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

JUN 07 2017

REPLY TO THE ATTENTION OF

WW-16J

Glenn Skuta, Watershed Division Director
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDL) for segments within the Chippewa River watershed, including support documentation and follow up information. The Chippewa River watershed (CRW) is in central Minnesota in parts of Chippewa, Douglas, Grant, Kandiyohi, Meeker, Otter Tail, Pope, Stearns, Stevens and Swift Counties. The CRW TMDLs address impaired aquatic recreation due to excessive nutrients (total phosphorus) and bacteria and impaired aquatic life use due to excessive sediment (turbidity/TSS) and nutrients (dissolved oxygen).

EPA has determined that the CRW TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations set forth at 40 C.F.R. Part 130. Therefore, EPA approves Minnesota's twelve bacteria TMDLs, twenty-seven total phosphorus TMDLs and two sediment (total suspended solids) TMDLs. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's efforts in submitting these TMDLs and look forward to future TMDL submissions by the State of Minnesota. If you have any questions, please contact Mr. Peter Swenson, Chief of the Watersheds and Wetlands Branch, at 312-886-0236.

Sincerely,

Christopher Korleski
Director, Water Division

Enclosure

cc: Celine Lyman, MPCA

wq-iw7-42g

TMDL: Chippewa River Watershed bacteria, phosphorus & TSS TMDLs, Chippewa, Douglas, Grant, Kandiyohi, Meeker, Otter Tail, Pope, Stearns, Stevens and Swift Counties, Minnesota
Date: June 7, 2017

DECISION DOCUMENT
FOR THE CHIPPEWA RIVER WATERSHED TMDLS, CHIPPEWA, DOUGLAS, GRANT, KANDIYOHI, MEEKER, OTTER TAIL, POPE, STEARNS, STEVENS & SWIFT COUNTIES, MINNESOTA

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

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

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

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

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

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

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

Comment:

Location Description/Spatial Extent:

The Chippewa River Watershed (CRW) (HUC-8 #07020005) is one of thirteen major tributaries to the Minnesota River and drains approximately 2,080 square miles (1,331,200 acres) in western-central Minnesota. The CRW occupies portions of Chippewa, Douglas, Grant, Kandiyohi, Meeker, Otter Tail, Pope, Stearns, Stevens and Swift Counties. The source of the Chippewa River is near Fish Lake in southern Otter Tail County. The Chippewa River flows in a southern direction approximately 130-miles until it joins the Minnesota River at Montevideo, Minnesota. The main tributaries to the Chippewa River are: the Little Chippewa River, East Branch Chippewa River, and Shakopee Creek. There are approximately 2,091 miles of streams and ditches within the Chippewa River basin.

The CRW TMDLs address twelve (12) impaired segments due to excessive bacteria, twenty-seven (27) impaired segments due to excessive nutrients, and two (2) impaired segments due to excessive sediment inputs (Table 1 of this Decision Document). The CRW spans three ecoregions, the North Central Hardwood Forest (NCHF) ecoregion, the Northern Glaciated Plain (NGP) (i.e., Lake Agassiz Plain) ecoregion and the Western Corn Belt Plain (WCBP) ecoregion.

Table 1: Chippewa River Watershed impaired waters addressed by this TMDL

Water body name	Assessment Unit ID	Affected Use	Pollutant or stressor	TMDL
Chippewa River	07020005-506	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Cottonwood Creek	07020005-511	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
East Branch Chippewa River	07020005-515	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
South Mud Creek	07020005-518	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Outlet Creek	07020005-523	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
North Mud Creek	07020005-554	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Shakopee Creek	07020005-557	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
County Ditch 3	07020005-579	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Tributary to Chippewa River	07020005-584	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Trappers Run Creek	07020005-628	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Little Chippewa River	07020005-713	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Huse Creek	07020005-917	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
			TOTAL bacteria TMDLs	**12**
Block Lake	56-0079-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Edwards Lake	61-0106-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Hanson Lake	61-0080-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Danielson Slough Lake	61-0194-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Gilbert Lake	21-0189-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Hassel Lake	76-0086-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Hollerberg Lake	76-0057-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Jennie Lake	21-0323-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
John Lake	61-0123-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL

Irgens Lake	61-0211-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Johanna Lake	61-0006-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Jorgenson Lake	61-0164-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Long Lake	21-0343-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Mary Lake	61-0099-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Monson Lake	76-0033-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Long Lake	75-0024-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
McIver Lake	61-0199-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Norway Lake	34-0251-02	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Rasmuson Lake	61-0086-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Simon Lake	61-0034-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Thompson Lake	26-0020-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Red Rock Lake	21-0291-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Swenoda Lake	61-0051-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
West Norway Lake	34-0251-01	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Wicklund Lake	61-0204-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
			TOTAL TP lake TMDLs	25
Mud Creek	07020005-554	Aquatic Life (Dissolved Oxygen)	Excess Nutrients (total phosphorus)	TP TMDL
Tributary to Chippewa River	07020005-584	Aquatic Life (Dissolved Oxygen)	Excess Nutrients (total phosphorus)	TP TMDL
			TOTAL TP stream TMDLs	2
Chippewa River	07020005-507	Aquatic Life (Turbidity & Impaired Biotic Community)	Sediment/TSS	TSS TMDL
Outlet Creek	07020005-523	Aquatic Life (Impaired Biotic Community)	Sediment/TSS	TSS TMDL
			TOTAL TSS TMDLs	2

The Minnesota Pollution Control Agency (MPCA) developed two TP stream TMDLs to address two segments (07020005-554 & 07020005-584) impaired due to dissolved oxygen deficiencies in the water column. Additionally, MPCA developed one TSS TMDL (07020005-523) to address a segment which displayed impaired biotic communities (IBC).

Land Use:
Land use in the CRW is predominantly agricultural, over 79% of the CRW area (Table 2 of this Decision Document). The CRW is comprised of cropland (68.5%), pasture/hay/grasslands (10.7%), open water (6.1%), wetlands (5.3%), developed lands (5.0%), forested/shrub lands (4.3%) and barren/mining lands (0.1%). Significant development is not expected in the CRW. The land use within the watershed is primarily agricultural and according to MPCA is expected to remain agricultural for the foreseeable future.

Table 2: Land Use for the Chippewa River Watershed based on Multi-Resolution Land Characteristics Consortium (MRLC) 2011 data set

Land Use	Chippewa River Watershed (07020005)
Cropland	68.5%
Pasture/Hay/Grassland	10.7%
Open Water	6.1%
Wetland	5.3%
Developed Land	5.0%
Forest/Shrub Land	4.3%
Barren/Mining Land	0.1%
TOTALS	100.0%

Problem Identification:

Bacteria TMDLs: Bacteria impaired segments identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive bacteria. Water quality monitoring within the CRW indicated that these segments were not attaining their designated aquatic recreation uses due to exceedances of bacteria criteria. Bacteria exceedances can negatively impact recreational uses (i.e., swimming, wading, boating, fishing) 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.

Phosphorus TMDLs: Lakes and stream segments identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive nutrients (phosphorus). Total phosphorus (TP), chlorophyll-*a* (chl-a) and Secchi depth (SD) measurements in the CRW indicated that water bodies addressed via these TMDL efforts were not attaining their designated aquatic recreation uses due to exceedances of nutrient criteria. Water quality monitoring within the CRW was completed at several locations and the data collected during these efforts was the foundation for modeling efforts completed in this TMDL study.

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 dissolved oxygen levels within the water column. The decreases in dissolved oxygen can stress benthic macroinvertebrates and fish. Depletion of oxygen in the water column can also lead to conditions where phosphorus is released from bottom sediments (i.e. internal loading). Also, 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.

Sediment (Total Suspended Solids) TMDLs: Sediment (turbidity) impaired segments identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive sediment within the water column. Water quality monitoring within the CRW indicated that these segments were not attaining their designated aquatic life uses due to high turbidity measurements and the negative impact of those conditions on aquatic life (i.e., fish and macroinvertebrate communities).

Total suspended solids (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.

Degradations in aquatic habitats or water quality (ex. low dissolved oxygen) can negatively impact aquatic life use. Increased turbidity, 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.

Excess siltation and flow alteration in streams impacts aquatic life by altering habitats. Excess sediment can fill pools, embed substrates, and reduce connectivity between different stream habitats. The result is a decline in habitat types that, in healthy streams, support diverse macroinvertebrate communities. Excess sediment can reduce spawning and rearing habitats for certain fish species. Flow alterations in the CRW have resulted from drainage improvements on or near agricultural lands. Specifically, tile drains and land smoothing have increased surface and subsurface flow to streams. This results in higher peak flows during storm events and flashier flows which carry sediment loads to streams and erode streambanks.

Priority Ranking:
The water bodies addressed by the CRW TMDLs were given a priority ranking for TMDL development due to: the impairment impacts on public health and aquatic life, the public value of the impaired water resource, the likelihood of completing the TMDL in an expedient manner, the inclusion of a strong base of existing data, the restorability of the water body, the technical capability and the willingness of local partners to assist with the TMDL, and the appropriate sequencing of TMDLs within a watershed or basin. Areas within the CRW are popular locations for aquatic recreation. Water quality degradation has led to efforts to improve the overall water quality within the CRW, and to the development of TMDLs for these water bodies. Additionally, MPCA explained that its TMDL development priorities were prioritized to align with its Statewide watershed monitoring approach and its 10-year Watershed Restoration and Protection Strategies (WRAPS) schedule.

Pollutants of Concern:
The pollutants of concern are bacteria, nutrients (TP) and sediment (TSS).

Source Identification (point and nonpoint sources):

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

CRW bacteria TMDLs:
National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: NPDES permitted facilities may contribute bacteria loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA determined that there are thirteen wastewater treatment facilities (WWTF) in the CRW which contribute bacteria from treated wastewater releases (Table 3 of this Decision Document). MPCA assigned each of these facilities a portion of the bacteria wasteload allocation (WLA).

Table 3: NPDES facilities which contribute pollutant loading in the Chippewa River Watershed

MS4/Facility Name	Permit #	Impaired Reach	WLA
Facilities assigned bacteria (*E. coli*) WLA (billions of bacteria/day)			
Clontarf WWTF	MNG580108	07020005-506	1.01
Evansville WWTF	MN0023329		3.57
Farwell/Kensington WWTF	MNG580220		2.72
Hancock WWTF	MN0023582		6.54
Hoffman WWTF	MNG580134		11.80
Lowry WWTF	MN0024007		2.01
Millerville WWTF	MN0054305		1.21
Murdock WWTF	MNG580086		1.52
Starbuck WWTF	MN0021415		1.67
Sunburg WWTF	MNG580125		0.57
Urbank WWTF	MN0068446		0.38
Danvers WWTF	MNG580119	07020005-511	0.9
Murdock WWTF	MNG580086	07020005-518	1.52
Lowry WWTF	MN0024007	07020005-523	2.01
Starbuck WWTF	MN0021415		1.67
Sunburg WWTF	MNG580125	07020005-554	0.57
Kerkhoven WWTF	MN0020583	07020005-557	0.72
Kerkhoven WWTF	MN0020583	07020005-579	0.72
Lowry WWTF	MN0024007	07020005-628	2.01
Facilities assigned Total Phosphorus (TP) WLA (lbs/day)			
Evansville WWTF	MN0023329	Long Lake (21-0343-00)	6.17
Millerville WWTF	MN0054305		4.19
Urbank WWTF	MN0068446		1.30
Facilities assigned Total Suspended Solids (TSS) WLA (tons/day)			
Benson WWTF	MN0020036	07020005-507	0.1
Clontarf WWTF	MNG580108		0.04
Evansville WWTF	MN0023329		0.14
Farwell/Kensington WWTF	MNG580220		0.11

Hancock WWTF	MN0023582		0.26
Hoffman WWTF	MNG580134		0.47
Kerkhoven WWTF	MN0020583		0.02
Lowry WWTF	MN0024007		0.08
Millerville WWTF	MN0054305		0.05
Murdock WWTF	MNG580086		0.06
Starbuck WWTF	MN0021415		0.04
Sunburg WWTF	MNG580125		0.02
Urbank WWTF	MN0068446		0.01
Chippewa Valley Ethanol Company (Industrial)	MN0062898		0.01
Lowry WWTF	MN0024007	07020005-523	0.08
Starbuck WWTF	MN0021415		0.04

Municipal Separate Storm Sewer System (MS4) communities: MPCA determined that there are no MS4 communities which discharge to impaired bacteria segments addressed in this TMDL report.

Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs): MPCA determined that the CRW does not have CSOs nor SSOs which contribute bacteria to the bacteria impaired segments addressed in this TMDL report.

Concentrated Animal Feedlot Operations (CAFOs): MPCA recognized the presence of twenty-one CAFOs in the CRW (Table 4 of this Decision Document). CAFO facilities must be designed to contain all surface water runoff (i.e., have zero discharge from their facilities) and have a current manure management plan. MPCA explained that these facilities do not discharge effluent and therefore were not assigned a portion of the WLA (WLA = 0).

Table 4: Permitted CAFOs in the Chippewa River Watershed

Facility Name	NPDES Permit #	Animal Units
Jennie-O Turkey Store - Commerford Grower	MNG440107	2,938
Jennie-O Turkey Store - Commerford Brood	MNG440107	1,080
Canadian Connection - Sec 14	MNG440305	1,800
Hancock Pro Pork Inc. - Sec 14	MNG440855	550
Hancock Pro Pork Inc.	MNG440856	1533
Tri-R-Pork Inc.	MNG440127	1,080
Eric Meyer Farm	MNG441050	990
Jennie-O Turkey Store - Olson North Farm	MNG440595	990
Jennie-O Turkey Store - Olson South Farm	MNG440595	990
Jennie-O Turkey Store - Riverside Farm	MNG441256	954
Stan Schaefer Inc.	MNG440747	1058
Riverview LLP - Moore Calves	MNG440748	1698
Blair West Site	MNG441303	1900
Jennie-O Turkey Store - Camp Lake Farm	MNG440595	989
Wilmar Poultry Farms Inc. - Kerkhoven	MNG440742	500
Carlson Dairy LLP - Sec 28	MNG441049	2240
Johnson Dairy Inc.	MNG441264	1990
Riverview LLP - Dublin Dairy	MNG440472	3953
Riverview LLP - East Dublin Dairy	MNG440797	8890

Gerald Tofte Farm	MNG441254	1510
East Dublin Dairy LLP - Chippewa Calves	MNG441023	1000

CRW phosphorus TMDLs:

NPDES permitted facilities: NPDES permitted facilities may contribute phosphorus loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA identified three NPDES permit holders which contribute nutrient loads to an impaired water (i.e., Long Lake (21-0343-00)) within the CRW (Table 3 of this Decision Document). These three WWTFs were assigned a nutrient WLA.

MS4 communities: MPCA determined that there are no MS4 communities which discharge to impaired nutrient lakes or stream segments addressed in this TMDL report.

CSOs and SSOs: MPCA determined that the CRW does not have CSOs nor SSOs which contribute nutrients to the nutrient impaired segments of the CRW.

Stormwater runoff from permitted construction and industrial areas: Construction and industrial sites may contribute phosphorus via sediment runoff during stormwater events. These areas within the CRW must comply with the requirements of the MPCA's NPDES Stormwater Program. The NPDES program requires construction and industrial sites to create a Stormwater Pollution Prevention Plan (SWPPP) that summarizes how stormwater will be minimized from the site.

CRW TSS TMDLs:

NPDES permitted facilities: NPDES permitted facilities may contribute sediment loads to surface waters through wastewater discharges. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA determined that there are thirteen WWTFs which contribute sediment from treated wastewater releases (Table 3 of this Decision Document). MPCA also found that there is one industrial site, Chippewa Valley Ethanol Company which contributes sediment loads via process wastewater to segment 07020005-507. MPCA assigned each of these facilities a portion of the sediment WLA.

MS4 communities: MPCA determined that there are no MS4 communities which contribute sediment loads to sediment impaired stream segments addressed in this TMDL report.

Stormwater runoff from permitted construction and industrial areas: Construction and industrial sites may contribute sediment via stormwater runoff during precipitation events. These areas within the CRW must comply with the requirements of the MPCA's NPDES Stormwater Program. The NPDES program requires construction and industrial sites to create a SWPPP that summarizes how stormwater will be minimized from the site.

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

CRW bacteria TMDLs:

Non-regulated urban runoff: Runoff from urban areas (urban, residential, commercial or industrial land uses) can contribute bacteria to local water bodies. Stormwater from urban areas, which drain impervious surfaces, may introduce bacteria (derived from wildlife or pet droppings) to surface waters.

Stormwater from agricultural land use practices and feedlots near surface waters: Animal Feeding Operations (AFOs) in close proximity to surface waters can be a source of bacteria to water bodies in the CRW. 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 which may lead to impairments in the CRW. 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.

Unrestricted livestock access to streams: Livestock with access to stream environments may add bacteria directly to the surface waters or resuspend particles that had settled on the stream bottom. Direct deposition of animal wastes can result in very high localized bacteria counts and may contribute to downstream impairments. Smaller animal facilities may add bacteria to surface waters via wastewater from these facilities or stormwater runoff from near-stream pastures.

Discharges from Subsurface Sewage Treatment Systems (SSTS) or unsewered communities: Failing septic systems are a potential source of bacteria within the CRW. Septic systems generally do not discharge directly into a water body, but effluents from SSTS may leach into groundwater or pond at the surface where they can be washed into surface waters via stormwater runoff events. Age, construction and use of SSTS can vary throughout a watershed and influence the bacteria contribution from these systems.

Failing SSTS are specifically defined as systems that are failing to protect groundwater from contamination, while those systems which discharge partially treated sewage to the ground surface, road ditches, tile lines, and directly into streams, rivers and lakes are considered an imminent threat to public health and safety (ITPHS). ITPHS systems also include illicit discharges from unsewered communities.

Wildlife: Wildlife is a known source of bacteria 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 urban park areas, forest, and rural areas.

CRW phosphorus TMDLs:

Internal loading: The release of phosphorus from lake sediments, the release of phosphorus from lake sediments via physical disturbance from benthic fish (rough fish, ex. carp), the release of phosphorus from wind mixing the water column, and the release of phosphorus from decaying curly-leaf pondweeds, may all contribute internal phosphorus loading to the lakes of the CRW. Phosphorus may build up in the bottom waters of the lake and may be resuspended or mixed into the water column when the thermocline decreases and the lake water mixes.

Stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of nutrients, organic material and organic-rich sediment which may lead to impairments in the CRW. Manure spread onto fields is often a source of phosphorus, and can be exacerbated by tile drainage lines, which channelize the stormwater. Tile lined fields and channelized ditches enable particles to move more efficiently into surface waters. Phosphorus, organic material and organic-rich sediment may be added via surface runoff from upland areas which are being used for

Conservation Reserve Program (CRP) lands, grasslands, and agricultural lands used for growing hay or other crops. Stormwater runoff may contribute nutrients and organic-rich sediment to surface waters from livestock manure, fertilizers, vegetation and erodible soils.

Unrestricted livestock access to streams: Livestock with access to stream environments may add nutrients directly to the surface waters or resuspend particles that had settled on the stream bottom. Direct deposition of animal wastes can result in very high localized nutrient concentrations and may contribute to downstream impairments. Smaller animal facilities may add nutrients to surface waters via wastewater from these facilities or stormwater runoff from near-stream pastures.

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

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

Groundwater discharge: Phosphorus can be added to the lake's water column through groundwater discharge. Phosphorus concentrations in groundwater are usually below the water quality standards for phosphorus. In those instances, where significant groundwater discharge into lake environments is occurring, phosphorus inputs can impact the phosphorus budgeting of the water body.

Discharges from SSTS or unsewered communities: Failing septic systems are a potential source of nutrients within the CRW. Septic systems generally do not discharge directly into a water body, but effluents from SSTS may leach into groundwater or pond at the surface where they can be washed into surface waters via stormwater runoff events. Age, construction and use of SSTS can vary throughout a watershed and influence the nutrient contribution from these systems.

Urban/residential sources: Nutrients, organic material and organic-rich sediment may be added via runoff from urban/developed areas near the lakes of the CRW. Runoff from urban/developed areas can include phosphorus derived from fertilizers, leaf and grass litter, pet wastes, and other sources of anthropogenic derived nutrients.

Wetland and Forest Sources: Phosphorus, organic material and organic-rich sediment may be added to surface waters by stormwater flows through wetland and forested areas in the CRW. Storm events may mobilize phosphorus through the transport of suspended solids and other organic debris.

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

CRW TSS TMDLs:

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

Stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of sediment which may lead to impairments in the CRW. Sediment inputs to surface waters can be exacerbated by tile drainage lines, which channelize the stormwater flows. Tile lined fields and channelized ditches enable particles to move more efficiently into surface waters.

Wetland Sources: Sediment may be added to surface waters by stormwater flows through wetland areas in the CRW. Storm events may mobilize particulates through the transport of suspended solids and other organic debris.

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

Atmospheric deposition: Sediment may be added via particulate deposition. Particles from the atmosphere may fall onto lake surfaces or other surfaces within the CRW.

Future Growth:

Significant development is not expected in the CRW. The land use within the watershed is primarily agricultural with small cities and towns scattered throughout the CRW. Approximately one half of the residents in the CRW live in cities and towns and the other half reside in rural areas. MPCA expects that land use in the CRW will remain unchanged for the foreseeable future. The WLA and load allocations (LA) for the CRW TMDLs were calculated for all current and future sources. Any expansion of point or nonpoint sources will need to comply with the respective WLA and LA values calculated in the CRW TMDLs.

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

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

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

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

Comment:

Designated Uses:

Water quality standards (WQS) are the fundamental benchmarks by which the quality of surface waters are measured. Within the State of Minnesota, WQS are developed pursuant to the Minnesota Statutes Chapter 115, Sections 03 and 44. Authority to adopt rules, regulations, and standards as are necessary and feasible to protect the environment and health of the citizens of the State is vested with the MPCA. Through adoption of WQS into Minnesota's administrative rules (principally Chapters 7050 and 7052), MPCA has identified designated uses to be protected in each of its drainage basins and the criteria necessary to protect these uses.

