TMDL: Milwaukee River Watershed TMDL, Dodge, Fond du Lac, Sheboygan, Ozaukee, Washington, Waukesha, and Milwaukee Counties, WI
Date: March 9, 2018

DECISION DOCUMENT FOR THE MILWAUKEE RIVER WATERSHED TMDL, WI

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

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

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

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

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

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

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

Comment:

Location Description/Spatial Extent:

The Wisconsin Department of Natural Resources (WDNR) has submitted a TMDL to address water quality impairments in the Milwaukee River basin. The Milwaukee River basin TMDL project was initiated by the Milwaukee Metropolitan Sewerage District (MMSD) as a "third-party" TMDL. MMSD applied for and received grant money under the EPA Great Lakes Restoration Initiative, and using contracting assistance, developed the TMDL in conjunction with the WDNR and EPA.

The Milwaukee River basin is located in Dodge, Fond du Lac, Sheboygan, Ozaukee, Washington, Waukesha, and Milwaukee Counties, Wisconsin, near Lake Michigan (Figure 1-1 of the TMDL). The basin consists of three watersheds: the Milwaukee River, the Menomonee River, and the Kinnickinnic River. Additionally, the TMDL addresses the Milwaukee River Estuary, where the three rivers join and enter Lake Michigan.

The Milwaukee River watershed is approximately 700 square miles, covering much of the northern portion of the basin. There are four subwatersheds (HUC-12): Cedar Creek, Milwaukee River North, Milwaukee River East-West, and Milwaukee River South. The upper reaches drain forest, and agriculture, with limited urban areas. The lower reaches are highly urbanized, and significant hydrological modification has occurred. Several dams are present, as well as significant portions that have been straightened and lined with concrete.

The Menomonee River watershed is located in the southwestern portion of the basin. The Menomonee River watershed is approximately 137 square miles, and drains into the Milwaukee Estuary. The watershed has been significantly modified, with 36 dams present and significant portions of the river channelized and lined with concrete. Little agricultural land remains in the headwaters.

The Kinnickinnic River watershed is located in the southern portion of the basin, and is the smallest watershed, covers 20 square miles, and flows only 8 miles. The watershed is highly urbanized, and has been highly modified. Over 40% of the watershed is impervious cover, and over 60% of the streams are either concrete-lined or in enclosed channels.

The Milwaukee Estuary is located in the eastern end of the basin. The three rivers flow into the estuary. The estuary includes the inner harbor area, which includes the lowermost portions of the rivers, and the outer harbor area, which extends from the shoreline to the breakwall, approximately 3000-3500 feet from the mouth of the harbor. The watershed is highly urbanized, although there are several parks along the shoreline (Figure 1-5 of the TMDL). The hydrology of the estuary is complex, as the three rivers flow into the inner harbor, and lake levels vary, contributing to flow into and out of the estuary.

The TMDL addresses 44 segments impaired due excess nutrients, total suspended solids, and fecal coliform. WDNR also identified several other impairments in Table 1 of this Decision Document (i.e., low DO, degraded biological community, temperature) that will also be addressed by reductions in TSS, TP, and bacteria (Section 1.1 of the TMDL). Table 1 of this Decision Document identifies the waterbodies with approved TMDLs (Table 1-1 and Figures 1-13 to 1-16 of the TMDL). Allocations were also calculated for the non-impaired waterbodies as noted in Appendix B (TMDL Reach and Subbasin map) and Table A.12 in Appendix A of the TMDL. These allocations are considered protection strategies as described in the "A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program".

Table 1: Approved 2014 303(d)-Listed Segments Included in the Milwaukee River Basin

Waterbody	Description	Representative TMDL Reach	Pollutants	Impairments
Menomonee River Watershed				
Butler Ditch	Mile 0-2.90	MN-08	Fecal Coliform	Recreational Restrictions – Pathogens
Goldenthal Creek	Mile 0-3.50	MN-03	Fecal Coliform	Recreational Restrictions – Pathogens
Honey Creek	Mile 0-8.96	MN-15	Fecal Coliform, Total Phosphorus	Recreational Restrictions – Pathogens, Degraded Biological Community
Lily Creek	Mile 0-4.70	MN-07	Fecal Coliform	Recreational Restrictions – Pathogens
Little Menomonee River	Mile 0-9	MN-09	Fecal Coliform, Total Phosphorus	Recreational Restrictions – Pathogens, Degraded Biological Community
Menomonee River Mile	2.2-2.67	MN-16	*E. coli*, Fecal Coliform, Total Phosphorus	Recreational Restrictions – Pathogens, Low DO
Menomonee River	Mile 2.66-6.27	MN-16	Fecal Coliform	Recreational Restrictions – Pathogens
Menomonee River	Mile 6.27-30.14	MN-1, MN-6, MN-10, MN-14, MN-16	Total Phosphorus	Impairment Unknown
Nor-X-Way Channel	Mile 0-4.90	MN-05	Fecal Coliform, Total Phosphorus	Recreational Restrictions – Pathogens, Water Quality Use Restrictions
South Branch Underwood Creek	Mile 0-1.00	MN-13	Total Phosphorus	Degraded Biological Community
Underwood Creek	Mile 0-2.84	MN-12	Fecal Coliform	Recreational Restrictions – Pathogens, Degraded Biological Community
Underwood Creek	Mile 2.84-8.54	MN-11, MN-12	Fecal Coliform	Recreational Restrictions – Pathogens, Degraded Biological Community
West Branch Menomonee River	Mile 0-2.45	MN-02	Fecal Coliform	Recreational Restrictions – Pathogens
Willow Creek	Mile 0-2.80	MN-04	Fecal Coliform	Recreational Restrictions – Pathogens

Kinnickinnic River Watershed				
Cherokee Creek	Mile 0-1.60	KK-6	Fecal Coliform	Recreational Restrictions – Pathogens
Holmes Avenue Creek	Mile 0-1.80	KK-5	Fecal Coliform	Recreational Restrictions – Pathogens
Kinnickinnic River	Mile 2.4-2.83	KK-7	*E. coli*, Fecal Coliform, Total Phosphorus	Recreational Restrictions – Pathogens, Low DO, Degraded Biological Community
Kinnickinnic River	Mile 2.84-9.94	KK-1, KK-2, KK-7	Fecal Coliform, Total Phosphorus	Recreational Restrictions – Pathogens, Degraded Biological Community
South 43rd Street Ditch	Mile 0-1.16	KK-3	Fecal Coliform, Total Phosphorus	Recreational Restrictions – Pathogens, Degraded Biological Community
Wilson Park Creek	Mile 0-3.5	KK-4	Fecal Coliform	Recreational Restrictions – Pathogens
Wilson Park Creek	Mile 3.5-5.5	KK-4	Fecal Coliform	Recreational Restrictions – Pathogens
Milwaukee River Watershed				
Adell Tributary	Mile 0-4.96	MI-09	Sediment/TSS	Degraded Habitat
Batavia Creek	Mile 0-4.1	MI-10	Total Phosphorus	Impairment Unknown
Beaver Creek	Mile 0-2.69	MI-28	Total Phosphorus	Impairment Unknown
Cedar Creek	Mile 5.01-32.71	MI-21, MI-22, MI-24	Total Phosphorus	Impairment Unknown
Evergreen Creek	Mile 0-5.21	MI-23	Sediment/TSS	Degraded Habitat
Fredonia Creek	Mile 0-4.2	MI-15	Total Phosphorus	Impairment Unknown
Indian Creek	Mile 0-2.63	MI-30	Total Phosphorus, Sediment/TSS	Low DO, Degraded Biological Community, Elevated Water Temperature, Degraded Habitat
Jackson Creek	Mile 0-1.25	MI-20	Sediment/TSS	Degraded Habitat
Lehner Creek	Mile 0-2.12	MI-19	Sediment/TSS	Elevated Water Temperature, Degraded Habitat
Lincoln Creek	Mile 0-9.70	MI-31	Total Phosphorus, Sediment/TSS	Low DO, Degraded Biological Community, Elevated Water Temperature, Degraded Habitat
Milwaukee River	Mile 3.1-19.35	MI-27, MI-32	*E. coli*, Total Phosphorus	Recreational Restrictions – Pathogens, Impairment Unknown
Milwaukee River	Mile 19.35-29.33	MI-17, MI-25	*E. coli*	Recreational Restrictions – Pathogens
Milwaukee River	Mile 29.33-68.5	MI-6, MI-7, MI-15, MI-16, MI-17	Total Phosphorus	Impairment Unknown
Milwaukee River North Branch	Mile 0-23.5	MI-08, MI-10, MI-13	Total Phosphorus	Degraded Biological Community
Mink Creek	Mile 0-13.2	MI-12	Total Phosphorus	Impairment Unknown
South Branch Creek	Mile 0-2.36	MI-29	Total Phosphorus, Sediment/TSS	Degraded Biological Community, Degraded Habitat

Ulao Creek	Mile 0-8.6	MI-25	Total Phosphorus	Degraded Biological Community
Un. Creek (Trinity Creek) (T09n R21e Se Ne 35)	Mile 0-3.1	MI-27	Total Phosphorus	Impairment Unknown
Estuary				
Menomonee River	Mile 0-2.2	Estuary	*E. coli*, Fecal Coliform, Total Phosphorus	Recreational Restrictions – Pathogens, Low DO
Kinnickinnic River	Mile 0-2.4	Estuary	*E. coli*, Fecal Coliform, Total Phosphorus	Recreational Restrictions – Pathogens, Low DO, Degraded Biological Community
Milwaukee River Estuary	Mile 0-2.9	Milwaukee	*E. coli*, Total Phosphorus	Recreational Restrictions – Pathogens, Low DO
Milwaukee River	Mile 2.9-3.1	Estuary	*E. coli*, Total Phosphorus	Recreational Restrictions – Pathogens, Impairment Unknown
Outer Harbor	Mile 0-0.32	Estuary	*E. coli*	Recreational Restrictions – Pathogens

Land Use:
The Milwaukee River basin is mainly urbanized land, with a mixture of forest, grassland, and agricultural land in the northern portion. The land uses for the watersheds are in Tables 2-4 of this Decision Document. WDNR noted that the future land use profile will include increases in urbanized land in the watersheds. WDNR used the 2020 land use projections to develop the source assessments and quantification of loads.

About 79% of the Milwaukee River watershed is rural, with significant urbanization in the southern (downstream) portion. The watershed is expected to continue to urbanize in the future. The population in the watershed is approximately 480,000 (in 2000). Table 2 of this Decision Document lists the land use information for the Milwaukee River watershed.

Table 2: Land use in the Milwaukee River watershed

Category	Square miles	Percent of total
Urban		
Residential	71.64	10.2
Commercial	6.32	0.9
Industrial and extractive	8.89	1.3
Transportation, communication, and utilities	44.54	6.3
Governmental and Institutional	6.9	1.0
Recreation	10.30	1.5
subtotal	148.58	21.2
Rural		
Agricultural and related	342.45	48.9
Water	12.05	1.7
Wetlands	104.86	15.0
Woodlands	62.24	8.9
Unused and other open lands	29.81	4.3

subtotal	551.42	78.8
Total	700.00	100

The Menomonee River watershed covers 136 square miles, and about two thirds (63%) is urban. Approximately 320,000 people live in the watershed, and much of the rural land has been converted to residential land (Figure 2-2 of the TMDL). Table 3 of this Decision Document contains the land use information for the Menomonee River.

Table 3: Land use in the Menomonee River watershed

Category	Square miles	Percent of total
Urban		
Residential	40.5	29.8
Commercial	5.5	4.0
Industrial and extractive	6.9	5.1
Transportation, communication, and utilities	22.7	16.8
Governmental and Institutional	5.7	4.2
Recreation	5.3	3.9
subtotal	86.72	63.8
Rural		
Agricultural and related	23.4	17.2
Water	0.8	0.5
Wetlands	10.6	7.8
Woodlands	3.3	2.4
Unused and other open lands	11.0	8.1
subtotal	49.1	36.2
Total	135.8	100

The Kinnickinnic River is approximately 25 square miles in size, and is almost completely urbanized. The population of the watershed is approximately 150,000. The remaining open lands in the watershed surround the Mitchell International Airport. Table 4 of this Decision Document contains the land use information for the Kinnickinnic River.

Table 4: Land use in the Kinnickinnic River watershed

Category	Square miles	Percent of total
Urban		
Residential	8.8	34.6
Commercial	1.5	5.9
Industrial and extractive	1.9	7.5
Transportation, communication, and utilities	8.3	32.7
Governmental and Institutional	1.9	7.5
Recreation	1.1	4.3
subtotal	23.5	92.5
Rural		
Agricultural and related	0.1	0.4
Water	0.2	0.8

Wetlands	0.1	0.4
Woodlands	0.1	0.4
Unused and other open lands	1.4	5.5
subtotal	1.9	7.5
Total	25.4	100

The Milwaukee Estuary watershed is approximately 16 square miles in size. Detailed land use information is not available, as the watershed does not correspond to the regional planning efforts in the region. The watershed is essentially 100% urban.

Problem Identification:
All the waterbodies in Table 1 of this Decision Document are on the 2014 WDNR 303(d) list of impaired waters. Considerable water quality data has been collected in the Milwaukee River Basin from a variety of sources, including the Milwaukee Metropolitan Sewerage District (MMSD), WDNR, United States Geological Survey (USGS), and the USEPA. The data were summarized in the Southeastern Wisconsin Regional Planning Commission (SEWRPC) 2007 Technical Report No. 39 *Water Quality Conditions and Sources on Pollution in the Greater Milwaukee Watersheds* (TR-39).

Phosphorus:
Milwaukee River: The Milwaukee River mainstem regularly exceeded the TP criteria. Attainment of the criteria (0.1 mg/L TP) was more common in the most upstream portion of the watershed, and the most downstream portion of the river, where inflow from the estuary occurs. The long-term average of TP was 0.129 mg/L, with a maximum value of 1.920 mg/L (Section 2.1.3 of the TMDL). Monitoring has occurred throughout the watershed, but most consistently along the mainstem and the five major tributaries. Table 31 of PR-50 lists the monitoring sites reviewed during the SEWRPC monitoring program.

