0	**0.1028**
S53	**2.6815**	**2.5495**	0.4826	2.0281	0.0388	**0.0220**	0.0220	0	0	**0.1099**
S54	**2.5807**	**2.4458**	0.3331	2.0955	0.0172	**0.0225**	0.0225	0	0	**0.1124**
S55	**0.8203**	**0.7919**	0.3470	0.2718	0.1731	**0.0047**	0.0047	0	0	**0.0237**
S56	**1.5170**	**1.4363**	0.1721	1.2568	0.0075	**0.0134**	0.0134	0	0	**0.0672**
S57	**0.3090**	**0.2998**	0.1634	0.0787	0.0577	**0.0015**	0.0015	0	0	**0.0077**
S58	**0.1545**	**0.1521**	0.1158	0	0.0363	**0.0004**	0.0004	0	0	**0.0020**
S59	**0.5312**	**0.5048**	0.1176	0.3469	0.0403	**0.0044**	0.0044	0	0	**0.0220**
S60	**0.1853**	**0.1807**	0.1087	0.0308	0.0412	**0.0008**	0.0008	0	0	**0.0038**
S61	**1.1404**	**1.0866**	0.2436	0.8354	0.0076	**0.0090**	0.0090	0	0	**0.0448**
S62	**0.3722**	**0.3556**	0.0958	0.2419	0.0180	**0.0028**	0.0028	0	0	**0.0138**
S63	**0.1557**	**0.1528**	0.1074	0.0005	0.0449	**0.0005**	0.0005	0	0	**0.0024**
S64	**0.5837**	**0.5540**	0.0890	0.4552	0.0098	**0.0049**	0.0049	0	0	**0.0247**
S65	**0.0129**	**0.0125**	0.0058	0.0067	0	**0.0001**	0.0001	0	0	**0.0004**
S66	**0.2176**	**0.2121**	0.1251	0.0870	0	**0.0009**	0.0009	0	0	**0.0046**
S67	**0.2287**	**0.2215**	0.1093	0.1095	0.0027	**0.0012**	0.0012	0	0	**0.0060**
S68	**0.0198**	**0.0189**	0.0034	0.0152	0.0003	**0.0002**	0.0002	0	0	**0.0008**
S69	**0.1397**	**0.1367**	0.0896	0.0452	0.0019	**0.0005**	0.0005	0	0	**0.0025**
S70	**1.0367**	**0.9780**	0.0595	0.9059	0.0127	**0.0098**	0.0098	0	0	**0.0489**
S71	**0.0332**	**0.0326**	0.0229	0.0091	0.0006	**0.0001**	0.0001	0	0	**0.0005**

(continued)

Rch	Total (LA+WLA+RC) (lbs/day)	LA (BG+Ag+NPU) (lbs/day)	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	WLA (GP+MS4+IP) (lbs/day)	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	RC (lbs/day)
S72	0.8601	0.8324	0.3988	0.4323	0.0014	0.0046	0.0046	0	0	0.0231
S73	0.7604	0.7233	0.1433	0.5786	0.0015	0.0062	0.0062	0	0	0.0309
S74	2.0373	1.9259	0.1809	1.7278	0.0172	0.0186	0.0186	0	0	0.0928
S75	0.1251	0.1199	0.0385	0.0801	0.0013	0.0009	0.0009	0	0	0.0043
S76	0.0452	0.0434	0.0158	0.0264	0.0013	0.0003	0.0003	0	0	0.0015
S77	0.0107	0.0106	0.0091	0	0.0014	0	0	0	0	0.0001
S78	0.0905	0.0863	0.0199	0.0552	0.0112	0.0007	0.0007	0	0	0.0035
S79	0.0700	0.0678	0.0329	0.0342	0.0007	0.0004	0.0004	0	0	0.0019
S80	0.0185	0.0181	0.0121	0.0051	0.0009	0.0001	0.0001	0	0	0.0003
S81	0.1770	0.1683	0.0319	0.1332	0.0032	0.0015	0.0015	0	0	0.0073
S82	0.2592	0.2486	0.0821	0.1662	0.0003	0.0018	0.0018	0	0	0.0089
S83	0.0269	0.0263	0.0166	0.0094	0.0004	0.0001	0.0001	0	0	0.0005
S84	0.0078	0.0078	0.0078	0	0	0	0	0	0	0
S85	0.0344	0.0094	0.0094	0	0	0.0237	0.0002	0.0235	0	0.0012
S86	1.3937	0.9215	0.2727	0.6182	0.0307	0.4162	0.0112	0.3820	0.0230	0.0561
S87	0.0301	0.0288	0.0088	0.0180	0.0019	0.0002	0.0002	0	0	0.0011
S88	0.0459	0.0445	0.0227	0.0218	0	0.0002	0.0002	0	0	0.0012
S89	0.1897	0.1801	0.0287	0.1263	0.0251	0.0016	0.0016	0	0	0.0081
S90	0.0245	0.0231	0.0023	0	0.0209	0.0002	0.0002	0	0	0.0011
S91	0.2173	0.2083	0.0663	0.1419	0	0.0015	0.0015	0	0	0.0075
S92	1.9971	1.9386	1.0219	0.9109	0.0058	0.0098	0.0098	0	0	0.0488
S93	2.0357	1.9307	0.2856	1.6087	0.0365	0.0175	0.0175	0	0	0.0875
S94	3.6326	3.3221	0.6391	2.6619	0.0212	0.1608	0.0299	0	0.1309	0.1497
S95	5.0144	4.7575	0.7326	3.9779	0.0471	0.0428	0.0428	0	0	0.2141
S96	4.2518	4.0544	0.9603	2.9744	0.1196	0.0329	0.0329	0	0	0.1646
S97	1.1467	0.2766	0.0888	0.1762	0.0116	0.8171	0.0106	0	0.8066	0.0529
S98	0.3959	0.3752	0.0507	0.3153	0.0091	0.0035	0.0035	0	0	0.0173
S99	1.8073	1.7121	0.2216	1.4469	0.0436	0.0159	0.0159	0	0	0.0793
S100	9.3832	8.6732	1.9138	6.6969	0.0625	0.3365	0.0747	0.0081	0.2538	0.3735
S101	11.2283	10.6507	1.6014	8.9606	0.0886	0.0963	0.0963	0	0	0.4813
S102	10.2179	9.6367	0.5310	9.0424	0.0634	0.0969	0.0969	0	0	0.4843
S103	0.6220	0.5924	0.1280	0.4632	0.0011	0.0049	0.0049	0	0	0.0247
S104	0.2739	0.1479	0.0875	0.0549	0.0055	0.1167	0.0019	0	0.1148	0.0093
S105	4.9383	4.6255	0.6314	3.9346	0.0595	0.0975	0.0431	0.0544	0	0.2153
S106	1.1540	0.0642	0.0642	0	0	1.0353	0.0109	1.0244	0	0.0545
S107	0.2798	0.0090	0.0079	0	0.0011	0.2572	0.0027	0.2545	0	0.0136
S108	3.1848	3.0124	0.5718	2.1889	0.2517	0.0347	0.0275	0.0072	0	0.1377
S109	2.7613	2.6503	0.9108	1.7050	0.0345	0.0185	0.0185	0	0	0.0925

(continued)

Rch	**Total (LA+WLA+RC) (lbs/day)**	**LA (BG+Ag+NPU) (lbs/day)**	BG (lbs/day)	Agric. (lbs/day)	NPU (lbs/day)	**WLA (GP+MS4+IP) (lbs/day)**	GP (lbs/day)	MS4 (lbs/day)	IP (lbs/day)	**RC (lbs/day)**
S110	**1.5235**	**1.2267**	0.0806	1.0704	0.0758	**0.2247**	0.0144	0.2102	0	**0.0721**

Total Phosphorus Percent Reductions

Table K.S.5. Total phosphorus reductions from baseline.