Minnesota Rule Chapter 7050 designates uses for waters of the state. The segments addressed by the CRW TMDLs are designated as Class 2 waters for aquatic recreation use (fishing, swimming, boating, etc.) and aquatic life use. The Class 2 designated use is described in Minnesota Rule 7050.0140 (3):

> *"Aquatic life and recreation includes all waters of the state that support or may support fish, other aquatic life, bathing, boating, or other recreational purposes and for which quality control is or may be necessary to protect aquatic or terrestrial life or their habitats or the public health, safety, or welfare."*

Standards:

Narrative Criteria: Minnesota Rule 7050.0150 (3) set forth narrative criteria for Class 2 waters of the State:

> *"For all Class 2 waters, the aquatic habitat, which includes the waters of the state and stream bed, shall not be degraded in any material manner, there shall be no material increase in undesirable slime growths or aquatic plants, including algae, nor shall there be any significant increase in harmful pesticide or other residues in the waters, sediments, and aquatic flora and fauna; the normal fishery and lower aquatic biota upon which it is dependent and the use thereof shall not be seriously impaired or endangered, the species composition shall not be altered materially, and the propagation or migration of the fish and other biota normally present shall not be prevented or hindered by the discharge of any sewage, industrial waste, or other wastes to the waters."*

Numeric criteria:

Bacteria TMDLs: The bacteria water quality standards which apply to CRW TMDLs are:

Table 5: Bacteria Water Quality Standards Applicable to the CRW TMDLs

Parameter	Units	Water Quality Standard
E. coli [1]	# of organisms / 100 mL	The geometric mean of a minimum of 5 samples taken within any calendar month may not exceed 126 organisms
		No more than 10% of all samples collected during any calendar month may individually exceed 1,260 organisms

[1] = Standards apply only between April 1 and October 31

Bacteria TMDL Targets: The bacteria TMDL targets employed for the CRW bacteria TMDLs are the *E. coli* standards as stated in Table 5 of this Decision Document. The focus of bacteria TMDLs is on the 126 organisms (orgs) per 100 mL (126 orgs/100 mL) portion of the standard (Table 5 of this Decision Document). MPCA believes that using the 126 orgs/100 mL portion of the standard for TMDL calculations will result in the greatest bacteria reductions within the CRW and will result in the attainment of the 1,260 orgs/100 mL portion of the standard. While the bacteria TMDLs will focus on the geometric mean portion of the water quality standard, attainment of both parts of the water quality standard is required.

Phosphorus Lake and Stream TMDLs:

TP Lake TMDLs: Numeric criteria for TP, chlorophyll-*a*, and Secchi Disk depth are set forth in Minnesota Rules 7050.0222. These three parameters form the MPCA eutrophication standard that must be achieved to attain the aquatic recreation designated use. The numeric eutrophication standards which are applicable to the CRW lake TMDLs are found in Table 6 of this Decision Document.

Table 6: Minnesota Eutrophication Standards for Deep and Shallow lakes within the North Central Hardwood Forest (NCHF), Northern Glaciated Plains and Western Corn Belt Plains (WCBP) ecoregions Applicable in the Chippewa River Watershed TMDLs

Parameter	NCHF Eutrophication Standard (general lakes)	NCHF Eutrophication Standard (shallow lakes)[1]	NGP Eutrophication Standard (shallow lakes)[1]	WCBP Eutrophication Standard (shallow lakes)[1]
Total Phosphorus (µg/L)	TP < 40	TP < 60	TP < 90	TP < 90
Chlorophyll-a (µg/L)	chl-a < 14	chl-a < 20	chl-a < 30	chl-a < 30
Secchi Depth (m)	SD > 1.4	SD > 1.0	SD > 0.7	SD > 0.7

[1] = Shallow lakes are defined as lakes with a maximum depth less than 15-feet, or with more than 80% of the lake area shallow enough to support emergent and submerged rooted aquatic plants (littoral zone).

In developing the lake nutrient standards for Minnesota lakes, MPCA evaluated data from a large cross-section of lakes within each of the State's ecoregions. Clear relationships were established between the causal factor, TP, and the response variables, chl-*a* and SD depth. MPCA anticipates that by meeting the TP concentrations of 40 µg/L, 60 µg/L and 90 µg/L the response variables chl-*a* and SD will be attained and the lakes addressed by the CRW lake TMDLs will achieve their designated beneficial uses. For lakes to achieve their designated beneficial use, the lake must not exhibit signs of eutrophication and must allow water-related recreation, fishing and aesthetic enjoyment. MPCA views the control of eutrophication as the lake enduring minimal nuisance algal blooms and exhibiting desirable water clarity.

TP Stream TMDLs: MPCA used the dissolved oxygen surface WQS of 5.0 mg/L as its endpoint for HSPF modeling runs to determine phosphorus loading to segments 07020005-584 and 07020005-554 (Section 4.2.3 of the final TMDL document and Section 3 of this Decision Document).

Phosphorus TMDL criteria: MPCA employed TP criteria of 40 μg/L, 60 μg/L and 90 μg/L to address eutrophic conditions in the CRW TP Lake TMDLs because of the interrelationships between TP and chl-*a*, and TP and SD depth. Algal abundance is measured by chl-*a*, which is a pigment found in algal cells. As more phosphorus becomes available, algae growth can increase. Increased algae in the water column will decrease water clarity that is measured by SD depth. MPCA employed the dissolved oxygen WQS of 5.0 mg/L to address eutrophic conditions in the CRW TP stream TMDLs. EPA finds the nutrient and dissolved oxygen targets employed in the CRW lake TMDLs to be reasonable.

TSS TMDLs: EPA approved MPCA's regionally-based TSS criteria for rivers and streams in 2015. The TSS criteria replaced Minnesota's statewide turbidity criterion (measured in Nephelometric Turbidity Units (NTU)). The TSS criteria provide water clarity targets for measuring suspended particles in rivers and streams.

TSS TMDL Targets: MPCA employed the regional TSS criterion for the South River Nutrient Region (SRNR) of **65 mg/L**.

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

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

Comment:

CRW bacteria TMDLs:

MPCA used the geometric mean portion (**126 orgs/100 mL**) of the *E. coli* water quality standard to calculate loading capacity values for the bacteria TMDLs. MPCA believes the geometric mean portion of the WQS provides the best overall characterization of the status of the watershed. EPA agrees with this assertion, as stated in the preamble of, *"The Water Quality Standards for Coastal and Great Lakes Recreation Waters Final Rule"* (69 FR 67218-67243, November 16, 2004) on page 67224, "…the geometric mean is the more relevant value for ensuring that appropriate actions are taken to protect and improve water quality because it is a more reliable measure, being less subject to random variation, and more directly linked to the underlying studies on which the 1986 bacteria criteria were based." MPCA stated that the bacteria TMDLs will focus on the geometric mean portion of the water quality standard (126 orgs/100 mL) and that it expects that by attaining the 126 orgs/100 mL portion of the *E. coli* WQS the 1,260 orgs/100 mL portion of the *E. coli* WQS will also be attained. 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 CRW bacteria TMDLs, MPCA used Minnesota's WQS for *E. coli* (126 orgs/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. MPCA's *E. coli* 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.

Separate flow duration curves (FDCs) were created for the each of the bacteria TMDLs in the CRW. The CRW FDCs were developed using daily simulated flows generated from Hydrologic Simulation Program-FORTRAN (HSPF) model runs. HSPF hydrologic models were developed to simulate daily flow characteristics within the CRW from 1996-2012. HSPF modeling was validated and calibrated using data from a USGS station in Milan, MN (USGS # 05340500) and four other stream flow gages in the CRW (Section 4.1.1 of the final TMDL). Flow data focused on dates within the recreation season (April 1 to October 31). Daily stream flows were necessary to implement the load duration curve approach.

FDCs graphs have flow duration interval (percentage of time flow exceeded) on the X-axis and discharge (flow per unit time) on the Y-axis. The FDC were transformed into LDC by multiplying individual flow values by the WQS (126 orgs/100 mL) and then multiplying that value by a conversion factor. The resulting points are plotted onto a load duration curve graph. LDC graphs, for the CRW bacteria TMDLs, have flow duration interval (percentage of time flow exceeded) on the X-axis and *E. coli* loads (number of bacteria per unit time) on the Y-axis. The CRW LDC used *E. coli* measurements in billions of bacteria per day. The curved line on a LDC graph represents the TMDL of the respective flow conditions observed at that location.

MPCA queried water quality data collected in the CRW between 2007-2010 (Section 3.5.1.1 of the final TMDL document). Water quality monitoring station information and bacteria data summaries were presented in Table 3.4 of the final TMDL document. Measured *E. coli* concentrations were converted to individual sampling loads by multiplying the sample concentration by the instantaneous flow measurement observed/estimated at the time of sample collection and then by a conversion factor which allows the individual samples to be plotted on the same figure as the LDCs (e.g., Chippewa River (07020005-506) of Appendix A of the final TMDL document). Individual LDCs are found in Appendix A of the final TMDL document.

The LDC plots were subdivided into five flow regimes; high flow conditions (exceeded 0–10% of the time), moist flow conditions (exceeded 10–40% of the time), mid-range flow conditions (exceeded 40–60% of the time), dry flow conditions (exceeded 60–90% of the time), and low flow conditions (exceeded 90–100% of the time). LDC plots can be organized to display individual sampling loads with the calculated LDC. Watershed managers can interpret LDC graphs with individual sampling points plotted alongside 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, and specific source reductions are not quantified. Overall, MPCA 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 Best Management Practices (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.

Bacteria TMDLs for the CRW were calculated and those results are found in Table 7 (Attachment #1 of this Decision Document). The load allocations were calculated after the determination of the WLA, and the Margin of Safety (MOS) (10% of the loading capacity). Load allocations (ex. stormwater runoff from agricultural land use practices and feedlots, SSTS, wildlife inputs etc.) were not split among individual nonpoint contributors. Instead, load allocations were combined together into a categorical LA value to cover all nonpoint source contributions.

Table 7 (Attachment #1 of this Decision Document) reports five points (the midpoints of the designated flow regime) on the loading capacity curve. 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 LDC 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. Table 7 (Attachment #1 of this Decision Document) identifies the loading capacity for the water body at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Table 7: Bacteria (*E. coli*) TMDLs for the Chippewa River Watershed is attached (Attachment #1)

Table 8 of this Decision Document presents MPCA's loading reduction estimates for each of the bacteria TMDLs in the CRW. These loading reductions were calculated from field sampling data collected in the CRW. MPCA explained that its load reduction estimates are likely more conservative since they are based on a limited water quality data set.

Table 8: Reductions for bacteria impaired stream segments in the Chippewa River Watershed

Water body name	Stream Reach AUID #	Reduction (%)
Chippewa River	07020005-506	62.1%
Cottonwood Creek	07020005-511	79.9%
East Branch Chippewa River	07020005-515	67.0%
South Mud Creek	07020005-518	17.8%
Outlet Creek	07020005-523	57.2%
North Mud Creek	07020005-554	84.7%
Shakopee Creek	07020005-557	75.4%
County Ditch 3	07020005-579	52.5%
Tributary to Chippewa River	07020005-584	76.2%
Trappers Run Creek	07020005-628	66.3%
Little Chippewa River	07020005-713	80.3%
Huse Creek	07020005-917	48.0%

EPA concurs with the data analysis and LDC approach utilized by MPCA in its calculation of loading capacities, wasteload allocations, load allocations and the margin of safety for the CRW bacteria TMDLs. The methods used for determining the TMDL are consistent with U.S. EPA technical memos.[1]

CRW phosphorus lake TMDLs: MPCA used the U.S. Army Corps of Engineers (USACE) BATHTUB model to calculate the loading capacities for the CRW TP TMDLs. The BATHTUB model was utilized to link observed phosphorus water quality conditions and estimated phosphorus loads to in-lake water quality estimates. MPCA has previously employed BATHTUB successfully in many lake studies in Minnesota. BATHTUB is a steady-state annual or seasonal model that predicts a lake's growing season (June 1 to September 30) average surface water quality. BATHTUB utilizes annual or

[1] 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.

seasonal time-scales which are appropriate because watershed TP loads are normally impacted by seasonal conditions.

BATHTUB has built-in statistical calculations which account for data variability and provide a means for estimating confidence in model predictions. BATHTUB employs a mass-balance TP model that accounts for water and TP inputs from tributaries, direct watershed runoff, the atmosphere, and sources internal to the lake, and outputs through the lake outlet, water loss via evaporation, and TP sedimentation and retention in the lake sediments. BATHTUB provides flexibility to tailor model inputs to specific lake morphometry, watershed characteristics and watershed inputs. The BATHTUB model also allows MPCA to assess different impacts of changes in nutrient loading. BATHTUB allows the user the choice of several different mass-balance TP models for estimating loading capacity.