Menomonee River: The Menomonee River also regularly exceeded the TP criteria. The long-term average for TP was 0.116 mg/L, with a maximum of 3.0 mg/L (page 1-19 of the TMDL). Monitoring has occurred throughout the watershed, but most consistently along the mainstem. Table 31 of PR-50 lists the monitoring sites reviewed during the SEWRPC monitoring program.

Kinnickinnic River: The long-term average for TP was not exceeded in the River (0.095 mg/L). However, WDNR noted that there were numerous exceedences of the criteria, and the maximum value was 2.780 mg/L. Monitoring has occurred throughout the watershed, but most consistently along the mainstem. Table 31 of PR-50 lists the monitoring sites reviewed during the SEWRPC monitoring program.

Milwaukee River Estuary: The Milwaukee River Estuary showed similar exceedences as the rivers; the average concentration was 0.115 mg/L, with a maximum of 3.880 mg/L. Monitoring has occurred throughout the estuary. Table 31 of PR-50 lists the monitoring sites reviewed during the SEWRPC monitoring program.

Total Suspended Solids (TSS)
Milwaukee River Watershed: WDNR developed a target of 12 mg/L for TSS in the Basin (discussed further in Section 2 of this Decision Document). The average concentration for TSS was 25.1 mg/L. There was considerable variation in TSS values; from 1.2 mg/L to 892 mg/L. WDNR noted that TSS values have increased over time in the watershed (Section 2.2.2.3 of the TMDL).

Menomonee River Watershed : The average concentration of TSS in the Menomonee River was 21.4 mg/L. As in the Milwaukee River, there was considerable variability in the values, with a maximum TSS value of 727 mg/L. Spring values were historically greater in the Menomonee River.

Kinnickinnic River Watershed: Similar to the other rivers, the Kinnickinnic River had an average TSS concentration of 20.5 mg/L, with considerable variability in the values. The values ranged up to 1,400 mg/L. Variability decreased downstream, possibly reflecting the high amount of concrete channelization along the river.

Milwaukee Estuary: The average TSS concentration in the estuary watershed was 22.1 mg/L, with values ranging up to 892 mg/L. The estuary portion of the Milwaukee River was slightly higher on a consistent basis than the other two rivers (Section 2.2.2.4 of the TMDL).

Fecal coliform:
As discussed in Section 2 of this Decision Document, the current WDNR water quality standard for bacteria is based upon fecal coliform. WDNR noted that many states are moving or have moved to *E. coli* as the bacteria of concern. Many monitoring programs are sampling for *E. coli*, and WDNR noted that trends are similar for either bacteria.

Milwaukee River Watershed: Exceedences of the fecal coliform criteria are common in the Milwaukee River, with results as high as 1,100,000 cfu/100 mL.

Menomonee River Watershed: Exceedences of the fecal coliform criteria are common in the Menomonee River, with counts as high as 2,000,000 cfu/100 mL.

Kinnickinnic River Watershed: Exceedences of the fecal coliform criteria are common in the Kinnickinnic River, with counts as high as 1,000,000 cfu/100 mL.

Milwaukee Estuary: Exceedences of the fecal coliform criteria are common in the Milwaukee Estuary, with counts as high as 2,400,000 cfu/100 mL. MMSD and WDNR have also sampled for *E. coli* in the estuary, as beach criteria are for *E. coli*. Exceedences of the *E. coli* criteria are also consistent in the estuary (Section 2.2.3.4 of the TMDL)

Pollutants of Concern:
The pollutants of concern are fecal coliform, TP, and TSS.

Pollutants:
E. coli: Bacteria exceedances can negatively impact recreational uses (fishing, swimming, wading, boating, etc.) and public health. At elevated levels, bacteria may cause illness within humans who have contact with or ingest bacteria laden water. Recreation-based contact can lead to ear, nose, and throat infections, and stomach illness.

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

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

TSS: TSS is a measurement of the sediment and organic material that inhibits natural light from penetrating the surface water column. Excessive sediment and organic material within the water column can negatively impact fish and macroinvertebrates within the ecosystem. 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 (ex. food processing).

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 (swimming, boating, fishing, etc.). Algal decomposition depletes oxygen levels which stresses benthic macroinvertebrates and fish. Excess algae can shade the water column and limit the distribution of aquatic vegetation. Established aquatic vegetation stabilizes bottom sediments and provides important habitat areas for healthy macroinvertebrates and fish communities.

Source Identification (point and nonpoint sources):
Milwaukee River Watershed:
Point Source Identification: WDNR identified twelve public and two private wastewater treatment facilities (WWTF) discharging into streams in the Milwaukee River watershed. (Section 2.1.3.3 of the TMDL). Approximately 21% of the watershed is served by public sewer systems. These facilities disinfect their wastestreams, and therefore are not considered a significant source of bacteria to the watershed. The facilities do discharge TP and TSS.

WDNR noted that there are 65 combined sewer overflow (CSO) outfalls in the Milwaukee River watershed. CSO discharges contain mixed wastewater and stormwater discharges that occur under extreme storm events, and contain bacteria, TP, and TSS. WDNR explained that the number of CSO events system-wide has been reduced from 50 events a year in the early 1990's to less than three events per year. WDNR also identified sanitary sewer overflows (SSO) as a source of bacteria in the watershed. SSOs are overflows of untreated sanitary waste primarily occurring during severe storm events. WDNR explained that the number of SSO events has dropped over time. Since SSOs are illicit discharges, no allocations have been assigned to these sources.

WDNR also identified numerous Municipal Separate Storm Sewer Systems (MS4) in the watershed (Table 4-2 of the TMDL). Bacteria, TP, and TSS can enter the systems after being washed off the surface. Pet and wildlife (i.e., geese) waste are often the source of bacteria and phosphorus in urban areas. Improper connections between sanitary lines and stormwater lines can be a source of bacteria and phosphorus as well. Studies noted by WDNR suggest that illicit connects can be a source of bacteria (Figure 1-12 of the TMDL). High flow rates in the streams can erode streambanks and contribute large amounts of sediment and TSS to the waterbodies.

Several concentrated animal feeding operations (CAFOs) were identified in the Milwaukee River watershed (Table 4-3 of the TMDL). CAFOs are generally defined as having over 1000 animal units confined for more than 45 days in a year. Under WDNR NPDES permit requirements, discharges of pollutants are not allowed except under extreme circumstances (24-hour storm duration exceeding the 25-year recurrence interval), and therefore no allocation was developed for the manure-handling facilities. Runoff from the spreading of manure in agronomic rates is not regulated as a point source discharge, and is therefore considered in the non-point source load discussed below.

WDNR identified non-contact cooling water (NCCW) as a source of TP in the watershed. WDNR explained that numerous industrial facilities utilize drinking water to operate their cooling systems. Drinking water is often treated with orthophosphate to coat the water pipes to prevent the release of lead. This water is then discharged to a nearby waterbody after use. Because there are a significant number of NCCW dischargers in the watershed, WDNR calculated the loadings of TP from this source.

Table 5 at the end of this Decision Document (Table 4-1 of the TMDL) lists the point sources within the Milwaukee River watershed. The locations of the point sources (including MS4s) are in Appendix B of the TMDL.

Nonpoint Source Identification: The potential nonpoint sources for the Milwaukee River watershed TMDLs are:

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

Stormwater from agricultural land use practices and feedlots near surface waters: Smaller animal feeding operations in close proximity to surface waters can be a source of bacteria, TP, and TSS to water bodies in the Milwaukee River watershed. These areas may contribute pollutants via the mobilization and transportation of pollutant laden waters from feeding, holding and manure storage sites. Runoff from agricultural lands may contain significant amounts of bacteria, TP, and TSS which may lead to impairments in the watersheds. Feedlots generate manure which may be spread onto fields. Runoff from fields with spread manure can be exacerbated by tile drainage lines, which channelize the stormwater flows and reduce the time available for bacteria to die-off.

Wildlife: Wildlife is a known source of bacteria and TP in water bodies as many animals spend time in or around water bodies. Deer, geese, ducks, raccoons, and other animals all create potential sources of bacteria. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as park areas, forest, and rural areas.

Failing septic systems: WDNR noted that failing septic systems, where waste material can pond at the surface and eventually flow into the waterbodies or be washed in during precipitation events, are potential sources of bacteria and TP. Approximately 79% of the watershed is rural, and failing septic systems are noted as a source of pollutants in the watershed.

Menomonee River Watershed:
Point Source Identification: WDNR noted that there are no public or private WWTFs discharging into the Menomonee River watershed. Although 77% of the watershed is served by public sewer systems, they are connected to WWTFs that discharge outside the Menomonee River watershed.

WDNR identified 28 CSO outfalls in the Menomonee River watershed. CSO discharges contain mixed wastewater and stormwater discharges that occur under extreme storm events. WDNR explained that the number of CSO events system-wide has been reduced from 50 events a year in the early 1990's to less than three events per year. WDNR also identified sanitary sewer overflows (SSO) as a source of bacteria in the watershed. SSOs are overflows of untreated sanitary waste primarily occurring during severe storm events. WDNR explained that the number of SSO events have dropped over time. Since SSOs are illicit discharges, no allocations have been assigned.

WDNR also identified numerous MS4s in the watershed (Table 4-2 of the TMDL). Bacteria, TP, and TSS can enter the systems after being washed off the surface. Pet and wildlife (i.e., geese) waste are often the source of bacteria and phosphorus in urban areas. Improper connections between sanitary lines and stormwater lines can be a source of bacteria and phosphorus as well. Studies noted by WDNR suggest that illicit connects can be a source of bacteria (Figure 1-12 of the TMDL). High flows rates in the streams can erode streambanks and contribute large amounts of sediment and TSS to the waterbodies.

WDNR identified NCCW as a source of TP in the watershed. WDNR explained that numerous industrial facilities utilize drinking water to operate their cooling systems. Drinking water is often treated with orthophosphate to coat the water pipes to prevent the release of lead. This water is then discharged to a nearby waterbody after use. Because there are a significant number of NCCW dischargers in the watershed, WDNR calculated the loadings of TP from this source.

Table 5 at the end of this Decision Document (Table 4-1 of the TMDL) lists the point sources within the Menomonee River watershed. The locations of the point sources (including MS4s) are in Appendix B of the TMDL.

Nonpoint Source Identification: The potential nonpoint sources for the Menomonee River watershed TMDLs are:

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

Stormwater from agricultural land use practices and feedlots near surface waters: Smaller animal feeding operations in close proximity to surface waters can be a source of bacteria, TP, and TSS to water bodies in the Menomonee River watershed. These areas may contribute bacteria via the mobilization and transportation of pollutant laden waters from feeding, holding and manure storage sites. Runoff from agricultural lands may contain significant amounts of bacteria, TSS, and TP which may lead to impairments in the watersheds. Feedlots generate manure which may be spread onto fields. Runoff from fields with spread manure can be exacerbated by tile drainage lines, which channelize the stormwater flows and reduce the time available for bacteria to die-off.

Wildlife: Wildlife is a known source of bacteria and phosphorus in water bodies as many animals spend time in or around water bodies. Deer, geese, ducks, raccoons, and other animals all create potential sources of bacteria. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as park areas, forest, and rural areas.

Failing septic systems: WDNR noted that failing septic systems, where waste material can pond at the surface and eventually flow into the waterbodies or be washed in during precipitation events, are potential sources of bacteria and TP. Approximately 36% of the watershed is rural, and failing septic systems are noted as a source of pollutants in the watershed.

Kinnickinnic River Watershed:
Point Source Identification: WDNR determined that there are no public or private WWTFs discharging into the Kinnickinnic River watershed. The entire watershed is within the MMSD sewer service area, and the discharges are outside the Kinnickinnic River watershed.

WDNR noted that there are 26 CSO outfalls in the Kinnickinnic River watershed. CSO discharges contain mixed wastewater and stormwater discharges that occur under extreme storm events. WDNR explained that the number of CSO events system-wide has been reduced from 50 events a year in the early 1990's to less than three events per year. WDNR also identified sanitary sewer overflows (SSO) as a source of bacteria in the watershed. SSOs are overflows of untreated sanitary waste primarily occurring during severe storm events. WDNR explained that the number of SSO events have dropped over time. Since SSOs are illicit discharges, no allocations have been assigned.

WDNR also identified numerous MS4s in the watershed (Table 4-2 of the TMDL). Bacteria, TP, and TSS can enter the systems after being washed off the surface. Pet and wildlife (i.e., geese) waste are often the source of bacteria and phosphorus in urban areas. Improper connections between sanitary lines and stormwater lines can be a source of bacteria and phosphorus as well. Studies noted by WDNR suggest that illicit connects can be a source of bacteria (Figure 1-12 of the TMDL). High flow rates in the streams can erode streambanks and contribute large amounts of sediment and TSS to the waterbodies.

WDNR identified NCCW as a source of TP in the watershed. WDNR explained that numerous industrial facilities utilize drinking water to operate their cooling systems. Drinking water is often treated with orthophosphate to coat the water pipes to prevent the release of lead. This water is then discharged to a nearby waterbody after use. Because there are a significant number of NCCW dischargers in the watershed, WDNR calculated the loadings of TP from this source.

Table 5 at the end of this Decision Document (Table 4-1 of the TMDL) lists the point sources within the Kinnickinnic River watershed. The locations of the point sources (including MS4s) are in Appendix B of the TMDL.

Nonpoint Source Identification: The potential nonpoint sources for the Kinnickinnic River watershed TMDLs are:

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

WDNR determined that only 7.5% of the watershed is not covered by MS4 permits, so nonpoint source loads are a small part of the overall loading. Wildlife, agricultural runoff, and failing septic systems are not considered significant sources in the watershed (Section 2.1.2.3 of the TMDL).

Milwaukee Estuary:
Point Source Identification: WDNR determined that there is one public WWTF discharging into the Milwaukee Estuary watershed. The entire watershed is within MMSD's sewer service area.

WDNR noted that there are CSO outfalls in the Milwaukee Estuary watershed. CSO discharges contain mixed wastewater and stormwater discharges that occur under extreme storm events. WDNR explained that the number of CSO events system-wide has been reduced from 50 events a year in the early 1990's to less than three events per year.

WDNR determined that there are no MS4s in the watershed. Stormwater runoff is captured in the combined sewer system, and transported to the MMSD treatment facility.