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
S1	Sauk Creek—mouth to 2.3	68.6	1,504
S2	Sauk Creek—mile 2.3 to 11.5	89.9	9,685
S3	Sucker Creek—mouth to mile 5.9	86.1	3,792
S4	Sauk Creek—miles 11.5 to headwaters	94.6	466
S5	Unnamed stream	91.7	4,321
S6	Unnamed tributary to Sauk Creek	86.0	5,204
S7	Unnamed tributary to Sauk Creek	75.1	603
S8	Sauk Creek—headwaters to mile 2.7	86.2	1,117
S9	Barr Creek—mouth to mile 2	87.1	2,539
S10	Black River—mouth to mile 1.2	57.0	979
S11	Black River—mile 1.2 to 5	73.1	1,738
S12	Unnamed tributary to Onion River	60.8	1,751
S13	Onion River—mile 16.9 to 18.9	74.8	516
S14	Unnamed tributary to Onion River	91.3	13,082
S15	Onion River—mile 18.9 to 26.5	74.3	3,508
S16	Unnamed stream	86.2	9,267
S18	Sucker Creek—mile 5.9 to headwaters	89.9	3,933
S19	Black River—mile 5 to headwaters	85.2	5,333
S20	Unnamed stream	93.2	1,350
S21	Onion River—mile 26.9 to 27.8	83.7	512
S22	Onion River—mile 8.6 to 16.9	69.0	3,148
S23	Onion River—mile 36.7 to headwaters	0.0	0
S24	Sheboygan River—mouth to mile 3.4	0.0	0
S25	Onion River—mouth to mile 3.1	69.6	1,134
S26	Sheboygan River—mile 67.6 to 77.2	0.0	0
S27	Sheboygan River—mile 3.4 to 13	0.0	0
S28	Onion River—mile 3.1 to 8.6	79.3	7,895
S29	Mullet River—mouth to mile 5.5	50.2	1,026
S30	Sheboygan River—mile 13 to 15.1	94.2	12,375
S31	Mullet River—mile 5.5 to 8.5	71.0	2,057

(continued)

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
S32	Unnamed tributary to Mullet River	68.7	3,008
S33	Mullet River—mile 8.5 to 13.1	70.1	3,616
S34	Mullet River—mile 13.1 to 17.7	77.5	6,470
S35	Mullet River—mile 17.7 to 20.6	38.2	813
S36	Mullet River—mile 20.6 to 22.5	0.0	0
S37	La Budde Creek	0.0	0
S38	Mullet River—mile 33.6 to 35.7	0.0	0
S39	Barr Creek—mile 2 to headwaters	80.8	3,368
S40	Pigeon River—mouth to 0.9	0.0	0
S41	Pigeon River—mile 10.9 to 18	77.4	3,797
S42	Fisher Creek	85.0	7,480
S43	Unnamed tributary to Pigeon River	74.9	2,478
S44	Sheboygan River—mile 15.1 to 29	84.0	9,202
S45	Sheboygan River—mile 29 to 40	0.0	0
S46	Sheboygan River—mile 40 to 43.6	0.0	0
S47	Sheboygan River—mile 43.6 to 54.1	43.8	2,785
S48	Sheboygan River—mile 56 to 62	0.0	18
S49	Unnamed tributary to Meeme River	70.7	1,216
S50	Meeme River—headwaters to mile 7.6	83.7	5,884
S51	Pigeon River—mile 18 to Little Pigeon Lake	76.7	8,923
S52	Meeme River—mile 11.7 to mouth	78.2	2,527
S53	Unnamed tributary to Sheboygan River	0.0	0
S54	Unnamed tributary to Onion River	77.6	2,676
S55	Elkhart Lake	6.0	10
S56	Mullet Lake	63.4	801
S57	Cedar Lake	0.0	3
S58	Crystal Lake	0.0	1
S59	Wilke Lake	0.0	10
S60	Pigeon Lake	6.7	2
S61	Little Pigeon Lake	24.5	100
S62	Wolf Lake	64.7	174
S63	Little Elkhart Lake	7.2	1

(continued)

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
S64	Horseshoe Lake	29.6	71
S65	West Lake	0.0	0
S66	Scout Lake	71.3	79
S67	Unnamed lakes/ponds	68.3	88
S68	Unnamed lake/pond	0.0	0
S69	Unnamed lakes/ponds	0.0	0
S70	Gitners Lake	0.0	0
S71	Jetzers Lake	82.4	17
S72	Gerber Lake	87.7	1,124
S73	Mischos Pond	83.3	1,059
S74	Sy Lake	12.8	94
S75	Unnamed lake/pond	0.0	0
S76	Unnamed lake/pond	0.0	0
S77	Dollar Lake	0.0	0
S78	Paulys Lake	0.0	0
S79	Ludowissi Lake	92.7	163
S80	Shoe Lake	0.0	0
S81	Graf Lake	0.0	0
S82	Grasser Lake	89.0	493
S83	Spring Lake	0.0	0
S84	Prueder Lake	0.0	0
S85	Sheboygan Quarry	0.0	0
S86	Pigeon River—mile 0.9 to 5	0.0	0
S87	Bullet Lake	0.0	0
S88	Unnamed lake/pond	92.8	103
S89	Mullet River—mile 22.5 to 23.7	0.0	0
S90	Mullet River—mile 23.7 to 23.9	0.0	0
S91	Unnamed lake/pond	0.0	0
S92	Sheboygan River—mile 54.1 to 56	90.5	3,191
S93	Mullet River—mile 33.6 to Mullet Lake	0.0	0
S94	Onion River—mile 27.8 to 30.7	84.3	5,526
S95	Onion River—mile 30.7 to 36.7	29.8	623
S96	Mullet River—mile 23.9 to to 30.9	0.0	0

(continued)

Reach	Reach description	Percent reduction (%)	Load reduction (lbs/year)
S97	Unnamed tributary to Mullet River	61.1	569
S98	Unnamed tributary to Mullet River	0.0	0
S99	Mullet River—mile 30.9 to 33.6	0.0	0
S100	Unnamed tributary to Sheboygan River	84.4	13,899
S101	Sheboygan River—mile 67 to headwaters	53.1	3,738
S102	Otter Creek	0.0	0
S103	Unnamed tributary to Sheboygan River	78.2	610
S104	Onion River—mile 26.5 to 26.9	91.3	669
S105	Pigeon River—mile 5 to 10.9	62.8	2,500
S106	Unnamed tributaries to Lake Michigan	0.0	0
S107	Unnamed tributaries to Lake Michigan	0.0	0
S108	Unnamed tributaries to Lake Michigan	0.0	51
S109	Unnamed tributaries to Lake Michigan	86.0	3,919
S110	Unnamed tributaries to Lake Michigan	61.5	792

<u>Attachment #3:</u> Total Suspended Solid TMDL results for the subbasins of the NELW

Appendix L – Table L.K.1: Annual (ton/year) total suspended solids load allocations by TMDL reach for the Kewaunee River Subbasin

Appendix L – Table L.K.2: Daily (ton/day) total suspended solids load allocations by TMDL reach for the Kewaunee River Subbasin

Appendix L – Table L.K.5: Total suspended solids (tons/yr) reductions from baseline conditions by TMDL reach for the Kewaunee River Subbasin

Appendix L – Table L.M.1: Annual (tons/yr) total suspended solids load allocations by TMDL reach for the Manitowoc River Subbasin

Appendix L – Table L.M.2: Daily (tons/day) total suspended solids load allocations by TMDL reach for the Manitowoc River Subbasin

Appendix L – Table L.M.5: Total suspended solids (tons/yr) reductions from baseline conditions by TMDL reach for the Manitowoc River Subbasin

Appendix L – Table L.S.1: Annual (tons/yr) total suspended solids load allocations by TMDL reach for the Sheboygan River Subbasin

Appendix L – Table L.S.2: Daily (tons/day) total suspended solids load allocations by TMDL reach for the Sheboygan River Subbasin