The loading capacity of the lake was determined through the use of BATHTUB and the Canfield-Bachmann subroutine and then allocated to the WLA, LA, and MOS (Section 4.2.4 of the final TMDL document). To simulate the load reductions needed to achieve the WQS, a series of model simulations were performed. Each simulation reduced the total amount of TP entering each of the water bodies during the growing season (or summer season, June 1 through September 30) and computed the anticipated water quality response within the lake. The goal of the modeling simulations was to identify the loading capacity appropriate (i.e., the maximum allowable load to the system, while allowing it to meet WQS) from June 1 to September 30. The modeling simulations focused on reducing the TP to the system.

The BATHTUB modeling efforts were used to calculate the loading capacity for each lake. The loading capacity is the maximum phosphorus load which each of these water bodies can receive over an annual period and still meet the shallow and general lake nutrient WQS (Table 6 of this Decision Document). Loading capacities on the daily scale (lbs/day) and on the annual scale (lbs/year) were calculated to meet the WQS during the growing season (June 1 through September 30). The time period of June to September was chosen by MPCA as the growing season because it corresponds to the eutrophication criteria, contains the months that the general public typically uses lakes in the CRW for aquatic recreation, and is the time of the year when water quality is likely to be impaired by excessive nutrient loading.

Loading capacities were determined using Canfield-Bachmann equations from BATHTUB. The model equations were originally developed from data taken from over 704 lakes. The model estimates in-lake phosphorus concentration by calculating net phosphorus loss (phosphorus sedimentation) from annual phosphorus loads as functions of inflows to the lake, lake depth, and hydraulic flushing rate. To estimate loading capacity, the model is rerun, each time reducing current loads to the lake until the model result shows that in-lake total phosphorus would meet the applicable water quality standards.

MPCA subdivided the loading capacity among the WLA, LA, and MOS components of the TMDL (Table 9 of this Decision Document (Attachment #2)). These calculations were based on the critical condition, the summer growing season, which is typically when the water quality in each lake is typically degraded and phosphorus loading inputs are the greatest. TMDL allocations assigned during the summer growing season will protect the CRW lakes during the worst water quality conditions of the year. MPCA assumed that the loading capacities established by the TMDL will be protective of water quality during the remainder of the calendar year (October through May).

Table 9 of this Decision Document is attached (Attachment #2)

Table 9 includes MPCA's estimates of the reductions required for lakes in the CRW to meet their water quality targets. These loading reductions (i.e., the percentage column) were estimated from existing and TMDL load calculations. MPCA expects that these reductions will result in the attainment of the water quality targets and the lake water quality will return to a level where the designated uses are no longer considered impaired.

CRW phosphorus stream TMDLs: MPCA developed phosphorus TMDLs for segments 07020005-554 and 07020005-584 which were impaired due to low dissolved oxygen concentrations in the water column. MPCA completed its TMDL calculations based on the calibrated CRW HSPF model and scenario runs which targeted phosphorus and sediment oxygen demand (SOD) simulations. MPCA explained that reductions to phosphorus inputs to surface waters would likely have positive impacts to DO concentrations in the water column, as phosphorus feeds algal biomass production which reduces DO via respiration. Reduction in algal biomass will also reduce organic inputs (e.g., dead organic matter settling out of the water column into the sediment) to stream sediment environments, thereby, reducing the SOD necessary for decomposition of organic material, which further decreases oxygen from the water column to fuel decomposition reactions in the sediments. MPCA further supported its claim that reducing phosphorus inputs will improve water column DO in its *Chippewa River Biotic Stressor Identification Report* (MPCA, 2015).

HSPF modeling runs were completed to systematically reduce phosphorus inputs until the DO concentration in the modeled reaches was greater than the DO WQS of 5 mg/L. TMDL allocations were developed based on these modeling efforts and daily and annual TP loadings were calculated to attain the DO WQS under the conditions modeled in segments 07020005-554 and 07020005-584. The load allocation was calculated after the determination of the WLA, and the MOS. Load allocations were not split among individual nonpoint contributors, rather load allocations were combined together into one value to cover all nonpoint source contributions (Table 10 of this Decision Document (Attachment #3)).

Table 10 of this Decision Document is attached (Attachment #3)

Table 11 of this Decision Document includes MPCA's estimates of the reductions required for segments 07020005-584 and 07020005-554 to meet their water quality targets. These loading reduction estimates were based on existing TMDL load calculations. MPCA expects that these reductions will result in the attainment of the water quality targets and the water quality in these segments will return to a level where the designated uses are no longer considered impaired.

Table 11: Reductions for TP impaired stream segments in the Chippewa River Watershed

Water body name	Stream Reach AUID #	Reduction (%)
Chippewa River	07020005-584	32.0%
Mud Creek	07020005-554	26.0%

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

CRW TSS TMDLs: MPCA developed LDCs to calculate sediment TMDLs for the two impaired segments of the CRW, segments 07020005-507 and 07020005-523. The same LDC development strategies which were employed for the sediment TMDLs were used to develop the bacteria TMDLs (e.g., the incorporation of HSPF model simulated flows from 1996-2012 to develop FDCs, water quality monitoring information collected within the CRW informing the LDC, etc.). The FDC were transformed into LDC by multiplying individual flow values by the SRNR TSS WQS (65 mg/L) and then multiplying that value by a conversion factor.

MPCA calculated TSS TMDLs (Table 12 of this Decision Document (Attachment #4)). The load allocation was calculated after the determination of the WLA, and the MOS. Load allocations (ex. stormwater runoff from agricultural land use practices) was not split among individual nonpoint contributors. Instead, load allocations were combined together into one value to cover all nonpoint source contributions. Table 12 of this Decision Document (Attachment #4) reports five points (the midpoints of the designated flow regime) on the loading capacity curve. 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 LDC method can be used to display collected sediment monitoring data and allows for the estimation of load reductions necessary for attainment of the SRNR TSS water quality standard. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for each segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 12 of this Decision Document (Attachment #4) identifies the loading capacity for each segment at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Table 12 of this Decision Document is attached (Attachment #4)

Table 13 of this Decision Document presents MPCA's loading reduction estimate for segment 07020005-507. MPCA did not provide a loading reduction estimate for segment 07020005-523. The loading reduction estimate for segment 07020005-507 was calculated from field sampling data collected in this segment. MPCA explained that its load reduction estimates are likely more conservative since they are based on a limited water quality data set.

Table 13: Reductions for TSS impaired stream segments in the Chippewa River Watershed

Water body name	Stream Reach AUID #	Reduction (%)
Chippewa River	07020005-507	11.6%

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

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

4. Load Allocations (LA)

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

Comment:
MPCA determined the LA calculations for each of the TMDLs based on the applicable WQS. MPCA recognized that LAs for each of the individual TMDLs addressed by the CRW TMDLs can be attributed to different nonpoint sources.

CRW bacteria TMDLs: The calculated LA values for the bacteria TMDLs are applicable across all flow conditions in the CRW (Table 7 of this Decision Document (Attachment #1)). MPCA identified several nonpoint sources which contribute bacteria loads to the surface waters of the CRW, including; non-regulated urban stormwater runoff, stormwater from agricultural and feedlot areas, failing septic systems, and wildlife (deer, geese, ducks, raccoons, turkeys and other animals). MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations, but aggregated the nonpoint sources into a categorical LA value.

CRW lake and stream phosphorus TMDLs: MPCA identified several nonpoint sources which contribute nutrient loading to the lakes and stream segments of the CRW (Tables 9 and 10 of this Decision Document (Attachments #2 and #3)). These nonpoint sources included: watershed contributions from each lake's direct watershed, watershed contributions from upstream watersheds, internal loading, atmospheric deposition, and groundwater contributions. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations, but aggregated the nonpoint sources into a categorical LA value.

CRW TSS TMDLs: The calculated LA values for the TSS TMDLs are applicable across all flow conditions (Table 12 of this Decision Document (Attachment #4)). MPCA identified several nonpoint sources which contribute sediment loads to the surface waters in the CRW. Load allocations were recognized as originating from many diverse nonpoint sources including; stormwater contributions from agricultural lands, stream channelization and streambank erosion, wetland and forest sources, and atmospheric deposition. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations, but aggregated the nonpoint sources into one LA value.

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

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

5. Wasteload Allocations (WLAs)

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

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

Comment:
CRW bacteria TMDLs: MPCA identified NPDES permitted facilities within the CRW and assigned those facilities a portion of the WLA (Table 7 of this Decision Document (Attachment #1)). The WLAs for each of these individual facilities were calculated based on the facility's maximum permitted discharge flow and the *E. coli* WQS (126 orgs /100 mL). MPCA explained that the WLA for each individual WWTF was calculated based on the *E. coli* WQS but WWTF permits are regulated for the fecal coliform effluent limits (200 orgs /100 mL) and that if a facility is meeting its fecal coliform limits, which are set in the facility's discharge permit, MPCA assumes the facility is also meeting the calculated *E. coli* WLA from the CRW TMDLs. The WLA was therefore calculated using the assumption that the *E. coli* standard of 126 orgs/100 mL provides equivalent protection from illness due to primary contact recreation as the fecal coliform WQS of 200 orgs/100 mL.

MPCA acknowledged the presence of CAFOs in the CRW in Section 3.6 of the final TMDL document. CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota Rule 7020.2003). CAFOs were assigned a WLA of zero (WLA = 0) for the CRW bacteria TMDLs.

CRW lake and stream phosphorus TMDLs: The Long Lake (21-0343-00) phosphorus TMDL identified three NPDES permit holders which contribute nutrient loads to Long Lake. Each of these facilities was assigned a phosphorus WLA (Table 9 of this Decision Document (Attachment #2)). The TP WLA was calculated based on the facility's maximum permitted effluent flow rate and facility effluent concentration assumptions (Section 4.3.1 of the final TMDL document).

For the lake and stream phosphorus TMDLs, MPCA calculated a portion of the WLA and assigned it to construction and industrial stormwater. MPCA reviewed historical information on construction sites which would be covered under a stormwater permit and determined that 0.7% of the total land area in the CRW could be reasonably assumed to be under construction. Additionally, MPCA reviewed historical information on industrial sites in the CRW and found that 1.3% of the total land area in the CRW was covered via industrial stormwater permits. MPCA then summed these percentages (0.7% + 1.3%) and added an additional 0.2% to account for future growth of construction or industrial sites. MPCA settled on an estimate of 2.2% of the loading capacity for each individual TMDL to be allocated to construction and industrial stormwater coverage (Tables 9 and 10 of this Decision Document (Attachments #2 and #3)).

MPCA explained that BMPs and other stormwater control measures should be implemented at active construction sites to limit the discharge of pollutants of concern. BMPs and other stormwater control measures which should be implemented at construction sites are defined in the State's NPDES/SDS General Stormwater Permit for Construction Activity (MNR100001). In the final TMDL document MPCA explained that if a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit (MNR100001) and properly selects, installs and maintains all BMPs required under MNR1000001 and applicable local construction stormwater ordinances, including those related to impaired waters discharges and any applicable additional requirements found in Appendix A of the Construction General Permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL.

The NPDES program requires construction sites and facilities subject to industrial stormwater requirements to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit (MNR100001) and applicable local construction stormwater ordinances, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan complies with the applicable requirements in the State permits and local ordinances. As noted above, MPCA has explained that meeting the terms of the applicable permits will be consistent with the WLAs set in the CRW TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified.