WDNR identified NCCW as a source of TP in the watershed. WDNR explained that numerous industrial facilities utilize drinking water to operate their cooling systems. Drinking water is often treated with orthophosphate to coat the water pipes to prevent the release of lead. This water is then discharged to a nearby waterbody after use. Because there are a significant number of NCCW dischargers in the watershed, WDNR calculated the loadings of TP from this source.

Table 5 at the end of this Decision Document (Table 4-1 of the TMDL) lists the point sources within the Milwaukee River Estuary watershed. The locations of the point sources are in Appendix B of the TMDL.

Nonpoint Source Identification: The potential nonpoint sources for the Milwaukee Estuary watershed TMDLs are extremely limited. The entire watershed drains to the combined sewer system, so the only nonpoint source contribution is loading from the upstream rivers.

Priority Ranking:
The Milwaukee River basin TMDL project was initiated by MMSD and SEWRPAC as a "third-party" TMDL. MMSD applied for and received grant money under the EPA Great Lakes Restoration Initiative, and using contracting assistance, developed the TMDL in conjunction with the WDNR and EPA. The impaired waters in the Milwaukee River basin were listed as high-priority for TMDL development by WDNR.

Future Growth:
To account for future growth in the watersheds, WDNR calculated a reserve capacity for each reach for TP and TSS. A reserve capacity of 5% of the loading capacity for each reach was set aside for future growth. In Section 6.6 of the TMDL, WDNR explains the process that will be followed for use of the reserve capacity, and that use of the reserve capacity will not be granted unless the need is demonstrated. WDNR noted that since NPDES permits have concentration effluent limits for bacteria, setting aside a bacteria load for reserve capacity is not needed.

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

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

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

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

Comment:

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

Bacteria:
Designated use: Chapter NR 102.04 states that all surface waters shall be suitable for supporting recreational use.

Numeric bacteria criteria:
Through adoption of WQS into Wisconsin's administrative rules, WDNR has identified the bacteria water quality standards which apply to the bacteria impaired waters (NR 102.04(6):

Table 6: Bacteria Water Quality Standards Applicable in the Milwaukee Basin TMDL

Parameter	Units	Water Quality Standard
Fecal coliform [1]	# / 100 mL	Not greater than 400 in < 10% of samples [2]
		Geometric Mean < 200 [3]

[1] = fecal coliform standards apply only between April 1 and October 31
[2] = Standard shall not be exceeded by more than 10% of the samples taken within any calendar month
[3] = Geometric mean based on minimum of 5 samples taken within any calendar month

For several waters in the basin, WDNR has approved variances to the statewide bacteria criteria. Chapter NR 104.06. For these waters, the water quality criteria are listed in Table 7 of this Decision Document. The EPA notes that the list of waters on page 3-5 of the TMDL were incorrect. WDNR submitted a revised page 3-5 on 02/12/18, and Table 7 of this Decision

Document is consistent with the revised page and Wisconsin Chapter NR 104.06. This does not affect the TMDL, as noted in the paragraph below.

Table 7: Waters with water quality variances in the Milwaukee River TMDL basin

Waterbodies	Water Quality Standard (Fecal coliform in # / 100 mL)
Honey Creek in Milwaukee County Indian Creek in Milwaukee County Kinnickinnic River in Milwaukee County Lincoln Creek in Milwaukee County Menomonee River in Milwaukee County below the confluence with Honey Creek Underwood Creek in Milwaukee and Waukesha Counties below Juneau Boulevard	Not greater than 2000 in < 10% of samples Geometric Mean < 1000
Milwaukee River in Milwaukee County downstream from the former North Avenue dam South Menomonee Canal and Burnham Canal in Milwaukee County	Geometric Mean < 1000

In 2004, EPA promulgated recreational water quality criteria (40 CFR 131.41) for open waters of Lake Michigan and the outer harbor area (Figure 1-16 of the TMDL). The criteria are based upon *E. coli*, and are noted in Table 8 of this Decision Document.

Table 8: Water quality criteria for the open waters of Lake Michigan

Parameter	Units	Water Quality Standard
E. coli	# / 100 mL	Not greater than 410 in < 10% of samples
		Geometric Mean < 126

WDNR reviewed the variance criteria as well as the beach criteria during the development of the TMDL (Section 3.2.3 of the TMDL). The outer harbor area is the downstream-most waterbody addressed in the TMDL. To ensure that downstream waters are protected, WDNR developed the TMDL without using the variance criteria. For the bacteria-impaired waters noted in Table 1 of this Decision Document and Appendix B of the TMDL, WDNR used the non-variance fecal coliform criteria in Table 6 throughout the basin. For the outer harbor, WDNR used the *E. coli* WQS noted in Table 8 of this Decision Document.

Since Wisconsin criteria are for fecal coliform, and the EPA beach criteria are for *E. coli*, a translator was developed to convert fecal coliform loadings to *E. coli* loadings to assess impacts in the outer harbor. The study, performed by the McLellan Lab at the University of Wisconsin – Milwaukee School of Freshwater Sciences, determined that the two standards are statistically consistent, and that attaining the fecal coliform criteria will likely result in attaining the E. coli criteria. See Appendix E of the TMDL for further information on the translator study.

Fecal Coliform Target:
The targets are the standard as stated above for the outer harbor and remainder of the basin, for both the geometric mean portion and the daily maximum portion, which is applicable from April 1st through October 31st. However, the focus of these TMDLs is on the "not-to-exceed" portion of the standard of 400 cfu/100ml. WDNR evaluated the bacteria data and determined that the not-to-exceed 400 cfu/100 mL was exceeded more frequently, and would therefore be more

restrictive. WDNR stated that while the TMDL will focus on the not-to-exceed portion of the water quality standard, both parts of the water quality standard must be met (Section 3.2.3 of the TMDL).

Phosphorus:

Numeric phosphorus criteria:

Numeric criteria for total phosphorus, are set forth in Section NR 102.06 of the Wisconsin Administrative Code. The criteria are **0.1 mg/L** TP for rivers and **0.075mg/L** TP for streams (Section 3.2.1 of the TMDL). The 0.1 mg/L applies to the following waterbodies in the basin:

- Menomonee River from the confluence with Little Menomonee River downstream to the estuary
- Kinnickinnic River from the confluence with Wilson Park Creek downstream to the estuary
- Milwaukee River from the confluence with Cedar Creek downstream to the estuary
- Inner and outer harbor areas of the estuary

For the rest of the waterbodies in the basin, the 0.075 mg/L TP criteria applies.

TP Target:

The TMDL targets for TP for the Milwaukee River basin TMDL are the TP criteria of 0.1 mg/L and 0.075 mg/L.

TSS:

Narrative criteria:

WDNR does not have a numeric criteria for TSS. However, WDNR determined that there are narrative criteria in NR 102.04 that can be applied to TSS (Section 3.2.2 of the TMDL). The regulations state in part,

> "(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 state. (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. (d) Substances in concentrations or combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life."

TSS Target:

To determine a numeric target for the TMDL, WDNR utilized a similar approach to that used by the State for the development of its nutrient criteria (Section 3.2.2 of the TMDL). This process emphasizes use of multiple lines of evidence, relating concentrations to biotic impacts, and using strong and supportable correlations between causal and response parameters. This process also used a study by the United States Geological Survey (USGS) to correlate TSS levels and biotic impacts.

As a result of this work, WDNR determined that the appropriate TSS target is **12 mg/L**, expressed as the median of monthly samples collected in the growing season between May and October. This numeric target is intended by WDNR to meet the narrative criteria in NR 102.04.

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

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

Comment:
Functionally a TMDL is represented by the equation:

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

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

WDNR utilized several earlier watershed and water quality models for the Milwaukee River basin TMDLs. In 2007, the Southeastern Wisconsin Regional Planning Commission (SEWRPC), along with a contracted consultant team, (hereafter collectively referred to as SEWRPC) developed a Regional Water Quality Management Plan Update (RWQMPU).

SEWRPC was created in 1960 under Wisconsin Statute as the official planning organization for southeastern Wisconsin (SEWRPC website, downloaded 12/18/2017). The RWQMPU was documented in the SEWRPC Report No. 50 (PR-50). The PR-50 report objectives include evaluating current water quality, and evaluating reductions needed to improve water quality. These efforts included both watershed runoff and water quality modeling of the basin. SEWRPC also developed a companion report, SEWRPC Technical Report No. 39 (TR-39), which contains the data used in the PR-50 report. Together, these studies are referred to as the Water Quality Initiative (WQI).

WDNR utilized the existing work from the WQI effort (Section 4.2.1 of the TMDL) to help quantify baseline pollutant loadings for phosphorus, TSS, and bacteria and estimate reach flows for the TMDL. As part of the WQI effort, two watershed models were used. For the Menomonee and Kinnickinnic rivers, the Hydrologic Simulation Program FORTRAN (HSPF) model was used. For the Milwaukee River, the Load Simulation Program in C++ (LSPC) model was used.

HSPF:
HSPF is a comprehensive modeling package used to simulate watershed hydrology and water quality on a basin scale. The package includes both an Agricultural Runoff Model and a more general nonpoint source model. HSPF parameterizes numerous hydrologic and hydrodynamic processes to determine flow rate, sediment, and nutrient loads. HSPF uses continuous meteorological records to create hydrographs and to estimate time series pollution concentrations.[1,2] The output of the HSPF process is a model of multiple hydrologic response unit (HRUs), or subwatersheds of the Menomonee and Kinnickinnic River watersheds. The flow from these HRUs were calibrated to eight different gage sites (1995 through 1998).

LSPC:
LSPC is the Loading Simulation Program in C++, a watershed modeling system that includes streamlined HSPF algorithms for simulating hydrology, sediment, and general water quality on land as well as a simplified stream transport model. A key data management feature of this system is that it uses a Microsoft Access database to manage model data and weather text files for driving the simulation. The system also contains a module to assist in TMDL calculation and source allocations. For each model run, it automatically generates comprehensive text-file output by subwatershed for all land-layers, reaches, and simulated modules, which can be expressed on hourly or daily intervals. LSPC has no inherent limitations in terms of modeling size or model operations. For this reason, SEWRPC determined that LSPC would be appropriate for the Milwaukee River watershed.

Model setup:
Both HSPF and LSPC utilize runoff rates and loads in part to determine overall watershed loadings. These runoff rates and loads are based upon the land use and pervious/impervious land cover. After consulting with WDNR, SEWRPC revised the runoff rates and loads estimated by HSPF and LSPC based upon two additional models, Soil and Water Assessment Tool (SWAT) and Source Loading and Management Model (SLAMM). SWAT models the runoff and loading

[1] HSPF User's Manual - https://water.usgs.gov/software/HSPF/code/doc/hspfhelp.zip
[2] EPA TMDL Models Webpage - https://www.epa.gov/exposure-assessment-models/tmdl-models-and-tools

from a wide variety of rural land uses and covers, and allows the user to vary land use based upon potential best management practices. SWAT uses more-detailed land covers and land management practices than HSPF and LSPC, allowing for a more accurate characterization of agricultural practices and nonpoint source loadings (Section 4.2.1 of the TMDL; page 324 of PR-50, SEWRPC, 2013). SLAMM models stormwater runoff, and is utilized primarily in urbanized stormwater environments. SLAMM is used by many of the stormwater permittees in the Milwaukee River basin to estimate loads from urban stormwater and evaluate the impact of management practices. SLAMM utilizes more-detailed build-up wash-off routines with more expansive land use classifications and the ability to better simulate Best Management Practices (BMPs). Since SWAT and SLAMM are more detailed than the runoff portions of HSPF and LSPC, SEWRPC used the SWAT/SLAMM outputs as appropriate to further refine the HSPF/LSPC output. HSPF/LSPC was then used to route pollutants through the river system (reaches), accounting for fate and transport processes.

Estuary Models:
Specialized models were used to simulate the estuary (Section 4.2.1 of the TMDL). The WQI project used two models, the Estuarine Coastal and Ocean Model (ECOM) and the Row-Column AESOP (Advanced Ecological Simulation Program) or the RCA model. The ECOM model simulates the complex hydrodynamic process found in estuaries in three dimensions. The model is able to account for the wind and current action, temperature differences, and changes in flow direction as well as many other inputs. The RCA model is a water-quality model that simulates water quality processes, including the changes in TP and nitrogen fractions, dissolved oxygen, plankton levels, and interactions with sediment.

Boundary conditions at the upstream boundaries of the estuary model were input from the HSPF and LSPC models for the river watersheds. ECOM/RCS does not simulate runoff from the estuary land area, so the runoff volumes and loadings were directly input from the HSPF/LSPC models.

Calibration/Validation:
The watershed models were calibrated for hydrology, water quality, and then validated (Section 4.2.1 of the TMDL). Results of the calibration/validation were considered acceptable by SEWRPC and WDNR, and are discussed in more detail in Section 4.2.1 of the TMDL and PR-50.

<u>Total Phosphorus/TSS:</u>
To develop the loads for TP and TSS, the calculations began in the headwaters of the watershed, and loads were either characterized as point source discharge or rainfall runoff (both NPS and urban). To characterize the runoff component, WDNR examined what the appropriate critical flow should be (Section 5.2.1 of the TMDL). WDNR explained that using the low-flow condition as the critical flow would best capture the point sources such as wastewater effluent, but would disproportionally impact wet-weather sources such as MS4s and NPS stormwater runoff, which contribute greater loads at high flows. Similarly, looking at the highest flows would address wet-weather flows but not address point source effluent flows. To address this issue, WDNR determined the appropriate flow condition to be the 4^{th} lowest flow for each calendar month. WDNR analyzed a variety of flows, and determined that this flow would best

represent the needed reductions for stormwater runoff and still ensure point source impacts were accounted for. More detail on this process can be found in Section 5.2.1 of the TMDL.

To determine the loading capacity in the waterbody segments, the target flow was multiplied by the TP water quality standard or TSS target for each modeled reach. The loads as calculated are cumulative, as the load (and flow) from the upstream segment is moving downstream. To determine the TMDL waterbody-specific load, the upstream load was subtracted from the overall load. These loads were calculated on a monthly basis, then divided by 30.4 to calculate the daily loads. This process also accounted for the TP criteria changing from 0.075 mg/L to 0.10 mg/L.