Appendix L – Table L.S.5: Total suspended solids (tons/yr) reductions from baseline conditions by TMDL reach for the Sheboygan River Subbasin

NOTE: *There is a "DRAFT" watermark behind all of the Appendix L Tables. EPA recognizes the Appendix L tables enclosed in Attachment #3 as the <u>final</u> NEL total suspended solid TMDL tables.*

Total Suspended Solids Annual Allocations

Table L.K.1. Annual total suspended solids load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (ton/year)**	**LA (BG+Ag+NPU) (ton/year)**	BG (ton/year)	Agric. (ton/year)	NPU (ton/year)	**WLA (GP+MS4+IP) (ton/year)**	GP (ton/year)	MS4 (ton/year)	IP (ton/year)	**RC (ton/year)**
TSS_K1	**7,069**	**6,649**	637	5,968	44	**98**	64	2.5	32	**322**
TSS_K2	**3,494**	**3,276**	219	3,040	17	**54**	33	2.9	19	**164**
TSS_K22	**164**	**154**	4.3	149	0.79	**1.6**	1.6	0	0	**8**
TSS_K23	**188**	**177**	10	165	1.4	**2.5**	1.8	0.7	0	**8.9**
TSS_K30	**304**	**286**	3.2	282	1	**3**	3	0	0	**15**
TSS_K31	**932**	**874**	50	816	7.3	**12**	8.8	0	3.3	**44**
TSS_K44	**599**	**552**	25	517	9.6	**24**	5.7	0	18	**29**
TSS_K54	**159**	**150**	16	132	1.5	**1.4**	1.4	0	0	**7.1**
TSS_K56	**65**	**61**	8.7	52	0.62	**0.56**	0.56	0	0	**2.8**
TSS_K57	**31**	**30**	1.9	27	0.28	**0.3**	0.3	0	0	**1.5**
TSS_K58	**64**	**61**	7.9	51	2	**0.56**	0.56	0	0	**2.8**
TSS_K59	**94**	**89**	2.7	85	0.71	**0.91**	0.91	0	0	**4.6**
TSS_K60	**64**	**60**	2.3	56	1.1	**0.61**	0.61	0	0	**3.1**
TSS_K101	**162**	**153**	7.9	143	1.7	**1.5**	1.5	0	0	**7.7**
TSS_K102	**19**	**18**	2	16	0.42	**0.17**	0.17	0	0	**0.86**
TSS_K103	**8.1**	**7.6**	0.8	6.7	0.18	**0.07**	0.07	0	0	**0.36**
TSS_K104	**15**	**14**	0.59	12	1.3	**0.14**	0.14	0	0	**0.7**
TSS_K105	**2.2**	**2.1**	0.12	0.22	1.7	**0.02**	0.02	0	0	**0.1**
TSS_K106	**174**	**164**	2.7	159	1.9	**1.7**	1.7	0	0	**8.6**
TSS_K107	**66**	**62**	1.8	59	1.7	**0.64**	0.64	0	0	**3.2**
TSS_K108	**277**	**260**	4.9	250	5	**2.9**	2.9	0	0	**14**
TSS_K109	**351**	**331**	17	311	3.3	**3.3**	3.3	0	0	**17**
TSS_K110	**8.4**	**7.9**	0.26	7.6	0.11	**0.08**	0.08	0	0	**0.41**
TSS_K111	**73**	**69**	4.6	62	2.5	**0.69**	0.69	0	0	**3.4**
TSS_K112	**2.3**	**0.74**	0	0	0.74	**1.5**	0.02	1.5	0	**0.12**

Total Suspended Solids Daily Allocations

Table L.K.2. Daily total suspended solids load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (ton/day)**	**LA (BG+Ag+NPU) (ton/day)**	BG (ton/day)	Agric. (ton/day)	NPU (ton/day)	**WLA (GP+MS4+IP) (ton/day)**	GP (ton/day)	MS4 (ton/day)	IP (ton/day)	**RC (ton/day)**
TSS_K1	**19.3531**	**18.2031**	1.7447	16.3386	0.1198	**0.2696**	0.1761	0.0069	0.0866	**0.8804**
TSS_K2	**9.5673**	**8.9700**	0.6009	8.3232	0.0459	**0.1490**	0.0897	0.0080	0.0513	**0.4483**
TSS_K22	**0.4485**	**0.4223**	0.0117	0.4084	0.0022	**0.0044**	0.0044	0	0	**0.0218**
TSS_K23	**0.5159**	**0.4848**	0.0283	0.4526	0.0039	**0.0068**	0.0049	0.0019	0	**0.0244**
TSS_K30	**0.8322**	**0.7828**	0.0087	0.7713	0.0028	**0.0082**	0.0082	0	0	**0.0412**
TSS_K31	**2.5528**	**2.3934**	0.1380	2.2353	0.0201	**0.0331**	0.0241	0	0.0090	**0.1207**
TSS_K44	**1.6399**	**1.5108**	0.0677	1.4168	0.0263	**0.0658**	0.0157	0	0.0501	**0.0786**
TSS_K54	**0.4345**	**0.4111**	0.0441	0.3627	0.0042	**0.0039**	0.0039	0	0	**0.0195**
TSS_K56	**0.1774**	**0.1682**	0.0238	0.1427	0.0017	**0.0015**	0.0015	0	0	**0.0077**
TSS_K57	**0.0859**	**0.0811**	0.0051	0.0752	0.0008	**0.0008**	0.0008	0	0	**0.0040**
TSS_K58	**0.1759**	**0.1667**	0.0217	0.1396	0.0055	**0.0015**	0.0015	0	0	**0.0077**
TSS_K59	**0.2574**	**0.2424**	0.0074	0.2330	0.0020	**0.0025**	0.0025	0	0	**0.0125**
TSS_K60	**0.1740**	**0.1639**	0.0064	0.1545	0.0031	**0.0017**	0.0017	0	0	**0.0084**
TSS_K101	**0.4442**	**0.4188**	0.0215	0.3926	0.0047	**0.0042**	0.0042	0	0	**0.0211**
TSS_K102	**0.0526**	**0.0498**	0.0053	0.0433	0.0012	**0.0005**	0.0005	0	0	**0.0024**
TSS_K103	**0.0221**	**0.0209**	0.0022	0.0183	0.0005	**0.0002**	0.0002	0	0	**0.0010**
TSS_K104	**0.0397**	**0.0374**	0.0016	0.0322	0.0036	**0.0004**	0.0004	0	0	**0.0019**
TSS_K105	**0.0060**	**0.0056**	0.0003	0.0006	0.0047	**0.0001**	0.0001	0	0	**0.0003**
TSS_K106	**0.4766**	**0.4484**	0.0073	0.4359	0.0052	**0.0047**	0.0047	0	0	**0.0235**
TSS_K107	**0.1806**	**0.1700**	0.0050	0.1604	0.0046	**0.0018**	0.0018	0	0	**0.0088**
TSS_K108	**0.7587**	**0.7112**	0.0134	0.6842	0.0136	**0.0079**	0.0079	0	0	**0.0396**
TSS_K109	**0.9619**	**0.9070**	0.0473	0.8507	0.0091	**0.0091**	0.0091	0	0	**0.0457**
TSS_K110	**0.0231**	**0.0217**	0.0007	0.0207	0.0003	**0.0002**	0.0002	0	0	**0.0011**
TSS_K111	**0.2009**	**0.1896**	0.0127	0.1700	0.0069	**0.0019**	0.0019	0	0	**0.0094**
TSS_K112	**0.0064**	**0.0020**	0	0	0.0020	**0.0041**	0.0001	0.0040	0	**0.0003**

Total Suspended Solids Percent Reductions

Table L.K.5. Total suspended solids reductions from baseline.