MPCA determined that there were CAFO facilities in the CRW. CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota Rule 7020.2003). CAFOs were assigned a WLA of zero (WLA = 0) for the CRW phosphorus TMDLs.

EPA finds the MPCA's approach for calculating the WLA for the CRW phosphorus TMDLs to be reasonable and consistent with EPA guidance.

<u>CRW TSS TMDLs:</u> MPCA identified NPDES permitted facilities within the CRW and assigned those facilities a portion of the WLA (Table 12 of this Decision Document (Attachment #4)). The WLAs for each of these individual facilities were calculated based on the maximum permitted discharge flow and a TSS permitted concentration (see Table 4.9 of the final TMDL document for individual facility permitted TSS concentrations). There is one industrial discharger permitted for TSS in the CRW, Chippewa Valley Ethanol Company (MN0062898). This facility is permitted to discharge a maximum flow of 0.1325 mgd and has a maximum monthly average TSS concentration of 30 mg/L (Table 4.12 of the final TMDL document).

MPCA calculated a construction and industrial stormwater WLA based on 2.2% of the loading capacity. MPCA used the same methodology for calculating the TSS construction and industrial stormwater WLA as it did for the TP construction and industrial stormwater WLA.

MPCA explained that BMPs and other stormwater control measures should be implemented at active construction sites to limit the discharge of pollutants of concern. BMPs and other stormwater control measures which should be implemented at construction sites are defined in the State's NPDES/SDS General Stormwater Permit for Construction Activity (MNR100001). In the final TMDL document MPCA explained that if a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit (MNR100001) and properly selects, installs and maintains all BMPs required under MNR1000001 and applicable local construction stormwater ordinances, including those related to impaired waters discharges and any applicable additional requirements found in Appendix A of the Construction General Permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL.

The NPDES program requires construction sites and facilities subject to industrial stormwater requirements to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit (MNR100001) and applicable local construction stormwater ordinances, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan complies with the applicable requirements in the State permits and local ordinances. As noted above, MPCA has explained that meeting the terms of the applicable permits will be consistent with the WLAs set in the CRW TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified.

EPA finds the MPCA's approach for calculating the WLA for the CRW TSS TMDLs to be reasonable and consistent with EPA guidance.

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

6. Margin of Safety (MOS)

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

Comment:

The final TMDL submittal outlines the determination of the Margin of Safety for the bacteria, phosphorus and TSS TMDLs (Section 4.5 of the final TMDL document). The bacteria, phosphorus and TSS TMDLs employed an explicit MOS set at 10% of the loading capacity. MPCA explained that for each parameter's TMDLs (e.g., bacteria TMDLs) HSPF modeling efforts incorporated 17 years of flow data from a USGS gage and other gages in the CRW and also 12 years of water chemistry data collected in the watershed. MPCA believes that the calibration results of the HSPF modeling efforts indicate that HSPF hydrologic outputs are representative of hydrologic conditions observed in the CRW.

<u>CRW bacteria and TSS TMDLs:</u> The bacteria and TSS TMDLs incorporated a 10% explicit MOS applied to the total loading capacity calculation for each flow regime of the LDC. Ten percent of the total loading capacity was reserved for MOS with the remaining load allocated to point and nonpoint sources (Tables 7 and 12 of this Decision Document (Attachments #1 and #4)). MPCA explained that the explicit MOS was set at 10% due to the following factors discovered during the development of the CRW bacteria and TSS TMDLs:

- Environmental variability in pollutant loading;
- Variability in water quality data (i.e., collected water quality monitoring data, field sampling error, etc.); and
- Calibration and validation processes of LDC modeling efforts, uncertainty in modeling outputs, and conservative assumptions made during the modeling efforts.

Challenges associated with quantifying *E. coli* loads include the dynamics and complexity of bacteria in stream environments. Factors such as die-off and re-growth contribute to general uncertainty that makes quantifying stormwater bacteria loads particularly difficult. The MOS for the CRW bacteria TMDLs also incorporated certain conservative assumptions in the calculation of the TMDLs. 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 *E. coli*. Bacteria have a limited capability of surviving outside their hosts, and normally a rate of decay would be incorporated. MPCA determined that it was more conservative to use the WQS (126 orgs/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 to meet the WQS of 126 orgs/100 mL. Thus, it is more conservative to apply the State's WQS as the bacteria target value, because this standard must be met at all times under all environmental conditions.

<u>CRW lake and stream phosphorus TMDLs:</u> The phosphorus TMDLs employed an explicit MOS set at 10% of the loading capacity. The explicit MOS was applied by reserving 10% of the total loading capacity, and then allocating the remaining loads to point and nonpoint sources (Tables 9 and 10 of this Decision Document (Attachments #2 and #3)). MPCA explained that the explicit MOS was set at 10% due to the following factors discovered during the development of the CRW phosphorus TMDLs:

- Environmental variability in pollutant loading;
- Variability in water quality data (i.e., collected water quality monitoring data);
- The agreement between water quality models' predicted and observed values;
- Conservative assumptions made during the modeling efforts; and

- MPCA's confidence in the BATHTUB (Canfield-Bachmann subroutine) model's performance during the development of phosphorus TMDLs.

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

7. Seasonal Variation

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

Comment:
CRW bacteria TMDLs: Bacterial loads vary by season, typically reaching higher numbers in the dry summer months when low flows and bacterial growth rates contribute to their abundance, and reaching relatively lower values in colder months when bacterial growth rates attenuate and loading events, driven by stormwater runoff events aren't as frequent. Bacterial WQS need to be met between April 1st to October 31st, regardless of the flow condition. The development of the LDCs utilized simulated HSPF flows which were validated and calibrated with USGS flow gage data. Modeled flow measurements represented a variety of flow conditions from the recreation season. LDCs developed from these modeled flow conditions represented a range of flow conditions within the CRW and thereby accounted for seasonal variability over the recreation season.

Critical conditions for *E. coli* loading occur in the dry summer months. This is typically when stream flows are lowest, and bacterial growth rates can be high. By meeting the water quality targets during the summer months, it can reasonably be assumed that the loading capacity values will be protective of water quality during the remainder of the calendar year (November through March).

CRW lake and stream phosphorus TMDLs: Seasonal variation was considered for the CRW phosphorus TMDLs as described in Section 4.6 of the final TMDL document. The nutrient targets employed in the CRW phosphorus TMDLs were based on the average nutrient values collected during the growing season (June 1 to September 30). The water quality targets were designed to meet the NCHF, NGP and WCBP eutrophication WQS during the period of the year where the frequency and severity of algal growth is the greatest.

The Minnesota eutrophication standards state that total phosphorus WQS are defined as the mean concentration of phosphorus values measured during the growing season. In the CRW phosphorus TMDL efforts, the LA and WLA estimates were calculated from modeling efforts which incorporated mean growing season total phosphorus values. Nutrient loading capacities were set in the TMDL development process to meet the WQS during the most critical period. The mid-late summer time period is typically when eutrophication standards are exceeded and water quality within the CRW is deficient. By calibrating the modeling efforts to protect these water bodies during the worst water quality conditions of the year, it is assumed that the loading capacities established by the TMDLs will be protective of water quality during the remainder of the calendar year (October through May).

CRW TSS TMDLs: The TSS WQS applies from April to September which is also the time period when high concentrations of sediment are expected in the surface waters of the CRW. Sediment loading to surface waters in the CRW varies depending on surface water flow, land cover and climate/season. Typically, in the CRW, sediment is being moved from terrestrial source locations into surface waters during or shortly after wet weather events. Spring is typically associated with large flows from snowmelt, the summer is associated with the growing season as well as periodic storm events and receding streamflows, and the fall brings increasing precipitation and rapidly changing agricultural landscapes.

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

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

8. Reasonable Assurance

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

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

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

Comment:
The CRW bacteria, phosphorus, and TSS TMDLs provide reasonable assurance that actions identified in the implementation section of the final TMDL (i.e., Sections 6 and 8 of the final TMDL document), will be applied to attain the loading capacities and allocations calculated for the impaired reaches within the CRW. The recommendations made by MPCA will be successful at improving water quality if the appropriate local groups work to implement these recommendations. Those mitigation suggestions,

which fall outside of regulatory authority, will require commitment from state agencies and local stakeholders to carry out the suggested actions.

MPCA has identified several local partners which have expressed interest in working to improve water quality within the CRW. Implementation practices will be implemented over the next several years. The following groups are expected to work closely with one another to ensure that pollutant reduction efforts via BMPs are being implemented within the CRW: the Chippewa River Watershed Project (CRWP), county Soil and Water Conservation Districts (SWCDs), the Minnesota Department of Natural Resources (DNR), the Minnesota Department of Agriculture (MDA), the Minnesota Department of Health (MDH) and the Minnesota Board of Water and Soil Resources (BWSR).

The CRWP is a stakeholder group which is actively engaged in water quality improvement activities in the CRW (http://www.chippewariver.org/). The CRWP's comprehensive goals are to improve water quality and reduce flooding events in the Chippewa River and its tributaries while promoting agricultural, industrial and recreational based economies for the region. To attain its goals, the CRWP aims to increase engagement of local watershed residents toward protecting waters in the CRW and the CRWP also acts to facilitate progress between the local community and state agencies/organizations whom are acting in the CRW on various implementation efforts.

The CRWP was awarded 319 funding to address sediment impaired stream reaches via the CRWP's *Chippewa River Sediment Reduction project*. Headwater areas were targeted to implement sustainable landscape practices (e.g., incorporation of cover crops) and to install practices which promote greater retention of agricultural stormwater via water/sediment control basins, grassed waterways, etc. Interested partners can apply for grant assistance through the CRWP and work with the CRWP to implement sediment BMP controls, expanding riparian buffers and improving channel stability. Members of the CRWP also collect water quality data throughout the CRW and work to empower local community members to become Citizen Monitors who can continue to monitor water quality in the CRW.

The Chippewa County SWCD has various ongoing programs which target erosion control and water management programs. The Chippewa County SWCD efforts focus on alleviating water quality challenges due to altered hydrology, controlling gully, rill and sheet erosion, controlling nutrient and sediment runoff during storm events, diversion of agricultural runoff during storm events to protect water quality, and reduction of wind erosion. The SWCD works with local farmers to identify appropriate state cost-sharing programs for BMP installation and upkeep. The Chippewa County SWCD also has water resource programming which focus on protecting local wetland resources and adhering to goals of Minnesota's Wetlands Conservation Act (WCA).

Programming from the Pope County SWCD focuses on promoting BMPs to decrease sediment, phosphorus and nitrogen contributions to local lakes. The SWCD has supported project efforts to map critical areas within direct subwatersheds of certain lakes in Pope County. This information aims to maximize the effectiveness of implementation efforts at reducing pollutant inputs to lakes in Pope County. The Pope County SWCD also has promoted shoreline restoration efforts via cost-share and grant assistance to local partners.

The ongoing efforts of the CRWP and local SWCDs in western-central Minnesota, demonstrate the commitment of stakeholders to improving water quality and reducing pollutant load to surface waters in the CRW and other adjacent watersheds of western Minnesota. While measureable progress may be slow to develop, actions from these groups and other stakeholders in the CRW should ultimately result in improvements to water quality for all of the pollutants addressed in the CRW TMDLs.