The loading capacity for each reach is in Tables A.10 (TP), and A.12 (TSS) of Appendix A of the TMDL, which is incorporated into this Decision Document. Note that each table includes the initials for the river, where Kinnickinnic = Kinnickinnic River, MI = Milwaukee River, and MN = Menomonee River. For example, Table A.10 (Kinnickinnic) contains the daily TP loads for the impaired segments of the Kinnickinnic River. For both TP and TSS, the loads are reported as daily loads per month and per segment.

Nonpoint Sources:
To determine the allocations for the various sources, WDNR first determined the baseline load (Section 6.3 of the TMDL). The baseline load for natural background was based upon the forest, wetland, and natural area land cover from the WQI models. The baseline loads for agricultural use was also based upon the WQI models, using the crop and pasture land use. The baseline loads for non-permitted urban areas were calculated from the non-background and non-agricultural land covers outside the permitted MS4 boundaries.

Point sources:
For wastewater point sources, the baseline load was based upon the concentration limit and design flow in the NPDES permit. The annual average design flow was used for municipal facilities, and the highest average annual flow over three years was used for industrial dischargers (Section 6.4 of the TMDL). If a permit did not contain a TP effluent limit, monitoring reports for the facility were examined, and the baseline load was set to the technology limit pursuant to the Wisconsin Administrative Code NR 217 technology limit of 1.0 mg/L, unless the limit was below 1.0 mg/L, in which case the lower limit was used. For TSS, the baseline is based upon the design flow and the permit effluent limit for TSS.

WDNR developed allocations for TP and TSS General Permit dischargers in the watersheds (Section 6.4.2 of the TMDL). A specific analysis was performed to address the TP loads from non-contact cooling water and MS4 dischargers. These analyses are discussed in more detail in Section 5 of this Decision Document.

There are 37 cities, villages, and townships within the basin regulated under MS4 permits (Table 4-2 and Figure B.4 of Appendix B of the TMDL). The WQI models were used to determine the baseline loads for the MS4 entities, with some adjustments. The WQI models included consideration of the then-runoff management performance standards requiring a 40% reduction in annual average TSS loads from existing development constructed prior to October 1, 2004 (Section 4.3.2.4 of the TMDL). In 2011, the performance standards were revised to require a

20% reduction from existing development. The models were revised to adjust the baseline loading to account for the current loading requirements, and assume that the 20% reduction has occurred as required under current Wisconsin law. The reduction determined under the TMDL will apply to the baseline loads assuming the TSS performance standard of 20% is being met.

Fecal coliform:

Load Duration Curves:

The approach utilized by WDNR to calculate the loading capacity for the fecal coliform TMDLs in the Milwaukee River, Menomonee River, and Kinnickinnic River are described in Section 5.3.2 of the TMDL.

For the fecal coliform TMDLs and protection strategies, a not-to-exceed value of 400 cfu/100 ml fecal coliform for more than 10% of all samples in a month was used to calculate the loading capacity of the TMDLs.

WDNR determined that the not-to-exceed portion of the WQS provides the best overall characterization of the status of the watershed. WDNR analyzed the fecal coliform data, and determined that the 400 cfu portion of the WQS was exceeded more frequently that the geometric mean portion (Section 3.2.3 of the TMDL). Therefore, WDNR utilized the 400 cfu portion of the WQS to develop the load duration curves (LDCs) for fecal coliform. WDNR stated that while the bacteria TMDLs and protection strategies will focus on the not-to-exceed portion of the water quality standard (i.e., the 400 cfu/100mL), attainment of the WQS involves the water bodies meeting both the geometric mean (200 cfu/100 mL) and not-to-exceed (400 cfu/100 mL) portions of the water quality standard. EPA finds these assumptions to be reasonable.

Typically loading capacities are expressed as a mass per time (e.g. pounds per day). However, for *E. coli* loading capacity calculations, mass is not always an appropriate measure because *E. coli* is expressed in terms of organism counts. This approach is consistent with the EPA's regulations which define "load" as "an amount of matter that is introduced into a receiving water" (40 CFR §130.2). To establish the loading capacities for the Milwaukee River basin bacteria TMDLs, WDNR used Wisconsin's water quality standards for fecal coliform (400 cfu/100 mL). A loading capacity is, "the greatest amount of loading that a water can receive without violating water quality standards." (40 CFR §130.2). Therefore, a loading capacity set at the WQS will assure that the water does not violate WQS. WDNR's bacteria TMDL approach is based upon the premise that all discharges (point and nonpoint) must meet the WQS when entering the water body. If all sources meet the WQS at discharge, then the water body should meet the WQS and the designated use.

A flow duration curve (FDC) was created for all reaches (Appendix D of the TMDL). The FDCs were developed from the WQI modeled flows (Appendix C of the TMDL).

The FDC was transformed into a LDC by multiplying individual flow values by the WQS (400 cfu/100 mL) and then multiplying that value by a conversion factor. The resulting points are plotted onto a LDC graph. The LDC graph for the twenty-one waterbodies has flow duration interval (percentage of time flow exceeded) on the X-axis and fecal coliform loads (number of bacteria per unit time) on the Y-axis. The LDC used fecal coliform measurements in billions of bacteria per day. The curved line on a LDC graph represents the TMDL for the respective flow conditions observed at that location.

Fecal coliform values from the monitoring sites were converted to individual sampling loads by multiplying the sample concentration by the instantaneous flow measurement observed/estimated at the time of sample collection. The individual sampling loads were plotted on the same figure with the LDC (Figure 5-1 of the TMDL as an example; Appendix D of the TMDL).

The LDC plots were subdivided into five flow regimes; very high flows (exceeded 0–10% of the time), high conditions (exceeded 10–40% of the time), mid-range flows (exceeded 40–60% of the time), low conditions (exceeded 60–90% of the time), and very low flows (exceeded 90–100% of the time). LDC plots can be organized to display individual sampling loads and the calculated LDC. Watershed managers can interpret these plots (individual sampling points plotted with the LDC) to understand the relationship between flow conditions and water quality exceedances within the watershed. Individual sampling loads which plot above the LDC represent violations of the WQS and the allowable load under those flow conditions at those locations. The difference between individual sampling loads plotting above the LDC and the LDC, measured at the same flow, is the amount of reduction necessary to meet WQS.

The strengths of using the LDC method are that critical conditions and seasonal variation are considered in the creation of the FDC by plotting hydrologic conditions over the flows measured during the recreation season. Additionally, the LDC methodology is relatively easy to use and cost-effective. The weaknesses of the LDC method are that nonpoint source allocations cannot be assigned to specific sources, only general source types, and specific source reductions are not quantified. Overall, WDNR believes and EPA concurs that the strengths outweigh the weaknesses for the LDC method.

Implementing the results shown by the LDC requires watershed managers to understand the sources contributing to the water quality impairment and which BMPs may be the most effective for reducing bacteria loads based on flow magnitudes. Different sources will contribute bacteria loads under varying flow conditions. For example, if exceedances are significant during high flow events this would suggest storm events are the cause and implementation efforts can target BMPs that will reduce stormwater runoff and consequently bacteria loading into surface waters. This allows for a more efficient implementation effort.

TMDLs and protection strategies for the reaches were calculated as appropriate. The loading capacity for each reach is in Table A.14 (by river) of Appendix A of the TMDL, which is incorporated into this Decision Document. Note that the table(s) include the initials for the river, where Kinnickinnic = Kinnickinnic River, MI = Milwaukee River, and MN = Menomonee River. For example, Table A.14 (Kinnickinnic) contains the daily fecal coliform loads for the segments of the Kinnickinnic River. For fecal coliform, the loads are reported as daily loads per flow regime and per segment.

Review of the LDCs indicate that exceedences are occurring under all flow conditions, and therefore control of several source types will be needed. The LDC demonstrates that reductions ranging from 0%-86% are needed to attain standards.

Table A.14 (by river) of Appendix A of the TMDL calculate five points (the midpoints of the designated flow regime) on the loading capacity curves. However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve. The load duration curve method can be used to display collected bacteria monitoring data and allows for the estimation of load reductions necessary for attainment of the bacteria water quality standard. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for the segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Although there are numeric loads for each flow regime, the LDC is what is being approved for these TMDLs.

Estuary:
The models and process for the Milwaukee Estuary differed from the processes described above (Section 5.4 of the TMDL). The allowable estuary concentrations for the three pollutants were calculated from running the ECOM/RCA model over the 10-year simulation period with the river inputs set as the WQS/targets, and the local point sources set at the baseline loads. The WQI models assessed attainment at 10 sampling sites in the estuary (Figure B.2 of Appendix B of the TMDL). The model analysis determined that further reductions in the estuary were not needed to attain the WQS/targets beyond those assumed in the river and point source baseline. Specific loads for the estuary were not calculated; rather, the model demonstrates that attainment of the WQSs in the estuary will be achieved by the TMDL reductions in the three river watersheds for the three pollutants (Tables A.A, A.B, and A.C of Appendix A of the TMDL)

Conclusion:
EPA concurs with the data analysis, modeling results and LDC approach utilized by WDNR in its calculation of loading capacities, wasteload allocations, load allocations and the margin of safety for the TMDLs. The methods used for determining the TMDL are consistent with U.S. EPA technical memos.[3]

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

4. Load Allocations (LA)

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

[3] U.S. Environmental Protection Agency. August 2007. *An Approach for Using Load Duration Curves in the Development of TMDLs.* Office of Water. EPA-841-B-07-006. Washington, D.C.

Comment:
Load allocations are addressed in Section 6.3 of the final TMDL document. For all three pollutants, the load allocations were calculated for three categories; background, agricultural, and non-permitted urban areas (Section 6.3 of the TMDL). The background category is defined by WDNR as based upon the forest, wetland, and natural area land cover from the WQI models. The agricultural category is defined by WDNR as the crop and pasture land cover from the WQI models, and the non-permitted urban area category is defined as the non-background/non-agricultural land covers outside the permitted MS4 boundaries.

The LAs for each reach are in Tables A.10 (TP), A.12 (TSS) and A.14 (fecal coliform) of Appendix A of the TMDL, which are incorporated into this Decision Document. For both TP and TSS, the loads are reported as daily loads per month and per segment. The estimated load reductions are in Table A-30 of Appendix A of the TMDL.

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

5. Wasteload Allocations (WLAs)

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

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. These individual WLAs may be adjusted during the NPDES permitting process. If the WLAs are adjusted, the individual effluent limits for each permit issued to a discharger on the impaired water must be consistent with the assumptions and requirements of the adjusted WLAs in the TMDL. If the WLAs are not adjusted, effluent limits contained in the permit must be consistent with the individual WLAs specified in the TMDL. If a draft permit provides for a higher load for a discharger than the corresponding individual WLA in the TMDL, the State/Tribe must demonstrate that the total WLA in the TMDL will be achieved through reductions in the remaining individual WLAs and that localized impairments will not result. All permittees should be notified of any deviations from the initial individual WLAs contained in the TMDL. EPA does not require the establishment of a new TMDL to reflect these revised allocations as long as the total WLA, as expressed in the TMDL, remains the same or decreases, and there is no reallocation between the total WLA and the total LA.

Comment:
WDNR calculated WLAs for NPDES-permitted dischargers for both TMDLs and protection strategies. WDNR noted that many facilities discharge upstream of impaired segments, and therefore WLAs need to be determined to ensure downstream uses are protected.

WWTFs: WDNR identified WWTFs discharging TP, TSS, and fecal coliform to impaired streams in the Milwaukee River basin (Section 6.4.1 and Table A.16, A.18 and A. 20 of

Appendix A of the TMDL (by river)). The municipal facilities were given an individual WLA based upon the annual average design flow times the instream criteria/target (0.075 or 0.10 mg/L for TP; permitted effluent limit for TSS, and 400 cfu /100mL for fecal coliform). The highest average annual flow over three years was used for industrial dischargers (Section 6.4 of the TMDL). If a permit did not contain a TP effluent limit, monitoring reports for the facility were examined, and the baseline load was set to the technology limit pursuant to the Wisconsin Administrative Code NR 217 technology limit of 1.0 mg/L TP, unless the limit was below 1.0 mg/L, in which case the lower limit was used. For TSS, current permitted effluent limit was used to determine TSS loads. Once the baseline load was determined, reductions were made as needed in the modeling process to determine WLAs needed to attain WQSs. Reductions for fecal coliform are not expected for WWTFs, these facilities are already disinfecting their wastestreams.

<u>MS4s:</u> There are 37 cities, villages, and townships within the basin regulated under MS4 permits (Table 4-2 and Figure B.4 of Appendix B of the TMDL). The MS4 WLAs were based upon the land area under the jurisdiction of the MS4 permit as discussed in Section 4.3.2.4 of the TMDL. The WQI models were used to determine the baseline loads for the MS4 entities, with some adjustments. The WQI models included consideration of the then-runoff management performance standards requiring a 40% reduction in annual average TSS loads from existing development constructed prior to October 1, 2004 (Section 4.3.2.4 of the TMDL). In 2011, the performance standards were revised to require a 20% reduction from existing development. The models were revised to adjust the baseline loading to account for the current loading requirements, and assume that the 20% reduction has occurred as required under current Wisconsin law. The reduction determined under the TMDL will apply to the baseline loads assuming the TSS performance standard of 20% is being met. The WLAs for each MS4 are in Tables A.22, A.24, and A. 26 of Appendix A of the TMDL. The WLAs are calculated for reach and flow regime. Tables A.28 and A. 29 (by river) of Appendix A of the TMDL contain the TP and TSS reductions required by the WDNR for the MS4 permittees.