Reach	Reach description	Percent reduction (%)	Load reduction (tons/year)
TSS_K1	West Twin River	19.5	1,466
TSS_K2	East Twin River	0.0	0
TSS_K22	Unnamed	0.0	0
TSS_K23	Molash Creek	0.0	0
TSS_K30	Unnamed	0.0	0
TSS_K31	Kewaunee River	0.0	0
TSS_K44	Ahnapee River	0.0	0
TSS_K54	Stony Creek	0.0	0
TSS_K56	Bear Creek	0.0	0
TSS_K57	Silver Creek (North)	0.0	0
TSS_K58	Threemile Creek	0.0	0
TSS_K59	Mashek Creek	0.0	0
TSS_K60	Unnamed	0.0	0
TSS_K101	Woodard and Schulyer Creeks	0.0	0
TSS_K102	Unnamed	0.0	0
TSS_K103	Unnamed	0.0	0
TSS_K104	Unnamed	0.0	0
TSS_K105	Unnamed	0.0	0
TSS_K106	Unnamed	0.0	0
TSS_K107	Unnamed	0.0	0
TSS_K108	Unnamed	0.0	17
TSS_K109	Unnamed	28.2	123
TSS_K110	Unnamed	0.0	0
TSS_K111	Unnamed	0.0	0
TSS_K112	Unnamed	0.0	0

Total Suspended Solids Annual Allocations

Table L.M.1. Annual total suspended solids load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (ton/year)**	**LA (BG+Ag+NPU) (ton/year)**	BG (ton/year)	Agric. (ton/year)	NPU (ton/year)	**WLA (GP+MS4+IP) (ton/year)**	GP (ton/year)	MS4 (ton/year)	IP (ton/year)	**RC (ton/year)**
TSS_M1	**66**	**62**	14	46	1.9	**0.51**	0.51	0	0	**2.6**
TSS_M2	**116**	**110**	12	97	0.95	**1**	1	0	0	**5.2**
TSS_M3	**214**	**206**	93	112	1.1	**1.2**	1.2	0	0	**6**
TSS_M4	**106**	**101**	26	74	1.7	**0.81**	0.8	0	0	**4**
TSS_M6	**64**	**62**	27	34	1.1	**0.38**	0.38	0	0	**1.9**
TSS_M7	**253**	**240**	76	161	2.8	**4.5**	1.8	1.9	0.77	**8.8**
TSS_M10	**1,587**	**1,476**	438	1,026	12	**44**	11	5.2	27	**57**
TSS_M12	**1,078**	**1,024**	231	789	4	**12**	8.5	0	3.4	**42**
TSS_M26	**831**	**780**	92	679	9.4	**14**	7.4	0	6.8	**37**
TSS_M27	**1,796**	**1,650**	119	1,518	13	**68**	17	0.01	51	**84**
TSS_M36	**131**	**119**	21	96	2	**6.1**	1.1	5	0	**5.5**
TSS_M39	**96**	**91**	6.2	83	1.4	**0.9**	0.9	0	0	**4.5**
TSS_M40	**63**	**57**	4.2	51	1.8	**3.6**	0.59	3	0	**3**
TSS_M79	**13**	**11**	0.78	8.5	2	**0.65**	0.12	0	0.54	**0.59**
TSS_M90	**14**	**10**	1	8.6	0.74	**3**	0.13	2.8	0	**0.65**
TSS_M91	**2.4**	**0**	0	0	0	**2.3**	0.02	2.2	0	**0.12**
TSS_M92	**15**	**0.71**	0.71	0	0	**13**	0.14	13	0	**0.7**
TSS_M93	**15**	**14**	0.53	13	0.57	**0.15**	0.15	0	0	**0.73**
TSS_M94	**4.1**	**3.8**	0.4	3.1	0.33	**0.04**	0.04	0	0	**0.18**
TSS_M95	**36**	**34**	0.95	31	1.2	**0.35**	0.35	0	0	**1.7**
TSS_M96	**21**	**20**	2.4	17	0.6	**0.19**	0.19	0	0	**0.94**
TSS_M97	**1.7**	**1.5**	0.07	1.1	0.38	**0.05**	0.02	0.03	0	**0.08**
TSS_M98	**3**	**2.8**	0.31	2.4	0.14	**0.03**	0.03	0	0	**0.13**
TSS_M99	**1.3**	**1.2**	0.5	0	0.73	**0.04**	0.01	0.04	0	**0.04**

Total Suspended Solids Daily Allocations

Table L.M.2. Daily total suspended solids load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (ton/day)**	**LA (BG+Ag+NPU) (ton/day)**	BG (ton/day)	Agric. (ton/day)	NPU (ton/day)	**WLA (GP+MS4+IP) (ton/day)**	GP (ton/day)	MS4 (ton/day)	IP (ton/day)	**RC (ton/day)**
TSS_M1	**0.1794**	**0.1710**	0.0392	0.1267	0.0051	**0.0014**	0.0014	0	0	**0.0070**
TSS_M2	**0.3184**	**0.3013**	0.0320	0.2666	0.0026	**0.0029**	0.0029	0	0	**0.0143**
TSS_M3	**0.5850**	**0.5652**	0.2547	0.3074	0.0030	**0.0033**	0.0033	0	0	**0.0165**
TSS_M4	**0.2911**	**0.2779**	0.0710	0.2022	0.0047	**0.0022**	0.0022	0	0	**0.0110**
TSS_M6	**0.1758**	**0.1696**	0.0728	0.0938	0.0029	**0.0010**	0.0010	0	0	**0.0051**
TSS_M7	**0.6925**	**0.6561**	0.2080	0.4404	0.0077	**0.0122**	0.0048	0.0053	0.0021	**0.0242**
TSS_M10	**4.3444**	**4.0400**	1.1994	2.8080	0.0326	**0.1204**	0.0314	0.0142	0.0748	**0.1572**
TSS_M12	**2.9512**	**2.8029**	0.6330	2.1590	0.0109	**0.0324**	0.0232	0	0.0092	**0.1159**
TSS_M26	**2.2760**	**2.1360**	0.2515	1.8588	0.0257	**0.0388**	0.0202	0	0.0185	**0.1012**
TSS_M27	**4.9177**	**4.5167**	0.3248	4.1574	0.0344	**0.1856**	0.0459	0	0.1396	**0.2296**
TSS_M36	**0.3574**	**0.3258**	0.0574	0.2630	0.0054	**0.0166**	0.0030	0.0136	0	**0.0150**
TSS_M39	**0.2642**	**0.2493**	0.0170	0.2284	0.0039	**0.0025**	0.0025	0	0	**0.0124**
TSS_M40	**0.1732**	**0.1553**	0.0114	0.1389	0.0050	**0.0098**	0.0016	0.0082	0	**0.0081**
TSS_M79	**0.0343**	**0.0309**	0.0021	0.0233	0.0055	**0.0018**	0.0003	0	0.0015	**0.0016**
TSS_M90	**0.0384**	**0.0285**	0.0028	0.0236	0.0020	**0.0082**	0.0004	0.0078	0	**0.0018**
TSS_M91	**0.0066**	**0**	0	0	0	**0.0062**	0.0001	0.0062	0	**0.0003**
TSS_M92	**0.0405**	**0.0020**	0.0020	0	0	**0.0366**	0.0004	0.0362	0	**0.0019**
TSS_M93	**0.0412**	**0.0388**	0.0014	0.0358	0.0016	**0.0004**	0.0004	0	0	**0.0020**
TSS_M94	**0.0111**	**0.0105**	0.0011	0.0085	0.0009	**0.0001**	0.0001	0	0	**0.0005**
TSS_M95	**0.0978**	**0.0920**	0.0026	0.0862	0.0032	**0.0010**	0.0010	0	0	**0.0048**
TSS_M96	**0.0582**	**0.0551**	0.0066	0.0468	0.0016	**0.0005**	0.0005	0	0	**0.0026**
TSS_M97	**0.0045**	**0.0042**	0.0002	0.0030	0.0010	**0.0001**	0	0.0001	0	**0.0002**
TSS_M98	**0.0081**	**0.0077**	0.0009	0.0064	0.0004	**0.0001**	0.0001	0	0	**0.0004**
TSS_M99	**0.0036**	**0.0034**	0.0014	0	0.0020	**0.0001**	0	0.0001	0	**0.0001**

Total Suspended Solids Percent Reductions

Table L.M.5. Total suspended solids reductions from baseline.