MPCA has authored a Chippewa River WRAPS document (finalized March 2017) which provides information on the development of scientifically-supported restoration and protection strategies for implementation planning and action. The report provides a summary of the stressors causing impairments for the stream segments, including a chart of point sources, and a table outlining the relative magnitude of contributing nonpoint pollutant sources in the CRW. According to the WRAPS, because much of the nonpoint source strategies outlined rely on voluntary implementation by landowners, land users, and residents of the watershed it is imperative to create social capital (trust, networks, and positive relationships) with those who will be needed to voluntarily implement BMPs. Thus, effective ongoing civic engagement is fully a part of the overall plan for moving forward. MPCA views the WRAPS document as a starting point for which MPCA and local partners can develop tools that will help local governments, land owners, and special interest groups determine (1) the best strategies for making improvements and protecting resources that are already in good condition, and (2) focus those strategies in the best places to do work.[2] EPA believes that the detail provided in the WRAPS document is a sound starting point for providing a focused, comprehensive implementation plan on the watershed scale. Subsequent work in the watershed by BWSR to further refine implementation on the local level via its One Watershed, One Plan (1W1P) document should also serve to enhance implementation discussions included in the WRAPS document.

Continued water quality monitoring within the basin is supported by MPCA. Additional water quality monitoring results could provide insight into the success or failure of BMP systems designed to reduce *E. coli*, nutrient and TSS loading into the surface waters of the watershed. Local watershed managers would be able to reflect on the progress of the various pollutant removal strategies and would have the opportunity to change course if observed progress is unsatisfactory.

The MPCA regulates the collection, transportation, storage, processing and disposal of animal manure and other livestock operation wastes at State registered animal feeding operation (AFO) facilities. The MPCA Feedlot Program implements rules governing these activities, and provides assistance to counties and the livestock industry. The feedlot rules apply to most aspects of livestock waste management including the location, design, construction, operation and management of feedlots and manure handling facilities.

Reasonable assurance that the WLA set forth will be implemented is provided by regulatory actions. According to 40 CFR 122.44(d)(1)(vii)(B), NPDES permit effluent limits must be consistent with assumptions and requirements of all WLAs in an approved TMDL. MPCA's stormwater program and the NPDES permit program are the implementing programs for ensuring WLA are consistent with the TMDL. The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan meets WLA set in the CRW

[2] Chippewa River WRAPS document (March 2017).

TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified. This applies to sites under the MPCA's General Stormwater Permit for Construction Activity (MNR100001) and its NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) or NPDES/SDS General Permit for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production facilities (MNG490000).

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

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

The Minnesota Board of Soil and Water Resources administers the Clean Water Fund as well, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (FY 2014 Clean Water Fund Competitive Grants Request for Proposal (*RFP*); *Minnesota Board of Soil and Water Resources*, 2014).

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 Chippewa River watershed. Progress of TMDL implementation will be measured through regular monitoring efforts of water quality and total BMPs completed. MPCA anticipates that monitoring will be completed by local groups (e.g., members of the CRWP) as long as there is sufficient funding to support the efforts of these local entities. Additionally, volunteers may be relied on to complete monitoring in the lakes discussed within this TMDL. At a minimum, the CRW will be monitored once every 10 years as part of the MPCA's Intensive Watershed Monitoring cycle.

Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation efforts utilized in the CRW. Water quality information will aid watershed managers in understanding how BMP pollutant removal efforts are impacting water quality. Water quality monitoring combined with an annual review of BMP efficiency will provide information on the success or failure of BMP systems designed to reduce pollutant loading into water bodies of the CRW. Watershed managers will have the opportunity to reflect on the progress or lack of progress, and will have the opportunity to change course if progress is unsatisfactory. Review of BMP efficiency is expected to be completed by the local and county partners.

Stream Monitoring:
River and stream monitoring in the CRW, has been completed by a variety of organizations (i.e., SWCDs) and funded by Clean Water Partnership Grants, and other available local funds. MPCA anticipates that stream monitoring in the CRW should continue in order to build on the current water quality dataset and track changes based on implementation progress. Continuing to monitor water quality and biota scores in the listed segments will determine whether or not stream habitat restoration measures are required to bring the watershed into attainment with water quality standards. At a minimum, fish and macroinvertebrate sampling should be conducted by the MPCA, Minnesota Department of Natural Resources (MN-DNR), or other agencies every five to ten years during the summer season.

Lake Monitoring:
The lakes of the CRW have all been periodically monitored by volunteers and staff over the years. Monitoring for some of these locations is planned for the future in order to keep a record of the changing water quality as funding allows. Lakes are generally monitored for TP, chl-a, and Secchi disk transparency. MPCA expects that in-lake monitoring will continue as implementation activities are installed across the watersheds. These monitoring activities should continue until water quality goals are met. Some tributary monitoring has been completed on the inlets to the lakes and may be important to continue as implementation activities take place throughout the subwatersheds.

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:
The findings from the CRW TMDLs will be used to inform the selection of implementation activities as part of the Chippewa River WRAPS process. The purpose of the WRAPS report is to support local working groups and jointly develop scientifically-supported restoration and protection strategies to be used for subsequent implementation planning. The TMDL outlined implementation strategies in Section 8 of the final TMDL document. MPCA outlined the importance of prioritizing areas within the CRW, education and outreach efforts with local partners, and partnering with local stakeholders to improve water quality within the watershed. Reduction goals for the bacteria, phosphorus and TSS TMDLs may be met via components of the following strategies:

CRW bacteria TMDLs:
Pasture management/livestock exclusion plans: Reducing livestock access to stream environments will lower the opportunity for direct transport of bacteria to surface waters. The installation of exclusion fencing near stream and river environments to prevent direct access for livestock, installing alternative water supplies, and installing stream crossings between pastures, would work to reduce the influxes of bacteria and improve water quality within the watershed. Additionally, introducing rotational grazing to increase grass coverage in pastures, and maintaining appropriate numbers of livestock per acre for grazing, can also aid in the reduction of bacteria inputs.

Manure Collection and Storage Practices: Manure has been identified as a source of bacteria. Bacteria can be transported to surface water bodies via stormwater runoff. Bacteria laden water can also leach into groundwater resources. Improved strategies for the collection, storage and management of manure can minimize impacts of bacteria entering the surface and groundwater system. Repairing manure storage facilities or building roofs over manure storage areas may decrease the amount of bacteria in stormwater runoff.

Manure management plans: Developing manure management plans can ensure that the storage and application rates of manure are appropriate for land conditions. Determining application rates that take into account the crop to be grown on that particular field and soil type will ensure that the correct amount of manure is spread on a field given the conditions. Spreading the correct amount of manure will reduce the availability of bacteria to migrate to surface waters.

Feedlot runoff controls: Treatment of feedlot runoff via diversion structures, holding/storage areas, and stream buffering areas can all reduce the transmission of bacteria to surface water environments. Additionally, cleaner stormwater runoff can be diverted away from feedlots so as to not liberate bacteria.

Subsurface septic treatment systems: Improvements to septic management programs and educational opportunities can reduce the occurrence of septic pollution. Educating the public on proper septic maintenance, finding and eliminating illicit discharges and repairing failing systems could lessen the impacts of septic derived bacteria inputs into the CRW.

Stormwater wetland treatment systems: Constructed wetlands with the purpose of treating wastewater or stormwater inputs could be explored in selected areas of the CRW. Constructed wetland systems may be vegetated, open water, or a combination of vegetated and open water. MPCA explained that recent studies have found that the more effective constructed wetland designs employ large treatment volumes in proportion to the contributing drainage area, have open water areas between vegetated areas, have long flow paths and a resulting longer detention time, and are designed to allow few overflow events.

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

Bioinfiltration of stormwater: Biofiltration practices rely on the transport of stormwater and watershed runoff through a medium such as sand, compost or soil. This process allows the medium to filter out sediment and therefore sediment-associated bacteria. Biofiltration/bioretention systems, are vegetated and are expected to be most effective when sized to limit overflows and designed to provide the longest flow path from inlet to outlet.

Education and Outreach Efforts: Increased education and outreach efforts to the general public bring greater awareness to the issues surrounding bacteria contamination and strategies to reducing loading and transport of bacteria. Education efforts targeted to the general public are commonly used to provide information on the status of impacted waterways as well as to address pet waste and wildlife issues. Education efforts may emphasize aspects such as cleaning up pet waste or managing the landscape to discourage nuisance congregations of wildlife and waterfowl. Education can also be targeted to municipalities, wastewater system operators, land managers and other groups who play a key role in the management of bacteria sources.

CRW phosphorus TMDLs:

Septic Field Maintenance: Septic systems are believed to be a source of nutrients to waters in the CRW. Failing systems are expected to be identified and addressed via upgrades to those SSTS not meeting septic ordinances. MPCA explained that SSTS improvement priority should be given to those failing SSTS on lakeshore properties or those SSTS adjacent to streams within the direct watersheds for each water body. MPCA aims to greatly reduce the number of failing SSTS in the future via local septic management programs and educational opportunities. Educating the public on proper septic maintenance, finding and eliminating illicit discharges, and repairing failing systems could lessen the impacts of septic derived nutrients inputs into the CRW.

Manure management (feedlot and manure stockpile runoff controls): Manure has been identified as a potential source of nutrients in the CRW. Nutrients derived from manure can be transported to surface water bodies via stormwater runoff. Nutrient laden water can also leach into groundwater resources. Improved strategies in the collection, storage and management of manure can minimize impacts of nutrients entering the surface and groundwater system. Repairing manure storage facilities or building roofs over manure storage areas may decrease the amount of nutrients in stormwater runoff.

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

Urban/Residential Nutrient Reduction Strategies: These strategies involve reducing stormwater runoff from lakeshore homes and other residences within the CRW. These practices would include; rain gardens, lawn fertilizer reduction, lake shore buffer strips, vegetation management and replacement of failing septic systems. Water quality educational programs could also be utilized to inform the general public on nutrient reduction efforts and their impact on water quality.

Municipal activities: Municipal programs, such as street sweeping, can also aid in the reduction of nutrients to surface water bodies within the CRW. Municipal partners can team with local watershed groups or water district partners to assess how best to utilize their monetary resources for installing new stormwater BMPs (ex. vegetated swales) or retro-fitting existing stormwater BMPs.

Internal Loading Reduction Strategies: Internal nutrient loads may be addressed to meet the TMDL allocations outlined in the CRW phosphorus TMDLs. MPCA recommends that before any strategy is put into action, an intensive technical review, to evaluate the costs and feasibility of internal load reduction options be completed. Several options should be considered to manage internal load inputs to each of the water bodies addressed in this TMDL.

- *Management of fish populations:* Monitor and manage fish populations to maintain healthy game fish populations and reduce rough fish (i.e. carp, bullheads, fathead minnows) populations.
- *Vegetation management:* Improved management of in-lake vegetation in order to limit phosphorus loading and to increase water clarity. Controlling the vitality of curly-leaf pondweeds via chemical treatments (herbicide applications) will reduce one of the significant sources of internal loading, the senescence of curly-leaf plants in the summer months.
- *Chemical treatment:* The addition of chemical reactants (ex. aluminum sulfate) to lakes of the CRW in order for those reactants to permanently bind phosphorus into the lake bottom sediments. This effort could decrease phosphorus releases from sediment into the lake water column during anoxic conditions.

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

CRW TSS TMDLs:

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

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

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

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 9 of the final TMDL document. Throughout the development of the CRW TMDLs the public was given various opportunities to participate. As part of the strategy to communicate the goals of the TMDL project and to engage with members of the public, MPCA collaborated with local partners via the Chippewa River Watershed Project which included coordination with local SWCD staff, NRCS staff, other state agency staff (e.g., staff from the Minnesota Department of Natural Resources and Board of Soil and Water Resources (BWSR)), county and township officials and local citizens. This group met at various times to discuss strategies for improving water quality in the CRW.