<u>Non-Contact Cooling Water (NCCW)</u>: WDNR also analyzed the impacts that phosphates added to drinking water contribute to the TP impairments in the Milwaukee River basin. Many facilities in the basin used drinking water from the City of Milwaukee as NCCW. To prevent corrosion of lead pipes, the Safe Drinking Water Act requires public drinking water suppliers to utilize some form of corrosion control for their pipes. Many systems, including Milwaukee, add orthophosphate to the drinking water to form a scale in the water pipes to prevent corrosion and the release of lead and copper. The addition of orthophosphate must continue after the development of the scale to ensure the scale remains in place. A portion of the orthophosphate remains in the drinking water, and after the water is used in NCCW, is discharged to surface waters. WDNR contacted the City of Milwaukee, and found that the TP concentration of the drinking water was 0.515 mg/L (Section 6.4.2 of the TMDL). To determine the loading from NCCW, WDNR determined the design flow for each facility, which was defined as the highest average annual flow over three years, and multiplied that by the 0.515 mg/L TP concentration. Some facilities include additives that may contain phosphates to their NCCW, and for those systems, the actual TP concentrations were used to calculate loads. Pass-through systems, where surface water is withdrawn, used for NCCW, and returned to the same waterbody, do not add phosphorus to the system, and therefore have a WLA = 0. WNDR noted that this does not mean

these facilities cannot discharge, but that the existing discharge does not add phosphorus to the system (Section 6.4.2 of the TMDL). Table A.16 (by river) of Appendix A of the TMDL contains the TP WLAs for NCCW for facilities in the Milwaukee River basin.

Combined Sewer Overflows (CSOs): WDNR reviewed the impacts of CSO bacteria and TP discharges on water quality in the Milwaukee River basin. CSO discharges occur when there is a significant rainfall, and the combined stormwater-sanitary sewage system cannot handle the volume. The mixed stormwater/sewage is discharged into surface waters to prevent sewage backups or treatment plant failures. The City of Milwaukee has been upgrading its CSO system for many years, which has included the Inline Storage System (aka Deep Tunnel). This system has reduced CSO events from more than 50 per year to 2.5 per year (Section 6.4.6 of the TMDL). MMSD is also implementing the requirements of the Long-Term Control Plan, as required by the USEPA. For this TMDL study, WDNR set the WLA = 0 for CSO discharges. The WDNR noted, and the EPA wants to emphasize, that this does not translate into an immediate cessation of CSO discharges. Rather, CSO discharges will be addressed under the MMSD Long-Term Control Plan and through WPDES permits.

Other Point Sources: Sanitary Sewer Overflows (SSOs) have occurred in the basin. As SSOs are not permitted, the WLA=0 for SSOs for all three pollutants. WDNR identified 12 Concentrated Animal Feeding Operations (CAFOs) in the basin (Table 9 of this Decision Document; Table 4-3 of the TMDL and Figure B.5 of Appendix B of the TMDL). WDNR explained that WPDES permits for these facilities require no discharge of pollutants from the production area except if caused by an extreme storm event (Section 4.3.2.7 of the TMDL). WDNR determined a WLA = 0 for CAFOs in the basin. WDNR did note that manure spreading from CAFOs at agronomic rates are considered a non-point source of bacteria and TP and are included in the modeled non-point source loads in the TMDL calculations.

Table 9: CAFOs in the Milwaukee River basin

Facility Name	Permit Number	TMDL Reach
BECK DAIRY FARM	0064599	MI-3
CLOVER HILL DAIRY*	0061689	MI-3
GOLDEN E DAIRY FARM	0064602	MI-13
HICKORY LAWN DAIRY FARM	0064611	MI-10
KETTLE MORAINE EGG RANCH, LLC	0056677	MI-13
MELICHAR BROAD ACRES	0064866	MI-16
MURPH-KO FARMS INC**	0062740	MI-1
OPITZ DAIRY FARM	0062600	MI-16
PAULUS DAIRY (APP RECEIVED)	0065927	MI-16
ROCKLAND DAIRY	0061786	MI-14
SECOND LOOK HOLSTEINS LLC	0062987	MI-1
VOLM FARMS	0064700	MI-3

*Clover Hill Dairy main farm is located in the Rock River basin. Outfalls 004, 005, 008, and 009 associated with the "Heifer Farm Site" are located in the Milwaukee River basin.
**Murph-KO Farms Inc. 2010 production area expansion into Milwaukee River basin.

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

6. Margin of Safety (MOS)

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

Comment:

Fecal coliform:

The fecal coliform TMDLs incorporated certain conservative assumptions in the calculation of the MOS. No rate of decay, or die-off rate of pathogen species, was used in the TMDL calculations or in the creation of load duration curves for fecal coliform. Bacteria have a limited capability of surviving outside their hosts, and normally a rate of decay would be incorporated. WDNR determined that it was more conservative to use the WQS (400 cfu/100 mL) and not to apply a rate of decay, which could result in a discharge limit greater than the WQS.

As stated in *EPA's Protocol for Developing Pathogen TMDLs* (EPA 841-R-00-002), many different factors affect the survival of pathogens, including the physical condition of the water. These factors include, but are not limited to sunlight, temperature, salinity, and nutrient deficiencies. These factors vary depending on the environmental condition/circumstances of the water, and therefore it would be difficult to assert that the rate of decay caused by any given combination of these environmental variables was sufficient enough to meet the WQS of 400 cfu/100 mL. Thus, it is more conservative to apply the State's WQS as the MOS, because this standard must be met at all times under all environmental conditions.

TP/TSS:

The TP and TSS TMDLs incorporated certain conservative assumptions in the calculation of the MOS. The WQI models utilized extensive data in the use of the models. The models went through a significant calibration and validation process (Appendices C and D of the PR-50) addressing both hydrology (flow) and water quality. The results of the calibration and validation indicate that they tend to slightly overpredict TP and TSS loads in the waterbodies (Sections 5.4 and 5.8 of Appendix D of PR-50). This overprediction indicates the modeled reductions are sufficient to attain WQSs. WDNR provided additional discussion on how the models do not entirely account for the fraction of TP and TSS that are lost due to uptake by plants (TP) and permanently deposited in bottom sediments (TSS). This is also discussed in Section 5.3.4 of Appendix D of PR-50.

WDNR noted that the MOS is reasonable due to the results of the generally good calibration and validation of the WQI model for pollutant loading (Section 6.5 of the TMDL). The calibration and validation results indicate the model adequately characterizes the waterbodies, and therefore additional MOS is not needed.

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

7. Seasonal Variation

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

Comment:
Pollutant loads vary by season, since much of the pollutant loading is driven by precipitation runoff. WDNR accounted for the seasonal variations in loading through the WQI modeling process. Both HSPF and LSPC utilize precipitation data to determine runoff from various land covers. The SWAT and SLAMM models provide even more detailed responses to precipitation events.

The WQI output was by month, which allows an examination of various seasonal events such as spring snowmelt and late summer drought. Nutrient influxes to the TP and TSS-impaired waters typically occur during wet weather events. Critical conditions that impact the response of the waters to TP and TSS inputs occur during periods of low flow in the summer. During low flow periods, nutrients accumulate, there is less assimilative capacity within the water body, water temperatures increase, and algae thrives. Increased algal growth during low flow periods can deplete dissolved oxygen within the water column. As flows are slower, TSS is able to settle and cover the streambed.

Bacterial WQS need to be met between April 1st to October 31st, regardless of the flow condition. The development of the LDC utilized flow measurements from local flow gages. These flow measurements were collected over a variety of flow conditions observed during the recreation season. The LDC developed from these flow records represents a range of flow conditions within the *E. coli* – impaired watersheds and thereby accounted for seasonal variability over the recreation season.

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

8. Reasonable Assurance

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

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991

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

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

Comment:

Section 7 of the TMDL provides information on actions and activities to reduce pollutant loading in the Milwaukee River basin. The main entities responsible for overseeing the pollutant reduction activities will be the WDNR, SEWRPC, and MMSD. WDNR has begun the development of an implementation plan for the Milwaukee River basin TMDL (Milwaukee River Basin TMDL Implementation Newsletter, WDNR, 12/29/2017). The Implementation Plan will provide more detailed information and direction on TMDL implementation activities, and include input from a wide variety of stakeholders (Section 7.2 of the TMDL).

In 2007, SEWRPC developed a Regional Water Quality Management Plan Update (RWQMPU). SEWRPC was created in 1960 under Wisconsin Statute as the official planning organization for southeastern Wisconsin (SEWRPC website, downloaded 12/18/2017). The RWQMPU was documented in the SEWRPC Report PR-50.. The PR-50 report objectives include evaluating current water quality, and evaluating reductions needed to improve water quality. These efforts included both watershed runoff and water quality modeling of the basin. SEWRPC also developed a companion report, SEWRPC Report TR-39, which contains the data used in the PR-50 report.

WDNR explained that the success of the RWQMP is dependent upon local implementation efforts including, but not limited to: refinement and detailing of sanitary sewer service areas; development of stormwater management plans; development of sewerage system facilities plans; and integration of recommendations into city and county resource planning. The RWQMP focuses on not only land use planning but also water quality improvements, stormwater management, flood control, and informational and educational efforts. The plan also documents expectations for NPS best management practices (BMPs) that will serve to reduce TP, TSS, and bacteria in the waterbodies of the basin. Additional watershed technical and planning documents are on the SEWRPC website http://www.sewrpc.org/SEWRPC/Environment.htm# .

The Southeastern Wisconsin Watershed Trust (Sweet Water) is a watershed coalition to improve and protect waters in the Milwaukee River basin. They are a diverse group of partners that include municipalities, dischargers, WDNR, and environmental groups working to address issues in the basin. Sweet Water has developed Watershed Restoration Plans (WRPs) for the Kinnickinnic and Menomonee rivers. The WRPs were developed to identify specific actions to implement in the watersheds, first for 2010-2015, and a second phase for beyond 2015 (Section

7.2.2 of the TMDL). The implementation plan portion includes completed efforts, those efforts underway, and efforts that are planned for the near future. These efforts are focused on bacteria/public health, habitat/aesthetics, and nutrients/phosphorus. Sweet Water also coordinates funding opportunities in the watersheds. Further information can be found at the Sweet Water website http://www.swwtwater.org/.

MMSD has a long history of waterbody improvements in the Milwaukee River basin. These efforts include: concrete removal in over 37 miles of the Menomonee River; removal of five fish barriers in the Menomonee River; removal of over 100 feet of concrete channel in the Kinnickinnic River, which included the purchase of 83 homes to provide additional room to provide a natural channel; and a planned series of stormwater ponds along the 30th Street corridor, where serious flooding has occurred. These efforts improve the habitat along the rivers and tributaries, allowing fish migration further upstream. A more natural river system processes TP and reduces algal growth. Restoring floodplains allow rivers to naturally "flush" sediment (and associated TP) out of the system during high flow events, and reduce pollutant transport to Lake Michigan. MMSD has an extensive green infrastructure program, as noted at https://www.mmsd.com/what-we-do/green-infrastructure.

MMSD, along with Milwaukee County, are in the final planning stages of removing the Estabrook Dam in the Milwaukee River. Removal of the dam will allow the river to be free-flowing and function as a more natural river. The dam is scheduled to be removed in 2018.

MMSD has also recently completed the $120 million Lincoln Creek Flood Management Project. This project involved removal of miles of concrete-lined channel, which were transformed into a more natural, meandering river, and the development of two large detention basins to control stormwater runoff. The main focus of the project was to address severe flooding problems in the Lincoln Creek watershed, but several measures were included to improve water quality, restore and stabilize habitat, and protect eroding banks. Further details on existing projects are found in Sections 2.1.1.2 (Menomonee River), 2.1.2.2 (Kinnickinnic River), and 2.1.3.2 (Milwaukee River) of the TMDL.

MMSD also has information available on their website regarding green infrastructure. MMSD has provided both technical and operating assistance in developing various green infrastructure practices, such as porous pavement, rain gardens, rain barrels, etc. The MMSD website provides additional details on various practices at https://www.mmsd.com/what-we-do/green-infrastructure.

Reasonable assurance that the WLAs set forth in the TMDLs will be implemented is provided by regulatory actions. According to 40 CFR 122.44(d)(1)(vii)(B), NPDES permit effluent limits must be consistent with assumptions and requirements of all WLAs in an approved TMDL. WDNR's NPDES permit program is the implementing program for ensuring effluent limits are consistent with the TMDL.

All regulated MS4 communities are required to satisfy the requirements of the MS4 general permit. Section 1.5 of the WDNR Stormwater General Permit documents the requirements for MS4 dischargers in TMDL watersheds (WDNR, 2014). The MS4 general permit requires the permittee to develop a storm water management program which addresses all permit requirements, including the following six minimum control measures:

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

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

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

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

The EPA finds that this criterion has been adequately addressed.

9. Monitoring Plan to Track TMDL Effectiveness

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

Comment:

The final TMDL document outlines the water monitoring efforts in the Milwaukee River basin (Section 7.2.5 of the TMDL). Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation planning efforts for these watersheds.

Follow-up monitoring is integral to the adaptive management approach. Monitoring addresses uncertainty in the efficacy of implementation actions and can provide assurance that implementation measures are succeeding in attaining water quality standards, as well as inform the ongoing TMDL implementation strategy. To assess progress toward meeting the TMDL targets, monitoring of the waterbodies will continue to be a part of the MMSD and WDNR monitoring programs. In addition to the WDNR state water quality monitoring program, MMSD operates a significant water quality monitoring program in the basin. Sites are sampled every two weeks at 91 locations in the basin.

The EPA finds that this criterion has been adequately addressed.

10. Implementation

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

Comment:
Implementation strategies are outlined in Section 7 of the final TMDL document. The WDNR presented a variety of possible implementation activities which could be undertaken within the watersheds. Most of these actions will address all three pollutants. WDNR has begun the development of a more-detailed implementation plan for the basin, which will address specific actions and activities designed to implement the TMDL and attain WQSs. Many of the examples below are or could be funded through several state programs, such as the Targeted Runoff Management Program, Notice of Discharge Grant Program, Lake Planning Program, and the River Planning and Protection Grant Program (Section 7.2.4 of the TMDL).

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

Pasture and Manure Management BMPs: Controlling animal sources, especially manure from small farms in the watersheds, was identified as a significant implementation activity by WDNR. Livestock exclusion from streams, alternate watering facilities, adoption of rotational grazing, and manure management are expected to reduce pollutant loads entering the waterbodies.

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

Public Education Efforts: Public programs will be developed to provide guidance to the general public on pollutant reduction efforts and their impact on water quality. These educational efforts could also be used to inform the general public on what they can do to protect the overall health of the waterbodies.