Reach	Reach description	Percent reduction (%)	Load reduction (tons/year)
TSS_M1	Centerville Creek	72.4	126
TSS_M2	Fischer Creek	70.5	234
TSS_M3	Point Creek	77.9	399
TSS_M4	Pine Creek	77.2	255
TSS_M6	Calvin Creek	68.6	77
TSS_M7	Silver Creek	74.1	475
TSS_M10	Manitowoc River	70.4	2,573
TSS_M12	Branch River	72.4	2,084
TSS_M26	North Branch Manitowoc River	58.3	972
TSS_M27	South Branch Manitowoc River	71.1	3,878
TSS_M36	Little Manitowoc River	58.2	143
TSS_M39	Sevenmile Creek	76.0	269
TSS_M40	Fourmile Creek	58.9	79
TSS_M79	Unnamed	42.7	8.2
TSS_M90	Unnamed	0.0	0
TSS_M91	Unnamed	36.9	1.3
TSS_M92	Unnamed	0.0	0
TSS_M93	Unnamed	45.8	12
TSS_M94	Unnamed	0.0	0
TSS_M95	Unnamed	34.2	17
TSS_M96	Unnamed	62.8	30
TSS_M97	Unnamed	0.0	0
TSS_M98	Unnamed	52.0	2.7
TSS_M99	Unnamed	13.4	0.12

Total Suspended Solids Annual Allocations

Table L.S.1. Annual total suspended solids load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (ton/year)**	**LA (BG+Ag+NPU) (ton/year)**	BG (ton/year)	Agric. (ton/year)	NPU (ton/year)	**WLA (GP+MS4+IP) (ton/year)**	GP (ton/year)	MS4 (ton/year)	IP (ton/year)	**RC (ton/year)**
TSS_S1	**900**	**836**	61	765	11	**22**	8.4	12	1.6	**42**
TSS_S3	**278**	**263**	29	229	4.8	**2.5**	2.5	0	0	**12**
TSS_S9	**271**	**248**	13	226	8.8	**9.9**	2.6	0	7.3	**13**
TSS_S10	**196**	**176**	9	164	2.8	**10**	1.9	4.2	4	**9.3**
TSS_S24	**4,971**	**4,634**	201	4,397	36	**111**	48	18	45	**238**
TSS_S25	**2,048**	**1,914**	166	1,735	14	**33**	19	1.2	13	**94**
TSS_S29	**1,690**	**1,557**	134	1,372	51	**55**	16	1.2	38	**78**
TSS_S40	**1,589**	**1,487**	184	1,293	10	**32**	14	9.4	8.4	**70**
TSS_S106	**14**	**0.34**	0.34	0	0	**13**	0.14	13	0	**0.7**
TSS_S107	**5.6**	**0.37**	0.19	0	0.18	**4.9**	0.05	4.9	0	**0.27**
TSS_S108	**215**	**202**	5.9	191	4.8	**2.5**	2.1	0.45	0	**10**
TSS_S109	**202**	**191**	28	161	3	**1.7**	1.7	0	0	**8.7**
TSS_S110	**103**	**89**	2.5	84	3	**8.5**	1	7.5	0	**5**

Total Suspended Solids Daily Allocations

Table L.S.2. Daily total suspended solids load allocations by TMDL reach. Some columns names have been abbreviated to fit: Load cap. = loading capacity, LA = load allocation (background, agriculture, non-permitted urban), WLA = wasteload allocation (general permits, MS4s, individual permits), RC = reserve capacity, BG = background load, Agric. = agriculture allocation, NPU = non-permitted urban allocation, GP = general permits, IP = individual permits.

Rch	**Total (LA+WLA+RC) (ton/day)**	**LA (BG+Ag+NPU) (ton/day)**	BG (ton/day)	Agric. (ton/day)	NPU (ton/day)	**WLA (GP+MS4+IP) (ton/day)**	GP (ton/day)	MS4 (ton/day)	IP (ton/day)	**RC (ton/day)**
TSS_S1	**2.4654**	**2.2889**	0.1664	2.0932	0.0293	**0.0615**	0.0230	0.0342	0.0043	**0.1150**
TSS_S3	**0.7610**	**0.7202**	0.0800	0.6270	0.0132	**0.0068**	0.0068	0	0	**0.0341**
TSS_S9	**0.7409**	**0.6787**	0.0369	0.6176	0.0242	**0.0271**	0.0070	0	0.0200	**0.0352**
TSS_S10	**0.5359**	**0.4828**	0.0247	0.4503	0.0077	**0.0275**	0.0051	0.0114	0.0110	**0.0256**
TSS_S24	**13.6098**	**12.6887**	0.5508	12.0391	0.0988	**0.3026**	0.1306	0.0487	0.1233	**0.6530**
TSS_S25	**5.6061**	**5.2408**	0.4538	4.7489	0.0382	**0.0904**	0.0515	0.0032	0.0357	**0.2576**
TSS_S29	**4.6268**	**4.2629**	0.3660	3.7571	0.1398	**0.1498**	0.0426	0.0033	0.1039	**0.2130**
TSS_S40	**4.3502**	**4.0707**	0.5038	3.5394	0.0274	**0.0872**	0.0385	0.0257	0.0231	**0.1923**
TSS_S106	**0.0394**	**0.0009**	0.0009	0	0	**0.0366**	0.0004	0.0362	0	**0.0019**
TSS_S107	**0.0153**	**0.0010**	0.0005	0	0.0005	**0.0135**	0.0001	0.0134	0	**0.0007**
TSS_S108	**0.5885**	**0.5529**	0.0160	0.5237	0.0132	**0.0070**	0.0057	0.0012	0	**0.0286**
TSS_S109	**0.5522**	**0.5236**	0.0754	0.4399	0.0082	**0.0048**	0.0048	0	0	**0.0238**
TSS_S110	**0.2815**	**0.2446**	0.0068	0.2295	0.0083	**0.0232**	0.0027	0.0204	0	**0.0137**

Total Suspended Solids Percent Reductions

Table L.S.5. Total suspended solids reductions from baseline.

Reach	Reach description	Percent reduction (%)	Load reduction (tons/year)
TSS_S1	Sauk Creek	57.2	1,057
TSS_S3	Sucker Creek	67.7	491
TSS_S9	Barr Creek	42.7	180
TSS_S10	Black River	0.0	0
TSS_S24	Sheboygan River	6.8	328
TSS_S25	Onion River	57.4	2,388
TSS_S29	Mullet River	27.7	561
TSS_S40	Pigeon River	55.9	1,676
TSS_S106	Unnamed	0.0	0
TSS_S107	Unnamed	0.0	0
TSS_S108	Unnamed	7.5	16
TSS_S109	Unnamed	53.5	188
TSS_S110	Unnamed	49.2	91

<u>Attachment #4:</u> Phosphorus TMDL results for the impaired lakes of the NELW

From Appendix I - Table 7, Table 9 and Table 10 of the NEL TMDL document: Individual lake loading capacities for lake phosphorus TMDLs in the NELW

Lake Name	Waters ID	WBIC	County	TMDL Subbasin(s)	Loading Capacity (lbs/year)
Becker	9920	77300	Calumet	M61, M62	92.8
Boot	9921	77600	Calumet, Manitowoc	M59	8.5
Bullhead	9881	68300	Manitowoc	M57	35.6
Carstens	9869	66800	Manitowoc	M5, M55	105.7
English	9878	68100	Manitowoc	M56	61.8
Gass	9870	67100	Manitowoc	M54	30.7
Harpt	10149	84600	Manitowoc	K68	93.0
Hartlaub	9871	67200	Manitowoc	M52, M6	149.9
Long	18042	77500	Manitowoc	M60, M61	74.2
Round	9910	68600	Calumet	M58	10.6
Shea	10154	85400	Kewaunee	K70	75.6
Weyers	9859	49400	Manitowoc	M52	11.8