MPCA posted the draft TMDL online at (https://www.pca.state.mn.us/water/total-maximum-daily-load-tmdl-projects) for a public comment period. The 30-day public comment period was started on August 7, 2016 and ended on September 7, 2016. MPCA received four public comments during the public comment period from Roger Granberg, Lower Minnesota River Watershed District (LMRWD), Minnesota Agricultural Water Resource Center (MAWRC) and Minnesota Department of Agriculture (MDA).

Roger Granberg, from Chippewa Falls Township in Pope County, shared concerns regarding cattle in streams and cattle activity breaking down streambanks in riparian areas. MPCA acknowledged that improved livestock management practices were highlighted in the Chippewa River WRAPS document as a strategy to reduce bacteria and sediment inputs to surface waters of the CRW. Additionally, MPCA encouraged Mr. Granberg to participate in the public process toward providing input to the 1W1P and to communicate and work with local partners (e.g., SWCDs) to highlight some of the bacteria and sediment sources he has observed.

The LMRWD shared its concern that the draft CRW TMDL document had the following inadequacies: reasonable assurance discussion, the use of a categorical LA and not subdividing load allocation sources into separate LA line items of the TMDL equation (e.g., stream bank erosion LA line item and Lake Shakopee LA line) and lack of LA source detail for sub-watershed contributions. Also, the LMRWD requested that the CRW TSS TMDLs have assurances that the CRW project aligns with the South Metro Mississippi River TSS TMDL. In response to these comments MPCA revised its reasonable assurance discussion in the TMDL document to include additional explanation and discussion of various efforts to ensure that nonpoint source reduction efforts would be undertaken and prioritized at the state and local levels. MPCA outlined state initiated NPS control programs, funding to support NPS implementation programming, commitments to track and monitor progress toward NPS reductions and other NPS assurance discussions (Section 6 of the final TMDL document). MPCA provided additional information to answer LMRWD's other concerns within its response to LMRWD's comments. MPCA referenced discussions included in the CRW WRAPS document which provides greater detail and addresses some of the topics posed by LMRWD.

The MAWRC expressed its concern with MPCA's interpretation of water quality data used in the development of the TMDL, the loss of local initiative in addressing the water quality challenges, potential implementation planning being completed without the input of local stakeholders and accuracy of the source discussion and responsibility of sources impacting water quality in the CRW. MPCA answered each of MAWRC's concerns and where appropriate, updated language within the final CRW TMDL.

The MDA provided comments on both the draft TMDL and the draft WRAPS documents. MDA's TMDL comments focused on MPCA updating its discussion of a journal article (Sadowsky et al. 2010[3] and 2015[4]) in the TMDL document and providing greater detail on HSPF model calibration and validation information. MPCA answered each of MDA's comments on the draft TMDL and where appropriate, updated language within the final CRW TMDL.

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[3] Sadowsky, M.J., S. Matteson, M. Hamilton, R. Chandrasekaran, 2010. "Growth, Survival, and Genetic Structure of *E. coli* found in Ditch Sediments and Water at the Seven Mile Creek Watershed". http://www.mda.state.mn.us/protecting/cleanwaterfund/research/~/~/media/Files/protecting/cwf/ecoliditch7milecreek.ashx

[4] Sadowsky M. J., R. Chandrasekaran, M. Hamilton, P. Wang, C. Staley, S. Matteson, A. Birr, 2015, "Geographic isolation of Escherichia coli genotypes in sediments and water of the Seven Mile Creek — A constructed riverine watershed." Science of the Total Environment 538 (2015) 78–85, www.elsevier.com/locate/scitotenv

EPA believes that MPCA adequately addressed the comments from the four commenters and updated the final TMDL appropriately. MPCA submitted all public comments received during the public notice period and individual responses to those comments in the final TMDL submittal packet received by the EPA on April 11, 2017.

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

12. Submittal Letter

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

Comment:
The EPA received the final CRW TMDL document, submittal letter and accompanying documentation from MPCA on April 11, 2017. The transmittal letter explicitly stated that the final TMDLs referenced in Table 1 of this Decision Document were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval.

The letter clearly stated that this was a final TMDL submittal under Section 303(d) of CWA. The letter also contained the name of the watershed as it appears on Minnesota's 303(d) list, and the causes/pollutants of concern. This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130.

The EPA finds that the TMDL transmittal letter submitted for the Chippewa River Watershed TMDLs by MPCA satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the 12 bacteria TMDLs, 27 nutrient (TP) TMDLs, and 2 TSS TMDLs satisfy all elements for approvable TMDLs. This TMDL approval is for **forty-one TMDLs**, addressing water bodies for aquatic recreational and aquatic life use impairments (Table 1 of this Decision Document).

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

ATTACHMENTS

Attachment #1: **Table 7: Bacteria (*E. coli*) TMDLs for the Chippewa River Watershed**

Attachment #2: **Table 9: Total Phosphorus (TP) Lake TMDLs for the Chippewa River Watershed**

Attachment #3: **Table 10: Total Phosphorus (TP) stream segment TMDLs for the Chippewa River Watershed**

Attachment #4: **Table 12: Total Suspended Solid (TSS) TMDLs for the Chippewa River Watershed**

Table 7: Bacteria (*E. coli*) TMDLs for the Chippewa River Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		E. coli (billions of bacteria/day)				
TMDL for Chippewa River (07020005-506)						
Wasteload Allocation	WLA - City of Clontarf WWTP (MNG580108)	1.01	1.01	1.01	1.01	1.01
	WLA - City of Evansville WWTP (MN0023329)	3.57	3.57	3.57	3.57	3.57
	WLA - City of Farwell/Kensington WWTP (MNG580220)	2.72	2.72	2.72	2.72	2.72
	WLA - City of Hancock WWTP (MN0023582)	6.54	6.54	6.54	6.54	6.54
	WLA - City of Hoffman WWTP (MNG580134)	11.80	11.80	11.80	11.80	11.80
	WLA - City of Lowry WWTP (MN0024007)	2.01	2.01	2.01	2.01	2.01
	WLA - City of Millerville WWTP (MN0054305)	1.21	1.21	1.21	1.21	1.21
	WLA - City of Murdock WWTP (MNG580086)	1.52	1.52	1.52	1.52	1.52
	WLA - City of Starbuck WWTP (MN0021415)	1.67	1.67	1.67	1.67	1.67
	WLA - City of Sunburg WWTP (MNG580125)	0.57	0.57	0.57	0.57	0.57
	WLA - Urbank WWTP (MN0068446)	0.38	0.38	0.38	0.38	0.38
	WLA Totals	33.00	33.00	33.00	33.00	33.00
Load Allocation	Watershed load	4567.80	1914.10	947.30	433.60	169.00
Margin Of Safety (10%)		511.20	216.40	108.90	51.80	22.50
Loading Capacity (TMDL)		**5112.00**	**2163.50**	**1089.20**	**518.40**	**224.50**
TMDL for Cottonwood Creek (07020005-511)						
Wasteload Allocation	WLA - City of Danvers WWTP (MNG580119)	0.90	0.90	0.90	0.90	0.90
	WLA Totals	0.90	0.90	0.90	0.90	0.90
Load Allocation	Watershed load	472.30	172.30	81.10	40.50	16.20
Margin Of Safety (10%)		52.30	19.20	9.10	4.60	1.90
Loading Capacity (TMDL)		**525.50**	**192.40**	**91.10**	**46.00**	**19.00**
TMDL for East Branch of Chippewa River (07020005-515)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	743.40	303.00	156.40	79.60	33.30
Margin Of Safety (10%)		82.60	33.70	17.40	8.80	3.70
Loading Capacity (TMDL)		**826.00**	**336.70**	**173.80**	**88.40**	**37.00**
TMDL for South Mud Creek (07020005-518)						

Wasteload Allocation	WLA - City of Murdock WWTP (MNG580086)	1.52	1.52	1.52	1.52	1.52
	WLA Totals	1.52	1.52	1.52	1.52	1.52
Load Allocation	Watershed Load	376.90	156.30	77.00	35.30	16.60
Margin Of Safety (10%)		42.10	17.50	8.70	4.10	2.00
Loading Capacity (TMDL)		**420.52**	**175.32**	**87.22**	**40.92**	**20.12**
TMDL for Outlet Creek (07020005-523)						
Wasteload Allocation	WLA - City of Lowry WWTP (MN0024007)	2.01	2.01	2.01	2.01	2.01
	WLA - City of Starbuck WWTP (MN0021415)	1.67	1.67	1.67	1.67	1.67
	WLA Totals	3.68	3.68	3.68	3.68	3.68
Load Allocation	Watershed load	319.70	95.70	31.10	12.60	2.80
Margin Of Safety (10%)		35.90	11.00	3.90	1.80	0.70
Loading Capacity (TMDL)		**359.28**	**110.38**	**38.68**	**18.08**	**7.18**
TMDL for North Mud Creek (07020005-554)						
Wasteload Allocation	WLA - City of Sunburg WWTP (MNG580125)	0.57	0.57	0.57	0.57	0.57
	WLA Totals	0.57	0.57	0.57	0.57	0.57
Load Allocation	Watershed load	497.80	200.00	93.70	45.20	20.00
Margin Of Safety (10%)		55.40	22.30	10.50	5.10	2.30
Loading Capacity (TMDL)		**553.77**	**222.87**	**104.77**	**50.87**	**22.87**
TMDL for Shakopee Creek (07020005-557)						
Wasteload Allocation	WLA - City of Kerkhoven WWTP (MN0020583)	0.72	0.72	0.72	0.72	0.72
	WLA Totals	0.72	0.72	0.72	0.72	0.72
Load Allocation	Watershed load	555.00	211.30	87.50	31.90	8.10
Margin Of Safety (10%)		61.70	23.60	9.80	3.60	1.00
Loading Capacity (TMDL)		**617.42**	**235.62**	**98.02**	**36.22**	**9.82**
TMDL for County Ditch 3 (07020005-579)						
Wasteload Allocation	WLA - City of Kerkhoven WWTP (MN0020583)	0.72	0.72	0.72	0.72	0.72
	WLA Totals	0.72	0.72	0.72	0.72	0.72
Load Allocation	Watershed Load	357.10	138.70	69.50	34.90	14.70
Margin Of Safety (10%)		39.80	15.50	7.80	4.00	1.70
Loading Capacity (TMDL)		**397.62**	**154.92**	**78.02**	**39.62**	**17.12**
TMDL for Tributary to Chippewa River (07020005-584)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00

Load Allocation	Watershed Load	112.00	40.90	19.20	9.50	4.00
Margin Of Safety (10%)		12.50	4.60	2.10	1.10	0.40
	Loading Capacity (TMDL)	**124.50**	**45.50**	**21.30**	**10.60**	**4.40**
TMDL for Trappers Run Road (07020005-628)						
Wasteload Allocation	WLA - City of Lowry WWTP (MN0024007)	2.01	2.01	2.01	2.01	2.01
	WLA Totals	2.01	2.01	2.01	2.01	2.01
Load Allocation	Watershed load	118.80	47.30	24.40	11.00	3.40
Margin Of Safety (10%)		13.40	5.50	2.90	1.40	0.60
	Loading Capacity (TMDL)	**134.21**	**54.81**	**29.31**	**14.41**	**6.01**
TMDL for Little Chippewa River (07020005-713)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	317.40	129.10	69.50	33.20	13.10
Margin Of Safety (10%)		35.30	14.40	7.70	3.70	1.50
	Loading Capacity (TMDL)	**352.70**	**143.50**	**77.20**	**36.90**	**14.60**
TMDL for Huse Creek (07020005-917)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	9.00	3.60	1.60	0.80	0.36
Margin Of Safety (10%)		1.00	0.40	0.20	0.09	0.04
	Loading Capacity (TMDL)	**10.00**	**4.00**	**1.80**	**0.89**	**0.40**