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

11. Public Participation

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

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

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

A kickoff workshop for stakeholders was held on November 14, 2011, with subsequent meetings held on March 5, 2012, July 31, 2012, and October 30, 2012. These stakeholder meetings were held to discuss the TMDL process, to discuss how the TMDL would be developed, and to solicit information from stakeholders and the public. A stakeholder meeting was held on February 27, 2012 to focus on MS4 issues in the TMDL. WDNR noted that the workshops were well attended and provided the opportunity for discussion and questions. A bacteria TMDL meeting was held on July 25, 2012, to discuss bacteria data, and the bacteria TMDL development process.

A preliminary TMDL public meeting was held on March 13, 2012, to discuss the TMDL process and provide the opportunity for the general public to provide input and ask questions. A second public meeting was held on July 20, 2016, to update the public and stakeholders on the TMDL development and solicit input. Informational meetings were held on July 21, 2016 with permitted MS4s and with permitted wastewater facilities on July 25 and August 4, 2016. The preliminary draft TMDL was posted on the WDNR website for an informal comment period.

The draft TMDL was updated and revised as appropriate base on the preliminary comments. The draft TMDL was posted online by WDNR at http://dnr.wi.gov/topic/TMDLs/Milwaukee/. The 30-day public comment period began on November 9, 2017 and ended on December 9, 2017. A public meeting was held on November 15, 2017. Copies of the public notice were sent to interested stakeholders as well as the public.

The WDNR received six public comments and adequately addressed these comments. Comments were submitted by MSA Professions Services, Winrock International/Delta Institute, the University of Wisconsin-Milwaukee (UWM), Ruekert-Mielke, WE Energies, and Milwaukee Riverkeepers. The comments and responses are in Appendix G of the TMDL.

Comments from MSA Professional Services and UWM requested revised WLAs for two wastewater discharges involving a fish hatchery and a fishery research facility. Both dischargers are expected to expand in the future, and both commenters requested that the WLAs be revised to account for the expanded discharges. WDNR explained that it is not certain that flows will increase, and therefore the WLAs will remain as determined. WDNR did note that if the flows do expand, the facilities could request that the loads set aside for reserve capacity could be used to increase the WLAs.

Winrock International/Delta Institute commented that research they have conducted suggests that the agricultural phosphorus losses are underestimated in the TMDL. They requested that the TMDL be revised to increase the phosphorus loss from agricultural fields. WDNR explained that the phosphorus loss was calculated differently in the TMDL than the process used by Winrock International/Delta Institute. The research from Winrock International/Delta Institute is based upon edge-of-field, while the TMDL calculates the phosphorus loss at the bottom (downstream) end of the TMDL reach. WDNR used SWAT and HSPF, both of which account for in-stream processes. WDNR agreed that the edge-of-field values will be higher, but that WDNR has developed methods to translate TMDL allocations to edge-of-field values which are commonly used in implementation efforts. WDNR noted that this will be included in the development of the implementation plan.

Ruekert-Mielke commented on how the load duration curves (LDC) should be interpreted regarding loadings, under what seasonal conditions the bacteria WLAs apply, and requested more details on the Implementation Plan and the monitoring network. WDNR noted that the LDCs represent a continuum of loadings, based upon the flow. In other words, as the flow increases, the load increases. The EPA wants to add that the actual bacteria TMDL is the LDC curve, and that the five flow-regime values represent the curve. WDNR also explained that the recreational season is from May-September, but that implementation activities will not be limited to just the recreational season. Many of the BMPs will be addressing bacteria loads year-round. WDNR provided links to the MMSD monitoring database, and explained that the detailed Implementation Plan is currently under development.

WE Energies submitted comments on a variety of topics, including flows and effluent limits for baseline calculations, and how WLAs were calculated. WE Energies requested that the baseline calculation procedure for industrial facilities be the same as the procedure for wastewater facilities regarding TP and TSS. WE Energies explained that the use of the highest average flow over a three-year period does not account for plant upgrades or system shut-downs, and will underestimate the WLA. WE Energies also requested the WDNR use the same TP concentration estimates for the industrial facilities as the wastewater facilities (1.0 mg/L TP and 30 mg/L TSS. WE Energies also stated that the actual calculations for the WLAs was confusing and needed further clarification.

For the baseline calculations, WDNR explained that design flows for industrial dischargers is often different that the design flows for wastewater facilities. Wastewater facility design flows are based upon the size and capacity of the treatment system and are based upon the maximum amount of wastewater that can be treated by the system. As noted by WDNR, industrial facilities often do not have "treatment" as do wastewater facilities, and flows are often more variable. The baseline flow calculations used by WDNR are similar to the flow calculations used to determine limits in the NPDES permit process. WDNR also explained that the concentration values used for the wastewater facilities is based upon the technology-based effluent limits (TBEL) set forth in the Wisconsin Administrative Code. WDNR determined that these limits of 1.0 mg/L TP and 30 mg/L TSS are not appropriate for industrial dischargers. Where TP and TSS limits were not present in permits, WDNR used actual effluent concentration values for the facility to calculate the baseline load.

Regarding the process used to calculate the WLAs, WDNR directed the commenters to the locations in the TMDL where the process was explained. WDNR also included additional language further clarifying the WLA process, specifically for the TSS WLAs.

The Milwaukee Riverkeeper submitted numerous comments on a variety of topics. These included concerns over the long implementation timeframes and compliance schedules in the TMDL, that some pollutant sources did not have allocations or reductions, concerns of how reserve capacity would be applied, and that the TMDL does not explain how regulatory controls will apply to nonpoint sources, especially for bacteria and TSS.

Milwaukee Riverkeeper raised concerns that the TMDL does not contain significant reductions for TP discharges from WWTFs, and where there are reductions, compliance schedules extended out to 2025 reduce the effectiveness of the TMDL. WDNR explained that the TMDL relies on existing regulatory mechanisms, and that the WDNR rules at NR 217.17 allow compliance schedules only on a site-specific basis, and only under strict conditions. WDNR further explained that WDNR rules allow several compliance options, such as adaptive management and pollutant trading in addition to advanced treatment technologies. The EPA adds that the TMDL approval does not extend to the implementation options for the permittees, only to the allocations.

Milwaukee Riverkeeper noted that several pollutant sources did not receive either an allocation or a reduction. These sources were the Wisconsin Department of Transportation (WisDOT), CAFOs, NCCW, CSOs, and SSOs. They consider these major sources that need controls for the TMDL to be achieved. WDNR discussed how each of these sources were addressed in the TMDL. WisDOT does not have a stormwater permit, and therefore did not receive a separate allocation. However, WDNR included the pollutant loads from roads in the MS4 allocations and referenced the guidance on implementing a WisDOT allocation in MS4 permits. For NCCW, Section 4.3.2.3 of the TMDL explains how the allocations were calculated by WDNR. WDNR determined that since NCCW loads are a small percentage of the loading (0.83%), individual WLAs were not considered necessary. WDNR further explained that the State is in the process of updating the tracking and monitoring database for general permits, and that this will allow the State to better analyze data submittals, and determine if changes are needed to allocations.

CAFOs were noted by Milwaukee Riverkeepers as being present in the basin, and that CAFOs were ignored as a source, as they did not receive a pollutant allocation. WDNR confirmed that CAFOs did not receive a WLA, as WDNR CAFO NPDES permits do not allow discharge from the production area except under extreme storm events. Manure runoff from CAFO operations spread in agronomic amounts are considered agricultural stormwater, and thus not regulated under NPDES. WNDR noted that manure runoff is considered in the modeled nonpoint source loads used in the TMDL models. Regarding CSOs and SSOs, WDNR noted that how the CSO allocations were calculated are explained in several locations in the TMDL, and that SSOs are not allowed, and therefore did not receive an allocation.

Milwaukee Riverkeeper expressed concerns over how reserve capacity would be allotted to facilitates, and the use of reserve capacity could be used to circumvent the WLAs. WDNR discussed the requirements for discharging into an impaired water, and explained how the State rules regulate how new dischargers can operate. Section 6.6 of the TMDL explains the process that WDNR will use to determine the use of reserve capacity.

Concerns over the lack of controls on nonpoint sources were also raised by Milwaukee Riverkeepers. They argued that without regulatory controls on the nonpoint sources, the TMDL cannot be attained. WDNR indicated that the TMDL does not create any new regulatory authority, and must abide by existing regulations. WDNR did, however, present detailed reasonable assurance that there are existing controls (stream buffers, setbacks) that are expected to control nonpoint source pollutants and attain WQSs. Section 7 of the TMDL provides discussion of the various actions and activities that will apply to nonpoint source pollutants.

The EPA carefully reviewed the comments submitted during the public notice period, as well as the responses from WDNR. The EPA agrees that WDNR appropriately addressed the comments, and revised the TMDL document as appropriate. The EPA finds that the TMDL document submitted by the WDNR satisfies the requirements of this eleventh element.

12. Submittal Letter

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

Comment:
The EPA received the final Milwaukee River basin TMDL document, submittal letter and accompanying documentation from the WDNR on October 30, 2017. The transmittal letter explicitly stated that the final TMDLs for the Menomonee River, Kinnickinnic River, Milwaukee River watersheds and Milwaukee Estuary were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval. The letter also contained the name of the watersheds as they appear on Wisconsin's 303(d) list, and the causes/pollutants of concern. This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130.

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

13. Conclusion

After a full and complete review, the EPA finds that the TMDLs for the Milwaukee River basin satisfy all of the elements of approvable TMDLs. This approval is for **44** TMDLs, addressing aquatic recreational use impairments due to bacteria and aquatic life use due to phosphorus and TSS.

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

The EPA's approval of these TMDLs extends to the water bodies which are identified in Table 1 of this Decision Document with the exception of any portions of the water bodies that are within Indian Country, as defined in 18 U.S.C. Section 1151. The EPA is taking no action to approve or disapprove TMDLs for those waters at this time. The EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.

Table 5: NPDES permittees and Baseline Loads for facilities in the Milwaukee River basin

Facility Name	Permit Number	Outfall Number	Permit Type	TMDL Reach	Baseline Flow (MGD)	Baseline TP Concentration (mg/L)	Baseline TP Load (lbs/month)	Baseline TSS Concentration (mg/L)	Baseline TSS Load (lbs/month)	Baseline FC Concentration (cells/100 mL)	Baseline FC Load (cells/month)	Notes	Map Number
Menomonee River Watershed													
A O Smith Corporation	0044938	001	General - NCCW	MN-06	0.013	0.535	1.76	0	0	0	0		100
Advanced Metal Treating Inc*	0044938	001	General - NCCW	MN-10	0.007	0.450	0.799	0	0	0	0	Permit discontinued 06/16/2014.	101
American Concrete Pipe Co Milwaukee*	0044938	001	General - NCCW	MN-06	0.003	0.512	0.130	0	0	0	0	Permit discontinued 03/03/2014.	102
Avsea Bioprocessing Corp*	0044938	001	General - NCCW	MN-05	0.002	0.450	0.228	0	0	0	0		103
Avsea Bioprocessing Corp	0044938	003	General - NCCW	MN-05	0.012	0.705	2.15	0	0	0	0		104
Avoca Bioprocessing Corp	0044938	004	General - NCCW	MN-05	0.006	0.457	0.696	0	0	0	0	Permit for Outfall 001 discontinued as of 03/02/2014.	105
Badger Alloys Inc	0044938	001	General - NCCW	MN-16	0.008	1.065	2.16	0	0	0	0		106
Blue Mound Golf & Country Club	0044938	001	General - NCCW	MN-10	0.027	0.022	0.151	0	0	0	0		107
Brenntag Great Lakes LLC - Milsolv Facility	0044938	001	General - NCCW	MN-07	0.005	0.515	0.653	0	0	0	0	Phosphorus concentrations represent average residual concentration of water supply per WDNR.	108
Briggs Stratton Corp Wauwatosa	0026514	002	Individual	MN-10	0.500	0.120	15.2	0	0	0	0	NCCW is discharged to one of two 3.2 million gallon stormwater ponds. . . Source water for NCCW is private well water which is chlorinated and treated with orthophosphate. Sampling is done at the overflow from one of the ponds (north). Current permit does not require TSS sampling.	109
Briggs Stratton Corp Wauwatosa	0026514	003	Individual	MN-10	0.010	0.550	1.40	0	0	0	0	Discharge contains NCCW w/o additives. Storm sewer to Menomonee River.	110
Cambridge Major Laboratories Inc	0044938	001	General - NCCW	MN-05	0.006	0.019	0.029	0	0	0	0		111
Cambridge Major Laboratories Inc - Grant Drive	0044938	001	General - NCCW	MN-05	0.042	2.30	24.5	0	0	0	0		112
Canadian Pacific Railway	0064351	001	Individual	MN-16	0.003	0.116	0.030	20	5.07	0	0	Oil/water separator. Stormwater runoff near engine fueling site. Discharge is rainfall dominated.	113
Charter Wire Division	0044938	001	General - NCCW	MN-16	0.0005	0.140	0.018	0	0	0	0		114
Chr Hansen Inc	0044938	001	General - NCCW	MN-15	0.009	0.410	0.936	0	0	0	0		115
Chr Hansen Inc	0044938	002	General - NCCW	MN-15	0.009	1.33	3.03	0	0	0	0		116
Dana Sealing Products LLC*	0044938	001	General - NCCW	MN-09	0.030	0.390	2.97	0	0	0	0	Permit discontinued 11/30/2012.	117
Derco Repair Service	0044938	001	General - NCCW	MN-09	0.001	0.486	0.123	0	0	0	0		118
D. R. Diedrich & Co LTD	0044938	004	General - NCCW	MN-16	0.016	0.740	3.00	0	0	0	0		119
D. R. Diedrich & Co LTD	0044938	006	General - NCCW	MN-16	0.028	0.700	4.97	0	0	0	0		120
Froedtert Memorial Lutheran Hospital	0044938	001	General - NCCW	MN-15	0.019	0.856	4.13	0	0	0	0		121
Gelos Metal Solutions Inc	0044938	001	General - NCCW	MN-09	0.004	0.593	0.602	0	0	0	0		122
GE Healthcare	0044938	001	General - NCCW	MN-09	0.002	0.605	0.307	0	0	0	0		123