Attachment #5: Phosphorus WLAs for individual permittees (WPDES) in the NELW

Appendix K – Table K.K.3: Total phosphorus wasteload allocations for individual permitted point sources in the Kewaunee River Subbasin

Appendix K – Table K.K.4: Total phosphorus wasteload allocations for MS4 permittees in the Kewaunee River Subbasin

Appendix K – Table K.M.3: Total phosphorus wasteload allocations for individual permitted point sources in the Manitowoc River Subbasin

Appendix K – Table K.M.4: Total phosphorus wasteload allocations for MS4 permittees in the Manitowoc River Subbasin

Appendix K – Table K.S.3: Total phosphorus wasteload allocations for individual permitted point sources in the Sheboygan River Subbasin

Appendix K – Table K.S.4: Total phosphorus wasteload allocations for MS4 permittees in the Sheboygan River Subbasin

NOTE: *There is a "DRAFT" watermark behind all of the Appendix K Tables. EPA recognizes the Appendix K tables enclosed in Attachment #5 as the final NEL total phosphorus wasteload allocations.*

Total Phosphorus Allocations by Permitted Point Source

Table K.K.3. Total phosphorus wasteload allocations for each individual permitted point source.

Reach	Permit no.	Outfall no.	Name	Allocation (lbs/year)	Allocation (lbs/day)
K91	50237	9	AGROPUR INC. - LUXEMBURG	211	0.5768
K44	20745	1	ALGOMA WASTEWATER TREATMENT FACILITY	3,048	8.3454
K63	51128	7	BELGIOIOSO CHEESE, INC. - DENMARK	209	0.5714
K96	23566	1	CASCO WASTEWATER TREATMENT FACILITY	546	1.4938
K9	21741	1	DENMARK WASTEWATER TREATMENT FACILITY	436	1.1940
K52	28894	1	FORESTVILLE WASTEWATER TREATMENT FACILITY	364	0.9962
K31	20176	1	KEWAUNEE WASTEWATER TREATMENT FACILITY	1,273	3.4864
K88	35874	1	KOSSUTH SANITARY DISTRICT NO. 2 WWTF	56	0.1527
K65	61051	2	MARIBEL WASTEWATER TREATMENT FACILITY	71	0.1952
K8	64629	6	NEW ORGANIC DIGESTION LLC	0.19	0.0005

Total Phosphorus Allocations by MS4

Table K.K.4. Total phosphorus wasteload allocations for each permitted MS4 and the reaches they drain to.

Municipality	Reach	Area (acres)	Allocation (lbs/year)	Allocation (lbs/day)	Reduction from baseline (%)	Reduction from no-controls (%)
City of Manitowoc	K1	11	0	0.001	0	15
City of Two Rivers	K1	1,806	47	0.129	0	15
City of Two Rivers	K112	144	11	0.029	0	15
City of Two Rivers	K2	1,099	40	0.110	15	28
City of Two Rivers	K23	326	7	0.019	0	15
City of Two Rivers	K87	7	2	0.005	0	15
City of Two Rivers	K95	78	0	0.000	69	74

Total Phosphorus Allocations by Permitted Point Source

Table K.M.3. Total phosphorus wasteload allocations for each individual permitted point source.

Reach	Permit no.	Outfall no.	Name	Allocation (lbs/year)	Allocation (lbs/day)
M10	66257	1	BRIESS MALT AND INGREDIENTS CO	107	0.2926
M10	20443	1	BRILLION WASTEWATER TREATMENT FACILITY	1,081	2.9599
M20	22799	2	CHILTON WASTEWATER TREATMENT FACILITY	517	1.4145
M14	36030	1	CLARKS MILLS SANITARY DISTRICT	9.8	0.0269
M28	21270	1	HILBERT WASTEWATER TREATMENT FACILITY	218	0.5980
M8	28142	1	HOLY FAMILY CONVENT WASTEWATER TREATMENT FAC	52	0.1433
M79	795	1	KOHLER COMPANY POWER SYSTEMS AMERICAS	50	0.1367
M47	36773	1	MORRISON SANITARY DISTRICT NO 1	74	0.2034
M44	20893	1	NEW HOLSTEIN WASTEWATER TREATMENT FACILITY	1,002	2.7427
M4	42650	1	NEWTON MEATS AND SAUSAGE	0.07	0.0002
M26	29025	1	POTTER WASTEWATER TREATMENT FACILITY	66	0.1802
M25	21342	2	REEDSVILLE WASTEWATER TREATMENT FACILITY	180	0.4940
M25	22802	1	ROCKLAND SD1 WASTEWATER TREATMENT FACILITY	15	0.0402
M23	22195	1	ST NAZIANZ WASTEWATER TREATMENT FACILITY	258	0.7056
M48	27618	1	TILLAMOOK WISCONSIN LLC	123	0.3358
M15	21831	1	VALDERS WASTEWATER TREATMENT FACILITY	168	0.4591
M66	22047	1	WHITELAW WASTEWATER TREATMENT FACILITY	157	0.4306

Total Phosphorus Allocations by MS4

Table K.M.4. Total phosphorus wasteload allocations for each permitted MS4 and the reaches they drain to.

Municipality	Reach	Area (acres)	Allocation (lbs/year)	Allocation (lbs/day)	Reduction from baseline (%)	Reduction from no-controls (%)
City of Manitowoc	M10	3,630	119	0.326	50	57
City of Manitowoc	M11	273	19	0.052	0	15
City of Manitowoc	M36	2,548	31	0.084	77	80
City of Manitowoc	M37	819	5	0.014	89	91
Town of Sheboygan	M40	61	1	0.003	0	15
City of Sheboygan	M41	143	6	0.017	0	15
Town of Sheboygan	M41	774	33	0.090	0	15
Town of Sheboygan	M42	1,081	19	0.053	54	61
Town of Taycheedah	M43	4,388	0	0.000	81	84
City of Manitowoc	M63	479	4	0.010	70	74
City of Manitowoc	M7	1,163	40	0.109	36	45
City of Manitowoc	M78	41	0	0.000	50	58
City of Manitowoc	M8	108	2	0.006	59	65
City of Manitowoc	M90	539	12	0.033	41	50
City of Two Rivers	M90	687	16	0.043	41	50
City of Manitowoc	M91	145	12	0.034	53	60
City of Manitowoc	M92	1,753	184	0.505	0	15
Town of Sheboygan	M97	8	0	0.000	0	15
City of Manitowoc	M99	31	0	0.001	0	15

Total Phosphorus Allocations by Permitted Point Source

Table K.S.3. Total phosphorus wasteload allocations for each individual permitted point source.