Facility Name	Permit Number	Outfall Number	Permit Type	TMDL Reach	Baseline Flow (MGD)	Baseline TP Concentration (mg/L)	Baseline TP Load (lbs/month)	Baseline TSS Concentration (mg/L)	Baseline TSS Load (lbs/month)	Baseline FC Concentration (cells/100 mL)	Baseline FC Load (cells/month)	Notes	Map Number
GEHL Guernsey Farms Inc*	0044938	001	General - NCCW	MN-01	0.190	0.432	20.8	0	0	0	0	Permit discontinued	124
Gkn Sinter Metals	0044938	001	General - NCCW	MN-01	0.006	0.205	0.312	0	0	0	0		125
Gkn Sinter Metals	0044938	001a	General - NCCW	MN-05	0.010	1.14	2.88	0	0	0	0		126
Gkn Sinter Metals	0044938	001b	General - NCCW	MN-05	0.010	0.566	1.44	0	0	0	0		127
Grede LLC - Liberty Foundry	0044938	001	General - NCCW	MN-16	0.089	0.532	12.0	0	0	0	0		128
Grede LLC - Liberty Foundry	0044938	002	General - NCCW	MN-16	0.028	0.256	1.82	0	0	0	0		129
Hampel Corp	0044938	001	General - NCCW	MN-03	0.120	0.040	1.22	0	0	0	0		130
Harley Davidson Motor Company Operations	0044938	001	General - NCCW	MN-05	0.003	1.16	0.884	0	0	0	0		131
Harley Davidson Motor Company PDC	0044938	001	General - NCCW	MN-10	0.007	0.193	0.343	0	0	0	0		132
Harley Davidson Motor Company PDC	0044938	002	General - NCCW	MN-10	0.003	1.39	1.06	0	0	0	0		133
Hellermann Tyton	0044938	001	General - NCCW	MN-09	0.067	1.57	26.7	0	0	0	0	WDNR Facility ID No. 26159	134
Helwig Carbon Products Inc	0044938	001	General - NCCW	MN-09	0.004	0.515	0.523	0	0	0	0	Phosphorus concentrations represent average residual concentration of water supply per WDNR.	135
Hentzen Coatings Inc Milwaukee	0044938	002	General - NCCW	MN-09	0.016	0.573	2.33	0	0	0	0		136
Hentzen Coatings Inc Milwaukee	0044938	003	General - NCCW	MN-09	0.016	0.566	2.30	0	0	0	0		137
Joy Global Surface Mining Inc	0025321	001	Individual	MN-16	0.285	0.500	36.1	15	1.08E+03	0	0	NCCW, heat treat quench water, boiler blowdown.	138
Krete Industries Inc	0044938	001	General - NCCW	MN-10	0.001	0.915	0.232	0	0	0	0		139
Masterson Co	0044938	001	General - NCCW	MN-16	0.045	0.593	6.77	0	0	0	0		140
Masterson Co	0044938	002	General - NCCW	MN-16	0.051	0.548	7.09	0	0	0	0		141
Mayfair Mall	0062260	001	Individual	MN-12	0.0085 (Mar-Nov)	1.70 (Mar-Nov)	3.67 (Mar-Nov)	20 (Mar-Nov)	43 (Mar-Nov)	0	0	Cooling tower blowdown w/ additives, operates March through November.	142
Midwestern Anodizing Corporation	0044938	001	General - NCCW	MN-09	0.004	0.643	0.652	0	0	0	0		143
Millercoors LLC	0000744	001	Individual	MN-16	0.190	0.300	14.5	10	482	0	0	Cooling water	144
Millercoors LLC	0000744	004	Individual	MN-16	0.320	0.800	64.9	20	1.62E+03	0	0	Filter backwash	145
Milwaukee County Power Plant	0044938	001	General - NCCW	MN-14	0.133	1.06	35.8	0	0	0	0		146
Milwaukee Logistic Center	0044938	001	General - NCCW	MN-05	0.00001	8.34	0.021	0	0	0	0		147
Motor Castings Co Plt 1 West Allis	0044938	004	General - NCCW	MN-16	0.003	0.247	0.188	0	0	0	0		148
Motor Castings Co Plt 1 West Allis	0044938	005	General - NCCW	MN-16	0.006	0.582	0.886	0	0	0	0		149
Motor Castings Co Plt 1 West Allis	0044938	007	General - NCCW	MN-16	0.003	0.470	0.358	0	0	0	0		150
Neubauer Fabrications Inc	0044938	001	General - NCCW	MN-01	0.0002	0	0	0	0	0	0	Facility is located in Germantown. The Village of Germantown does not add phosphorus to its water supply per WDNR.	151
Perlick Corp	0044938	001	General - NCCW	MN-09	0.024	0.245	1.49	0	0	0	0		152
Pettit National Ice Center	0044938	001	General - NCCW	MN-15	0.005	0.515	0.653	0	0	0	0	Phosphorus concentrations represent average residual concentration of water supply per WDNR.	153
Phoenix Metal Treating	0044938	001	General - NCCW	MN-01	0.014	0.032	0.114	0	0	0	0		154
Rexnord Industries Inc	0044938	001	General - NCCW	MN-16	0.133	0.500	16.9	0	0	0	0		155

Facility Name	Permit Number	Outfall Number	Permit Type	TMDL Reach	Baseline Flow (MGD)	Baseline TP Concentration (mg/L)	Baseline TP Load (lbs/month)	Baseline TSS Concentration (mg/L)	Baseline TSS Load (lbs/month)	Baseline FC Concentration (cells/100 mL)	Baseline FC Load (cells/month)	Notes	Map Number
Rexnord Industries Inc	0044938	004	General - NCCW	MN-16	0.0005	1.20	0.163	0	0	0	0		156
Rexnord Industries Inc	0044938	009	General - NCCW	MN-16	0.034	0.670	5.85	0	0	0	0		157
Rexnord Industries LLC -Falk	0044938	005	General - NCCW	MN-16	0.030	0.480	3.65	0	0	0	0		158
Sun Chemical Kohl & Madden	0044938	004	General - NCCW	MN-05	0.001	0.620	0.157	0	0	0	0		159
Super Steel LLC	0044938	001	General - NCCW	MN-09	0.002	0.362	0.184	0	0	0	0		160
Super Steel LLC	0044938	002	General - NCCW	MN-09	0.002	0.677	0.343	0	0	0	0		161
Thiele Tanning Co	0044938	001	General - NCCW	MN-16	0.0009	0.515	0.118	0	0	0	0	Phosphorus concentrations represent average residual concentration of water supply per WDNR.	162
Toshiba International Corp	0044935	001	General - NCCW	MN-16	0.0086	0.427	0.933	0	0	0	0		163
Toshiba International Corp	0044938	002	General - NCCW	MN-16	0.0014	0.692	0.246	0	0	0	0		164
US Food Service	0044938	001	General - NCCW	MN-05	0.003	5.16	3.93	0	0	0	0		165
Waste Management of Omega Hills Landfill	0049514	001	Individual	MN-05	0.080	0.020	0.406	20	406	0	0	Baseline flow based on design flow in permit.	166
We Energies Germantown	0042757	001	Individual	MN-01	0.005 (May-Oct)	0.197 (May-Oct)	0.250 (May-Oct)	10 (May-Oct)	13 (May-Oct)	0	0	Intermittent discharge, operates May through November. Oil/water separator. Flow from permit application. Source water private well.	167
We Energies Germantown	0042757	002	Individual	MN-01	0.008 (May-Oct)	0.202 (May-Oct)	0.410 (May-Oct)	20 (May-Oct)	41 (May-Oct)	0	0	Intermittent discharge, operates May through November. Condenser blowdown, cooling coil condensate, ice water storage tanks. Flow from permit application. Source water private well.	168
We Energies Germantown	0042757	003	Individual	MN-01	0	0	0	0	0	0	0	Portable demineralizer tanks. No discharge.	169
We Energies Milwaukee Heating Plant	0044938	003	General - NCCW	MN-16	0.024	0.380	2.31	0	0	0	0		170
West Allis Memorial Hospital	0044938	001	General - NCCW	MN-15	0.017	0.555	2.39	0	0	0	0		171
Xymox Technologies Inc	0044938	001	General - NCCW	MN-09	0.001	0.712	0.181	0	0	0	0		172
Kinnickinnic River Watershed													
Acme Galvanizing Inc	0044938	003	General - NCCW	KK-7	0.003	0.400	0.304	0	0	0	0		200
Apiscent Labs	0044938	001	General - NCCW	KK-4	0.124	1.04	32.7	0	0	0	0		201
Associated Spring	0044938	001	General - NCCW	KK-5	0.0001	1.62	0.041	0	0	0	0		202
Campbell Soup Supply Co LLC	0044938	001	General - NCCW	KK-5	0.090	0.720	16.4	0	0	0	0		203
Elite Finishing	0044938	001	General - NCCW	KK-7	0.010	0.630	1.60	0	0	0	0		204
General Electric Medical Tube Manufacturing	0044938	001	General - NCCW	KK-3	0.070	0.610	10.8	0	0	0	0		205
General Electric Medical Tube Manufacturing	0044938	002	General - NCCW	KK-3	0.093	0.892	21.0	0	0	0	0		206
General Mitchell International Airport	0046477	001	Individual	KK-5	0.06	0.780	11.9	45	695	0	0	Non-continuous deicing discharge. Outfall 003 discharges to Oak Creek. Flows are max annual average from permit application. P concentration from P point source load summary table. TSS is average from Mar 2006 - Jan 2015.	207
General Mitchell International Airport	0046477	007	Individual	KK-4	3.14	0.780	621	60	4.78E+04	0	0		208
Great Lakes Water Institute	0045942	001	Individual	KK-7	0.260	0.500	33.0	10	650	0	0		209

Facility Name	Permit Number	Outfall Number	Permit Type	TMDL Reach	Baseline Flow (MGD)	Baseline TP Concentration (mg/L)	Baseline TP Load (lbs/month)	Baseline TSS Concentration (mg/L)	Baseline TSS Load (lbs/month)	Baseline FC Concentration (cells/100 mL)	Baseline FC Load (cells/month)	Notes	Map Number
Great Lakes Water Institute	0045942	002	Individual	KK-7	0.260	0.500	33.0	10	660	0	0		210
Grebes Bakery	0044938	001	General - NCCW	KK-2	0.0003	0.515	0.039	0	0	0	0	Phosphorus concentrations represent average residual concentration of water supply per WDNR.	211
Grebes Bakery	0044938	002	General - NCCW	KK-2	0.002	0.515	0.261	0	0	0	0		212
Grebes Bakery	0044938	003	General - NCCW	KK-3	0.006	0.515	0.784	0	0	0	0		213
Joy Mark Inc*	0044938	001	General - NCCW	KK-4	0.000006	0.515	0.001	0	0	0	0	Permit discontinued as of 03/13/2015. Phosphorus concentrations represent average residual concentration of water supply per WDNR.	214
Ladish Forging LLC	0000728	040	Individual	KK-4	0.23	0.400	23.3	10	583	0	0	Outfall 040 is the combined discharge of Ladish Outfalls 002 and 003 (NCCW discharges). Flow is estimated and reported on Discharge Monitoring Report; no other monitoring done at this outfall.	215
Malteurop North America Inc.	0044938	001	General - NCCW	KK-3	0.025	0.810	5.14	0	0	0	0		216
Maynard Steel Casting Co*	0000272	002	Individual	KK-7	0.012	0.197	0.601	0	0	0	0	Permit discontinued March 2016.	217
Patrick Cudahy Inc	0044938	001	General - NCCW	KK-4	0.060	0	0	0	0	0	0	Source water does not contain phosphorus per WDNR.	218
Reliable Plating Works Inc	0044938	001	General - NCCW	KK-5	0.022	0.564	3.15	0	0	0	0		219
Rexnord/Stearns Division	0044938	001	General - NCCW	KK-4	0.026	0.238	1.57	0	0	0	0		220
St Luke's Medical Center	0044938	008	General - NCCW	KK-7	0.009	0.302	0.689	0	0	0	0		221
St Luke's Medical Center	0044938	009	General - NCCW	KK-4	0.029	0.488	3.59	0	0	0	0		222
St Luke's Medical Center	0044938	011	General - NCCW	KK-7	0.019	0.600	2.89	0	0	0	0		223
St Luke's Medical Center	0044938	016	General - NCCW	KK-7	0.0007	0.240	0.043	0	0	0	0		224
Unit Drop Forge Co Inc	0044935	001	General - NCCW	KK-3	0.027	0.478	3.27	0	0	0	0		225
Milwaukee River Watershed													
Airsan Corp*	0044938	001	General - NCCW	MI-31	0.000012	0.500	0.002	0	0	0	0	Permit discontinued 10/21/2011.	300
Amcor Flexibles Inc	0044938	002	General - NCCW	MI-31	0.022	0.302	1.69	0	0	0	0		301
Arkema Inc	0027731	001	Individual	MI-16	0.870	0	0	0	0	0	0	Water supply is from a groundwater source per WDNR. Background TP and TSS are present in effluent from source water. Point source is not contributing TP or TSS beyond that which is present in the water supply. For these reasons, no TP or TSS reductions are necessary to meet TMDL targets.	302
Badger Meter Inc	0033529	001	Individual	MI-28	0.2255	0.350	20.0	0	0	0	0	Meter test stand water is discharged to stormwater pond..Samples are collected at overflow structure to storm sewer to Beaver Creek. Source water for test stand water is municipal water supply. Current permit does not require TSS sampling.	303
Badger Meter Inc*	0033529	002	Individual	MI-28	–	–	–	–	–	–	–	WLAs will not be assigned. Outfall 002 abandoned per WDNR.	304
Brady USA Inc Coated Products Div	0044938	001	General - NCCW	MI-31	0.028	0.570	4.05	0	0	0	0		305