Reach	Permit no.	Outfall no.	Name	Allocation (lbs/year)	Allocation (lbs/day)
S97	50521	3	BAKER CHEESE FACTORY INC.	295	0.8066
S12	23353	1	BELGIUM WASTEWATER TREATMENT FACILITY	753	2.0620
S30	27456	1	BEMIS MANUFACTURING COMPANY - PLANT D	140	0.3824
S9	20711	1	CEDAR GROVE WASTEWATER TRTMNT FACIL	157	0.4301
S20	51535	11	CEDAR VALLEY CHEESE, INC	20	0.0541
S22	31577	1	GIBBSVILLE SANITARY DISTRICT	62	0.1702
S41	21679	1	HOWARDS GROVE WASTEWATER TRTMT FAC	308	0.8424
S44	1759	2	JOHNSONVILLE LLC	247	0.6761
S44	1759	3	JOHNSONVILLE LLC	0.42	0.0011
S46	20141	1	KIEL WASTEWATER TREATMENT FACILITY	4,359	11.9339
S44	29335	4	LAKELAND UNIVERSITY	40	0.1105
S12	817	4	LAKESIDE FOODS, INC. - BELGIUM PLANT	99	0.2701
S100	35963	1	MOUNT CALVARY WASTEWATER TREATMENT FACILITY	93	0.2537
S104	36811	1	ONION RIVER WASTEWATER COMMISSION	42	0.1148
S19	22233	1	OOSTBURG WASTEWATER TREATMENT PLANT	198	0.5429
S86	66681	101	PLASTICS ENGINEERING COMPANY	9.8	0.0267
S34	30031	1	PLYMOUTH UTILITIES WWTF	1,325	3.6290
S27	66699	1	POLY VINYL COMPANY INC	56	0.1536
S34	41904	1	SARTORI COMPANY-WEST MAIN BUILDING	98	0.2675
S48	26867	1	ST CLOUD VILLAGE UTILITY COMMISSION	82	0.2254
S94	22471	1	WALDO WASTEWATER UTILITY	48	0.1309
S10	1589	14	WISCONSIN POWER AND LIGHT EDGEWATER GEN. STATION	0.03	0.0001

Total Phosphorus Allocations by MS4

Table K.S.4. Total phosphorus wasteload allocations for each permitted MS4 and the reaches they drain to.

Municipality	Reach	Area (acres)	Allocation (lbs/year)	Allocation (lbs/day)	Reduction from baseline (%)	Reduction from no-controls (%)
City of Port Washington	S1	2,224	134	0.367	69	73
City of Sheboygan	S10	1,964	72	0.198	57	63
Town of Sheboygan	S10	7	0	0.001	57	63
Town of Wilson	S10	1,262	47	0.127	57	63
Town of Taycheedah	S100	6,423	3	0.008	84	87
Town of Sheboygan	S105	1,497	15	0.041	63	68
Village of Howards Grove	S105	472	5	0.013	63	68
City of Sheboygan	S106	2,374	337	0.922	0	15
Town of Sheboygan	S106	264	37	0.102	0	15
City of Sheboygan	S107	599	86	0.234	0	15
Town of Wilson	S107	51	7	0.020	0	15
City of Sheboygan	S108	121	0	0.001	0	20
Town of Wilson	S108	714	2	0.006	0	20
City of Sheboygan	S11	510	2	0.005	73	77
Town of Wilson	S11	2,953	11	0.031	73	77
City of Port Washington	S110	824	77	0.210	62	67
City of Port Washington	S2	14	0	0.000	90	91
City of Sheboygan	S24	3,123	309	0.846	0	15
City of Sheboygan Falls	S24	224	22	0.061	0	15
Town of Sheboygan	S24	832	82	0.225	0	15
Town of Wilson	S24	32	3	0.009	0	15
Village of Kohler	S24	974	96	0.264	0	15
City of Sheboygan Falls	S25	621	7	0.019	70	74
Town of Wilson	S25	390	4	0.012	70	74
Village of Kohler	S25	22	0	0.001	70	74
City of Sheboygan Falls	S26	568	88	0.241	0	15
City of Sheboygan	S27	113	3	0.008	0	15
City of Sheboygan Falls	S27	698	18	0.049	0	15
Town of Sheboygan	S27	61	2	0.004	0	15
Town of Wilson	S27	4,923	125	0.342	0	15

(continued)

Municipality	Reach	Area (acres)	Allocation (lbs/year)	Allocation (lbs/day)	Reduction from baseline (%)	Reduction from no-controls (%)
Village of Kohler	S27	2,311	59	0.161	0	15
City of Sheboygan Falls	S28	7	0	0.000	79	82
Town of Wilson	S28	2	0	0.000	79	82
City of Sheboygan Falls	S29	284	14	0.039	50	58
City of Sheboygan Falls	S30	1,139	4	0.012	94	95
City of Sheboygan	S40	144	7	0.018	0	15
Town of Sheboygan	S40	308	14	0.039	0	15
Village of Howards Grove	S41	562	14	0.040	77	81
Village of Howards Grove	S42	406	6	0.017	85	87
Town of Sheboygan	S43	405	5	0.013	75	79
Village of Kohler	S43	196	2	0.006	75	79
City of Sheboygan	S86	680	43	0.118	0	15
Town of Sheboygan	S86	1,493	94	0.258	0	15
Village of Kohler	S86	38	2	0.007	0	15

<u>Attachment #6:</u> Total suspended solid WLAs for individual permittees (WPDES) in the NELW

Appendix L – Table L.K.3: Total suspended solid wasteload allocations for individual permitted point sources in the Kewaunee River Subbasin

Appendix L – Table L.K.4: Total suspended solid wasteload allocations for MS4 permittees in the Kewaunee River Subbasin

Appendix L – Table L.M.3: Total suspended solid wasteload allocations for individual permitted point sources in the Manitowoc River Subbasin

Appendix L – Table L.M.4: Total suspended solid wasteload allocations for MS4 permittees in the Manitowoc River Subbasin

Appendix L – Table L.S.3: Total suspended solid wasteload allocations for individual permitted point sources in the Sheboygan River Subbasin

Appendix L – Table L.S.4: Total suspended solid wasteload allocations for MS4 permittees in the Sheboygan River Subbasin

NOTE: *There is a "DRAFT" watermark behind all of the Appendix L Tables. EPA recognizes the Appendix L tables enclosed in Attachment #6 as the <u>final</u> NEL total suspended solid wasteload allocations.*

Total Suspended Solids Allocations by Permitted Point Source

Table L.K.3. Total suspended solids wasteload allocations for each individual permitted point source.

Reach	Permit no.	Outfall no.	Name	Allocation (lbs/year)	Allocation (lbs/day)
TSS_K2	50237	9	AGROPUR INC. - LUXEMBURG	41,387	113.3127
TSS_K44	20745	1	ALGOMA WASTEWATER TREATMENT FACILITY	36,578	100.1447
TSS_K1	51128	7	BELGIOIOSO CHEESE, INC. - DENMARK	23,332	63.8786
TSS_K31	23566	1	CASCO WASTEWATER TREATMENT FACILITY	6,547	17.9259
TSS_K1	21741	1	DENMARK WASTEWATER TREATMENT FACILITY	35,573	97.3942
TSS_K44	28894	1	FORESTVILLE WASTEWATER TREATMENT FACILITY	10,916	29.8852
TSS_K31	20176	1	KEWAUNEE WASTEWATER TREATMENT FACILITY	49,332	135.0630
TSS_K1	35874	1	KOSSUTH SANITARY DISTRICT NO. 2 WWTF	1,990	5.4493
TSS_K1	61051	2	MARIBEL WASTEWATER TREATMENT FACILITY	2,355	6.4467
TSS_K1	64629	6	NEW ORGANIC DIGESTION LLC	8.7	0.0239

Total Suspended Solids Allocations by MS4

Table L.K.4. Total suspended solids wasteload allocations for each permitted MS4 and the reaches they drain to.

Municipality	Reach	Area (acres)	Allocation (lbs/year)	Allocation (lbs/day)	Reduction from baseline (%)	Reduction from no-controls (%)
City of Manitowoc	TSS_K1	11	30	0.082	20	36
City of Two Rivers	TSS_K1	1,806	5,010	13.717	20	36
City of Two Rivers	TSS_K2	1,099	5,866	16.060	0	20
City of Two Rivers	TSS_K23	404	1,396	3.823	0	20
City of Two Rivers	TSS_K112	144	2,922	8.000	0	20

Total Suspended Solids Allocations by Permitted Point Source

Table L.M.3. Total suspended solids wasteload allocations for each individual permitted point source.

Reach	Permit no.	Outfall no.	Name	Allocation (lbs/year)	Allocation (lbs/day)
TSS_M10	66257	1	BRIESS MALT AND INGREDIENTS CO	29,122	79.7319
TSS_M10	20443	1	BRILLION WASTEWATER TREATMENT FACILITY	25,897	70.9025
TSS_M27	22799	2	CHILTON WASTEWATER TREATMENT FACILITY	43,491	119.0721
TSS_M10	36030	1	CLARKS MILLS SANITARY DISTRICT	973	2.6641
TSS_M26	21270	1	HILBERT WASTEWATER TREATMENT FACILITY	11,924	32.6472
TSS_M7	28142	1	HOLY FAMILY CONVENT WASTEWATER TREATMENT FAC	1,536	4.2061
TSS_M79	795	1	KOHLER COMPANY POWER SYSTEMS AMERICAS	1,073	2.9389
TSS_M12	36773	1	MORRISON SANITARY DISTRICT NO 1	1,910	5.2288
TSS_M27	20893	1	NEW HOLSTEIN WASTEWATER TREATMENT FACILITY	48,649	133.1925
TSS_M4	42650	1	NEWTON MEATS AND SAUSAGE	4.7	0.0128
TSS_M26	29025	1	POTTER WASTEWATER TREATMENT FACILITY	1,617	4.4260
TSS_M10	21342	2	REEDSVILLE WASTEWATER TREATMENT FACILITY	11,241	30.7771
TSS_M10	22802	1	ROCKLAND SD1 WASTEWATER TREATMENT FACILITY	1,351	3.7002
TSS_M10	22195	1	ST NAZIANZ WASTEWATER TREATMENT FACILITY	7,316	20.0289
TSS_M27	27618	1	TILLAMOOK WISCONSIN LLC	9,828	26.9088
TSS_M10	21831	1	VALDERS WASTEWATER TREATMENT FACILITY	10,159	27.8131
TSS_M12	22047	1	WHITELAW WASTEWATER TREATMENT FACILITY	4,841	13.2529

Total Suspended Solids Allocations by MS4

Table L.M.4. Total suspended solids wasteload allocations for each permitted MS4 and the reaches they drain to.

Municipality	Reach	Area (acres)	Allocation (lbs/year)	Allocation (lbs/day)	Reduction from baseline (%)	Reduction from no-controls (%)
City of Manitowoc	TSS_M7	1,790	3,842	10.518	74	79
City of Manitowoc	TSS_M10	3,904	10,378	28.413	70	76
Town of Taycheedah	TSS_M27	4,388	27	0.073	71	77
City of Manitowoc	TSS_M36	3,367	9,944	27.226	58	67
City of Sheboygan	TSS_M40	143	415	1.136	59	67
Town of Sheboygan	TSS_M40	1,916	5,546	15.183	59	67
City of Manitowoc	TSS_M90	539	2,506	6.860	0	20
City of Two Rivers	TSS_M90	687	3,190	8.734	0	20
City of Manitowoc	TSS_M91	145	4,499	12.317	37	50
City of Manitowoc	TSS_M92	1,753	26,449	72.414	0	20
Town of Sheboygan	TSS_M97	8	66	0.180	0	20
City of Manitowoc	TSS_M99	31	71	0.195	13	31

Total Suspended Solids Allocations by Permitted Point Source

Table L.S.3. Total suspended solids wasteload allocations for each individual permitted point source.

Reach	Permit no.	Outfall no.	Name	Allocation (lbs/year)	Allocation (lbs/day)
TSS_S29	50521	3	BAKER CHEESE FACTORY INC.	10,932	29.9311
TSS_S25	23353	1	BELGIUM WASTEWATER TREATMENT FACILITY	23,044	63.0912
TSS_S24	27456	1	BEMIS MANUFACTURING COMPANY - PLANT D	16,762	45.8913
TSS_S9	20711	1	CEDAR GROVE WASTEWATER TRTMNT FACIL	14,631	40.0579
TSS_S1	51535	11	CEDAR VALLEY CHEESE, INC	3,160	8.6505
TSS_S25	31577	1	GIBBSVILLE SANITARY DISTRICT	2,562	7.0147
TSS_S40	21679	1	HOWARDS GROVE WASTEWATER TRTMT FAC	16,339	44.7342
TSS_S24	1759	2	JOHNSONVILLE LLC	18,572	50.8468
TSS_S24	1759	3	JOHNSONVILLE LLC	32	0.0863
TSS_S24	20141	1	KIEL WASTEWATER TREATMENT FACILITY	52,306	143.2070
TSS_S24	29335	4	LAKELAND UNIVERSITY	7,073	19.3639
TSS_S25	817	4	LAKESIDE FOODS, INC. - BELGIUM PLANT	3,019	8.2644
TSS_S24	35963	1	MOUNT CALVARY WASTEWATER TREATMENT FACILITY	11,089	30.3601
TSS_S25	36811	1	ONION RIVER WASTEWATER COMMISSION	6,137	16.8014
TSS_S10	22233	1	OOSTBURG WASTEWATER TREATMENT PLANT	26,824	73.4395
TSS_S40	66681	101	PLASTICS ENGINEERING COMPANY	509	1.3933
TSS_S29	30031	1	PLYMOUTH UTILITIES WWTF	70,711	193.5956
TSS_S24	66699	1	POLY VINYL COMPANY INC	2,434	6.6627
TSS_S29	41904	1	SARTORI COMPANY-WEST MAIN BUILDING	5,212	14.2701
TSS_S24	26867	1	ST CLOUD VILLAGE UTILITY COMMISSION	4,604	12.6046
TSS_S25	22471	1	WALDO WASTEWATER UTILITY	3,892	10.6551
TSS_S10	1589	14	WISCONSIN POWER AND LIGHT EDGEWATER GEN. STATION	3.5	0.0095

Total Suspended Solids Allocations by MS4

Table L.S.4. Total suspended solids wasteload allocations for each permitted MS4 and the reaches they drain to.

Municipality	Reach	Area (acres)	Allocation (lbs/year)	Allocation (lbs/day)	Reduction from baseline (%)	Reduction from no-controls (%)
City of Port Washington	TSS_S1	2,238	24,953	68.319	57	66
City of Sheboygan	TSS_S10	2,474	3,071	8.408	0	20
Town of Sheboygan	TSS_S10	7	9	0.025	0	20
Town of Wilson	TSS_S10	4,215	5,232	14.324	0	20
City of Sheboygan	TSS_S24	3,236	5,369	14.700	7	25
City of Sheboygan Falls	TSS_S24	2,630	4,363	11.946	7	25
Town of Sheboygan	TSS_S24	892	1,481	4.054	7	25
Town of Taycheedah	TSS_S24	6,423	10,658	29.180	7	25
Town of Wilson	TSS_S24	4,954	8,221	22.507	7	25
Village of Kohler	TSS_S24	3,285	5,451	14.923	7	25
City of Sheboygan Falls	TSS_S25	628	1,402	3.839	57	66
Town of Wilson	TSS_S25	392	875	2.396	57	66
Village of Kohler	TSS_S25	22	50	0.137	57	66
City of Sheboygan Falls	TSS_S29	284	2,400	6.571	28	42
City of Sheboygan	TSS_S40	824	2,494	6.828	56	65
Town of Sheboygan	TSS_S40	3,703	11,200	30.664	56	65
Village of Howards Grove	TSS_S40	1,440	4,356	11.926	56	65
Village of Kohler	TSS_S40	234	706	1.934	56	65
City of Sheboygan	TSS_S106	2,374	23,798	65.155	0	20
Town of Sheboygan	TSS_S106	264	2,643	7.235	0	20
City of Sheboygan	TSS_S107	599	9,008	24.663	0	20
Town of Wilson	TSS_S107	51	769	2.107	0	20
City of Sheboygan	TSS_S108	121	131	0.359	7	26
Town of Wilson	TSS_S108	714	772	2.115	7	26
City of Port Washington	TSS_S110	824	14,934	40.887	49	59