Facility Name	Permit Number	Outfall Number	Permit Type	TMDL Reach	Baseline Flow (MGD)	Baseline TP Concentration (mg/L)	Baseline TP Load (lbs/month)	Baseline TSS Concentration (mg/L)	Baseline TSS Load (lbs/month)	Baseline FC Concentration (cells/100 mL)	Baseline FC Load (cells/month)	Notes	Map Number
Brewery Works Inc	0044938	001	General - NCCW	MI-32	5.90	0	0	0	0	0	0	Water supply is surface water per WDNR. Background TP is present in effluent from source water. Point source is not contributing TP beyond that which is present in the water supply. For these reasons, no TP reductions are necessary to meet TMDL targets.	306
C & D Technologies	0063258	006	Individual	MI-32	0.010	0.600	1.52	20	50.7	0	0	NCCW, boiler blowdown	307
Campbellsport Wastewater Treatment Facility	0020818	001	Individual	MI-01	0.470	1.00	119	10.0	1.19E+03	400 (May-Sept)	2.16E+11 (May-Sept)	Baseline TP concentrations for all POTWs is set at 1 mg/L to reflect compliance with NR 217.	308
Cascade Wastewater Treatment Facility	0031372	001	Individual	MI-08	0.130	1.00	33.0	60.0	1.98E+03	400 (May-Sept)	5.98E+10 (May-Sept)	Baseline TP concentrations for all POTWs is set at 1 mg/L to reflect compliance with NR 217.	309
Cedarburg Wastewater Treatment Facility	0020222	001	Individual	MI-24	3.07	1.00	779	15.0	1.17E+04	400 (May-Sept)	1.41E+12 (May-Sept)	Baseline TP concentrations for all POTWs is set at 1 mg/L to reflect compliance with NR 217. Baseline flow set at Planned 2035 Flow per SEWRPC.	310
Charter Steel Div Of Charter Mfg Co	0044938	002	General - NCCW	MI-16	0.239	0.030	1.82	0	0	0	0		311
Charter Steel Div Of Charter Mfg Co	0044938	003	General - NCCW	MI-16	0.027	0.040	0.274	0	0	0	0		312
Charter Steel Div Of Charter Mfg Co	0044938	005	General - NCCW	MI-16	0.011	0.070	0.195	0	0	0	0		313
Chicago Faucets	0044938	001	General - NCCW	MI-31	0.004	0.563	0.571	0	0	0	0		314
Compass Properties	0044938	001	General - NCCW	MI-32	0.177	0	0	0	0	0	0	Water supply is surface water per WDNR. Background TP is present in the surface water intake. Point source is not contributing TP beyond that which is present in the water supply. For these reasons, no TP reductions are necessary to meet TMDL targets.	315
DRS Power & Control Technologies Inc	0062723	002	Individual	MI-31	0.032	0.584	4.76	0	0	0	0	HVAC cooling water discharge to Storm Sewer to Lincoln CreekFlow and baseline TP load for former Outfall 001 added to flow and baseline TP load for Outfall 002. Outfall 001 no longer active.	316
DRS Power & Control Technologies Inc	0062723	003	Individual	MI-31	0.0001	1.80	0.046	20	0.51	0	0	Cooling tower blowdown, discharge is once per year.	317
DRS Power & Control Technologies Inc	0062723	009	Individual	MI-31	0.048	2.30	28.0	0	0	0	0	Heat Exchanger; Point source is not contributing TSS beyond that which is present in the water supply. Discharge is once through city water. For these reasons, no TSS reductions are necessary to meet TMDL targets.	318
Electron Beam Fusion Corp	0044938	001	General - NCCW	MI-31	0.003	0.780	0.594	0	0	0	0		319
Franchise Mailing Systems*	0044938	001	General - NCCW	MI-32	0.0001	0.515	0.013	0	0	0	0	Permit discontinued 2/20/2014.	320
Fred Usinger Inc	0044938	001	General - NCCW	MI-32	0.005	0.515	0.653	0	0	0	0	Phosphorus concentration represents average residual concentration of water supply per WDNR.	321
Fredonia Municipal Sewer and Water Utility	0020800	001	Individual	MI-15	0.600	1.00	152	30	4.57E+03	400 (May-Sept)	2.76E+11 (May-Sept)		322
Fromm Family Pet Food	0044938	001	General - NCCW	MI-26	0.008	0.100	0.203	0	0	0	0		323
Grafton Village Water & Wastewater Utility	0020184	001	Individual	MI-17	2.50	1.00	634	30	1.90E+04	400 (May-Sept)	1.15E+12 (May-Sept)		324

Facility Name	Permit Number	Outfall Number	Permit Type	TMDL Reach	Baseline Flow (MGD)	Baseline TP Concentration (mg/L)	Baseline TP Load (lbs/month)	Baseline TSS Concentration (mg/L)	Baseline TSS Load (lbs/month)	Baseline FC Concentration (cells/100 mL)	Baseline FC Load (cells/month)	Notes	Map Number
Hellermann Tyton	0044938	001	General - NCCW	MI-31	0.0005	0.515	0.065	0	0	0	0	WDNR Facility ID No. 50265. Phosphorus concentration represents average residual concentration of water supply per WDNR.	325
Hub Milwaukee Center Properties LLC	0044938	001	General - NCCW	MI-32	3.56	0	0	0	0	0	0	Water supply is surface water per WDNR. Background TP is present in the surface water intake. Point source is not contributing TP beyond that which is present in the water supply. For these reasons, no TP reductions are necessary	326
Hydrite Chemical Company	0044938	001	General - NCCW	MI-29	0.054	1.49	20.4	0	0	0	0		327
Hydro Platers Inc	0044938	001	General - NCCW	MI-31	0.005	0.650	0.824	0	0	0	0		328
Hydro Platers Inc	0044938	002	General - NCCW	MI-31	0.005	0.633	0.803	0	0	0	0		329
Jackson (Village) Wastewater Treatment Plant	0021806	001	Individual	MI-21	1.69	1.00	429	12	5.14E+03	400 (May-Sept)	7.78E+11 (May-Sept)		330
Johnson Controls Inc	0000108	001	Individual	MI-31	0.004 (Mar-Nov)	1.70 (Mar-Nov)	1.51 (Mar-Nov)	20 (Mar-Nov)	17.8 (Mar-Nov)	0	0	Cooling tower blowdown, operates March through November.	331
Kewaskum Village	0021733	001	Individual	MI-02	0.750	1.00	190	10 (May-Oct) 18 (Nov-Apr)	1.90E+03 (May-Oct) 3.42E+03 (Nov-Apr)	400 (May-Sept)	3.45E+11 (May-Sept)		332
Kracor Inc	0044938	001	General - NCCW	MI-31	0.0004	1.16	0.118	0	0	0	0		333
Kracor Inc	0044938	002	General - NCCW	MI-31	0.0008	1.16	0.235	0	0	0	0		334
Krier Foods Inc Random Lake	0049204	001	Individual	MI-14	0.082	0.18	3.74	0	0	0	0	NCCW, reverse osmosis reject	335
Lallemand Specialities Inc	0044938	001	General - NCCW	MI-31	0.020	0.677	3.43	0	0	0	0		336
Mid City Foundry United Division*	0044938	001	General - NCCW	MI-17	0.011	0.240	0.670	0	0	0	0	Permit discontinued March 2015.	337
Milk Specialties Global Adell	0001236	001	Individual	MI-09	1.39	0.740	261	10	3.53E+03	0	0		338
Milwaukee Gear Co Inc	0044938	001	General - NCCW	MI-27	0.183	0.160	7.43	0	0	0	0		339
Molecular Biology Resources Inc	0044938	001	General - NCCW	MI-31	0.014	0.632	2.24	0	0	0	0		340
Newburg Village	0024911	001	Individual	MI-07	0.200	1.00	50.7	30	1.52E+03	400 (May-Sept)	9.21E+10 (May-Sept)	Baseline TP concentrations for all POTWs is set at 1 mg/L to reflect compliance with NR 217. Baseline flow set at Planned 2035 Flow per SEWRPC.	341
Norstar Aluminum Molds Inc	0044938	002	General - NCCW	MI-24	0.001	0.345	0.088	0	0	0	0	Phosphorus concentration represents average residual concentration of water supply per WDNR (Cedarburg).	342
Norstar Aluminum Molds Inc	0044938	003	General - NCCW	MI-24	0.0006	0.345	0.053	0	0	0	0	Phosphorus concentration represents average residual concentration of water supply per WDNR (Cedarburg).	343
Novozymes Bioag Inc	0044938	001	General - NCCW	MI-31	0.014	0.700	2.49	0	0	0	0		344
Pentair Residential Filtration LLC	0044938	002	General - NCCW	MI-27	0.0015	0.515	0.196	0	0	0	0	Phosphorus concentration represents average residual concentration of water supply per WDNR. Previous individual permit discontinued 6/30/2015 (that discharge is now covered by Hydrostatic Test Water General Permit.)	345

Facility Name	Permit Number	Outfall Number	Permit Type	TMDL Reach	Baseline Flow (MGD)	Baseline TP Concentration (mg/L)	Baseline TP Load (lbs/month)	Baseline TSS Concentration (mg/L)	Baseline TSS Load (lbs/month)	Baseline FC Concentration (cells/100 ml)	Baseline FC Load (cells/month)	Notes	Map Number
Pereles Bros	0044938	001	General - NCCW	MI-31	0.202	0.892	45.7	0	0	0	0		346
Random Lake Village	0021415	001	Individual	MI-14	0.449	1.00	114	20	2.28E+03	400 (May-Sept)	2.07E+11 (May-Sept)		347
Regal Beloit America	0044938	001	General - NCCW	MI-27	0.046	0.173	2.02	0	0	0	0		348
Regal Ware Inc	0044938	001	General - NCCW	MI-06	0.057	0.322	5.47	0	0	0	0		349
Ritus Rubber Corporation	0044938	001	General - NCCW	MI-29	0.074	0.515	9.67	0	0	0	0	P Per letter from facility on 06/23/2016, facility uses closed loop system now. No discharge. Permit discontinued.	350
Riveredge Nature Center	0044938	001	General - NCCW	MI-07	0.014	0	0	0	0	0	0	Water supply is from a well source per WDNR.	351
Saukville Village Sewer Utility	0021555	001	Individual	MI-16	1.61	1.00	408	30	1.23E+04	400 (May-Sept)	7.41E+11 (May-Sept)		352
Schreiber Foods Inc - West Bend	0026751	001	Individual	MI-24	0.476	1.00	121	10 (May-Oct) 19 (Nov-Apr)	1.21E+03 (May-Oct) 2.29E+03 (Nov-Apr)	0	0		353
Signicast LLC - Milwaukee	0044938	002	General - NCCW	MI-26	0.024	0.607	3.70	0	0	0	0		354
Signicast LLC - Milwaukee	0044938	003	General - NCCW	MI-28	0.004	0.580	0.589	0	0	0	0		355
Solines, LLC	0044938	007	General - NCCW	MI-31	0.162	1.76	72.1	0	0	0	0		356
Solines, LLC	0044938	014	General - NCCW	MI-31	0.002	0.646	0.328	0	0	0	0		357
Stainless Foundry Engineering Inc	0044938	002	General - NCCW	MI-31	0.040	0.800	8.12	0	0	0	0		358
Stainless Foundry Engineering Inc	0044938	004	General - NCCW	MI-31	0.112	0.585	16.6	0	0	0	0		359
Super Steel LLC Calumet*	0044938	001	General - NCCW	MI-29	0.002	0.480	0.244	0	0	0	0	Permit discontinued June 2015.	360
Sysco Food Service Of Eastern Wisconsin	0063231	001	Individual	MI-18	0.002	0.370	0.188	0	0	0	0	Wastewater component is cooling tower blowdown (not a "pass-through" NCCW), operates April through October.	361
Universal Strap Inc	0044938	001	General - NCCW	MI-20	0.0004	0	0	0	0	0	0	The facility is located in Village of Jackson which uses orthophosphate for corrosion control in water supply distribution system. Average concentration is 0.43 mg/L orthophosphate, or 0.14 mg/L TP.	362
We Energies Milwaukee Heating Plant	0044938	001	General - NCCW	MI-32	0.002	0.144	0.073	0	0	0	0		363
We Energies Milwaukee Heating Plant	0044938	002	General - NCCW	MI-32	0.0002	0.065	0.003	0	0	0	0		364
We Energies Milwaukee Heating Plant	0044938	004	General - NCCW	MI-32	0.007	0.410	0.728	0	0	0	0		365
We Energies Milwaukee Heating Plant	0044938	006	General - NCCW	MI-32	0.006	0.090	0.137	0	0	0	0		366
West Bend City	0025763	001	Individual	MI-06	9.00	1.00	2.28E+03	10	2.28E+04	400 (May-Sept)	4.14E+12 (May-Sept)		367
WDNR Kettle Moraine Springs Fish Hatchery	0026255	001	Individual	MI-11	1.20	0.060	18.3	10	3.04E+03	0	0		368
Wisconsin Thermoset Molding Inc	0042218	005	Individual	MI-32	0.0002	1.650	0.084	0	0	0	0	Cooling tower blowdown	369

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Milwaukee Harbor Estuary													
Aldrich Chemical Co Inc Emmber	0044938	001	General - NCCW	Estuary	0.009	0.530	1.21	0	0	0	0		400
Discovery World at Pier Wisconsin	0044938	001	General - NCCW	Estuary	2.44	0	0	0	0	0	0	Water supply is surface water per WDNR.	401
Miller Compressing Mainyard Recycle AP	0044938	003	General - NCCW	Estuary	0.003	0.820	0.624	0	0	0	0		402
Milwaukee Art Museum	0044938	001	General - NCCW	Estuary	1.44	0	0	0	0	0	0	Water supply is surface water per WDNR.	403
Milwaukee Metropolitan Sewerage District - Jones Island	0036820	002	Individual	Estuary	123.0	0.660	2.06E+04	30	9.36E+05	400	5.66E+13		404
Milwaukee Metropolitan Sewerage District - Jones Island	0036820	003	Individual	Estuary	2.40	0	0	0	0	0	0	Water supply is surface water per WDNR. Flow is based on highest 7-day averages from 1/2006 through 5/2011 and phosphorus values from 8/2011 thru 8/2012.	405
We Energies Valley Power Plant	0000931	001	Individual	Estuary	79.2	0	0	0	0	0	0	Process wastewater discharged to MMSD for treatment. Water supply for remainder of discharge is surface water per WDNR.	406
We Energies Valley Power Plant	0000931	002	Individual	Estuary	54.9	0	0	0	0	0	0	Water supply is surface water per WDNR.	407

*An asterisk (*) behind a facility name indicates that the discharge has been discontinued. Baseline and draft wasteload allocation amounts were calculated for this outfall during TMDL development. Since the discharge was discontinued prior to TMDL approval, a final individual wasteload allocation was not assigned to this outfall. Instead, the draft WLA portion will be set aside as additional reserve capacity for the reach.