Table 9: Nutrient TMDLs for lakes in the Chippewa River Watershed

Allocation	Source	TMDL	Load Reduction to achieve WQS*
		lbs/day	*(%)*
TP TMDL for Block Lake (56-0079-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.02	--
	WLA Totals	***0.02***	--
Load Allocation	Watershed Load**	0.83	--
	LA Totals	***0.83***	--
Margin Of Safety (10%)		0.09	--
Loading Capacity (TMDL)		**0.94**	71%
TP TMDL for Danielson Slough Lake (61-0194-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.06	--
	WLA Totals	***0.06***	--
Load Allocation	Watershed Load**	2.31	--
	LA Totals	***2.31***	--
Margin Of Safety (10%)		0.26	--
Loading Capacity (TMDL)		**2.63**	52%
TP TMDL for Edwards Lake (61-0106-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.02	--
	WLA Totals	***0.02***	--
Load Allocation	Watershed Load**	0.78	--
	LA Totals	***0.78***	--
Margin Of Safety (10%)		0.09	--
Loading Capacity (TMDL)		**0.89**	72%
TP TMDL for Gilbert Lake (21-0189-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.02	--
	WLA Totals	***0.02***	--
Load Allocation	Watershed Load**	0.94	--
	LA Totals	***0.94***	--
Margin Of Safety (10%)		0.10	--

	Loading Capacity (TMDL)	**1.06**	**31%**
TP TMDL for Hanson Lake (61-0080-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.11	--
	WLA Totals	***0.11***	--
Load Allocation	Watershed Load**	4.72	--
	LA Totals	***4.72***	--
Margin Of Safety (10%)		0.52	--
	Loading Capacity (TMDL)	5.35	**55%**
TP TMDL for Hassel Lake (76-0086-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.12	--
	WLA Totals	***0.12***	--
Load Allocation	Watershed Load**	4.65	--
	LA Totals	***4.65***	--
Margin Of Safety (10%)		0.52	--
	Loading Capacity (TMDL)	**5.29**	77%
TP TMDL for Hollerberg Lake (76-0057-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.03	--
	WLA Totals	***0.03***	--
Load Allocation	Watershed Load**	1.21	--
	LA Totals	***1.21***	--
Margin Of Safety (10%)		0.14	--
	Loading Capacity (TMDL)	**1.38**	**52%**
TP TMDL for Irgens Lake (61-0211-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.06	--
	WLA Totals	***0.06***	--
Load Allocation	Watershed Load**	2.25	--
	LA Totals	***2.25***	--
Margin Of Safety (10%)		0.25	--
	Loading Capacity (TMDL)	**2.56**	77%
TP TMDL for Jennie Lake (21-0323-00)			

Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.01	--
	WLA Totals	***0.01***	--
Load Allocation	Watershed Load**	0.32	--
	LA Totals	***0.32***	--
Margin Of Safety (10%)		0.04	--
Loading Capacity (TMDL)		**0.37**	**80%**
TP TMDL for Johanna Lake (61-0006-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.10	--
	WLA Totals	***0.10***	--
Load Allocation	Watershed Load**	4.04	--
	LA Totals	***4.04***	--
Margin Of Safety (10%)		0.46	--
Loading Capacity (TMDL)		**4.60**	**44%**
TP TMDL for John Lake (61-0123-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.04	--
	WLA Totals	***0.04***	--
Load Allocation	Watershed Load**	1.53	--
	LA Totals	***1.53***	--
Margin Of Safety (10%)		0.17	--
Loading Capacity (TMDL)		**1.74**	**70%**
TP TMDL for Jorgenson Lake (61-0164-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.01	--
	WLA Totals	***0.01***	--
Load Allocation	Watershed Load**	0.28	--
	LA Totals	***0.28***	--
Margin Of Safety (10%)		0.03	--
Loading Capacity (TMDL)		**0.32**	**86%**
TP TMDL for Long Lake (75-0024-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.07	--
	WLA Totals	***0.07***	--

Load Allocation	Watershed Load**	2.74	--
	LA Totals	*2.74*	--
Margin Of Safety (10%)		0.30	--
Loading Capacity (TMDL)		**3.11**	**59%**
TP TMDL for Mary Lake (61-0099-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.01	--
	WLA Totals	*0.01*	--
Load Allocation	Watershed Load**	0.47	--
	LA Totals	*0.47*	--
Margin Of Safety (10%)		0.05	--
Loading Capacity (TMDL)		**0.53**	**58%**
TP TMDL for McIver Lake (61-0199-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.02	--
	WLA Totals	*0.02*	--
Load Allocation	Watershed Load**	0.68	--
	LA Totals	*0.68*	--
Margin Of Safety (10%)		0.08	--
Loading Capacity (TMDL)		**0.78**	**79%**
TP TMDL for Monson Lake (76-0033-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.02	--
	WLA Totals	*0.02*	--
Load Allocation	Watershed Load**	0.60	--
	LA Totals	*0.60*	--
Margin Of Safety (10%)		0.07	--
Loading Capacity (TMDL)		**0.69**	**34%**
TP TMDL for Norway Lake (34-0251-02)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.10	--
	WLA Totals	*0.10*	--
Load Allocation	Watershed Load**	4.41	--
	LA Totals	*4.41*	--
Margin Of Safety (10%)		0.50	--
Loading Capacity (TMDL)		**5.01**	**27%**

TP TMDL for Rasmuson Lake (61-0086-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.01	--
	WLA Totals	***0.01***	--
Load Allocation	Watershed Load**	0.45	--
	LA Totals	***0.45***	--
Margin Of Safety (10%)		0.05	--
Loading Capacity (TMDL)		**0.51**	**78%**

TP TMDL for Red Rock Lake (21-0291-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.05	--
	WLA Totals	***0.05***	--
Load Allocation	Watershed Load**	1.95	--
	LA Totals	***1.95***	--
Margin Of Safety (10%)		0.22	--
Loading Capacity (TMDL)		**2.22**	**88%**

TP TMDL for Simon Lake (61-0034-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.04	--
	WLA Totals	***0.04***	--
Load Allocation	Watershed Load**	1.71	--
	LA Totals	***1.71***	--
Margin Of Safety (10%)		0.19	--
Loading Capacity (TMDL)		**1.94**	**72%**

TP TMDL for Swenoda Lake (61-0051-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.01	--
	WLA Totals	***0.01***	--
Load Allocation	Watershed Load**	0.56	--
	LA Totals	***0.56***	--
Margin Of Safety (10%)		0.06	--
Loading Capacity (TMDL)		**0.63**	**49%**

TP TMDL for Thompson Lake (26.0050-00)

Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.01	--
	WLA Totals	***0.01***	--
Load Allocation	Watershed Load**	0.43	--
	LA Totals	***0.43***	--
Margin Of Safety (10%)		0.05	--
Loading Capacity (TMDL)		**0.49**	**88%**
TP TMDL for West Norway Lake (34-0251-01)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.22	--
	WLA Totals	***0.22***	--
Load Allocation	Watershed Load**	9.61	--
	LA Totals	***9.61***	--
Margin Of Safety (10%)		1.09	--
Loading Capacity (TMDL)		**10.92**	**47%**
TP TMDL for Wicklund Lake (61-0204-00)			
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.03	--
	WLA Totals	***0.03***	--
Load Allocation	Watershed Load**	1.24	--
	LA Totals	***1.24***	--
Margin Of Safety (10%)		0.14	--
Loading Capacity (TMDL)		**1.41**	**75%**

* = See Table 4.6 of the final TMDL document

** = Watershed load is further sub-divided (e.g., internal load, atmospheric load, etc.) in the BATHTUB model and presented in Appendix B of the final TMDL document

Allocation	**Source**	**TMDL**		**Load Reduction to achieve WQS***
		lbs/day	*lbs/year*	*(%)*
TP TMDL for Long Lake (21-0343-00)				
Wasteload Allocation	WLA - City of Evansville WWTP (MN0023329)	6.17	304.20	--
	WLA - City of Millerville WWTP (MN0054305)	4.19	119.00	
	WLA - Urbank WWTP (MN0068446)	1.30	66.10	

	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.12	126.70	
	WLA Totals	***11.78***	***616.00***	--
Load Allocation	Watershed Load**	5.33	5633.20	--
	LA Totals	***5.33***	***5633.20***	--
Margin Of Safety (10%)		1.90	693.80	--
Loading Capacity (TMDL)		**19.01**	**6943.00**	**57%**

* = See Table 4.6 of the final TMDL document

** = Watershed load is further sub-divided (e.g., internal load, atmospheric load, etc.) in the BATHTUB model and presented in Appendix B of the final TMDL document

Table 10: Nutrient TMDLs for streams in the Chippewa River Watershed

Allocation	Source	TP TMDL (lbs/day)
TMDL for Mud Creek (07020005-554)		
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000) (2.2%)	0.60
	WLA Totals	***0.60***
Load Allocation	Watershed Load	23.20
Margin Of Safety (10%)		2.60
Loading Capacity (TMDL)		**26.40**
TMDL for Chippewa River (07020005-584)		
Wasteload Allocation	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000) (2.2%)	0.10
	WLA Totals	***0.10***
Load Allocation	Watershed Load	5.70
Margin Of Safety (10%)		0.70
Loading Capacity (TMDL)		**6.50**

Table 12: Total Suspended Solids (TSS) TMDLs for the Chippewa River Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		TSS (tons/day)				
TMDL for Chippewa River (07020005-507)						
Wasteload Allocation	WLA - City of Benson WWTP (MN0020036)	0.10	0.10	0.10	0.10	0.10
	WLA - City of Clontarf WWTP (MNG580108)	0.04	0.04	0.04	0.04	0.04
	WLA - City of Evansville WWTP (MN0023329)	0.14	0.14	0.14	0.14	0.14
	WLA - City of Farwell/Kensington WWTP (MNG580220)	0.11	0.11	0.11	0.11	0.11
	WLA - City of Hancock WWTP (MN0023582)	0.26	0.26	0.26	0.26	0.26
	WLA - City of Hoffman WWTP (MNG580134)	0.47	0.47	0.47	0.47	0.47
	WLA - City of Kerkhoven WWTP (MN0020583)	0.02	0.02	0.02	0.02	0.02
	WLA - City of Lowry WWTP (MN0024007)	0.08	0.08	0.08	0.08	0.08
	WLA - City of Millerville WWTP (MN0054305)	0.05	0.05	0.05	0.05	0.05
	WLA - City of Murdock WWTP (MNG580086)	0.06	0.06	0.06	0.06	0.06
	WLA - City of Starbuck WWTP (MN0021415)	0.04	0.04	0.04	0.04	0.04
	WLA - City of Sunburg WWTP (MNG580125)	0.02	0.02	0.02	0.02	0.02
	WLA - Urbank WWTP (MN0068446)	0.01	0.01	0.01	0.01	0.01
	WLA - Chippewa Valley Ethanol Wastewater (MN0062898)	0.01	0.01	0.01	0.01	0.01
	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000) (2.2%)	8.90	3.70	1.90	0.90	0.40
	WLA Totals	10.31	5.11	3.31	2.31	1.81
Load Allocation	Watershed load	351.90	146.50	75.50	35.10	14.00
Margin Of Safety (10%)		40.20	16.80	8.80	4.20	1.80
	Loading Capacity (TMDL)	**402.41**	**168.41**	**87.61**	**41.61**	**17.61**
IBI (TSS Surrogate TMDL)						
TMDL for Outlet Lake (07020005-523)						
Wasteload Allocation	WLA - City of Lowry WWTP (MN0024007)	0.08	0.08	0.08	0.08	0.08
	WLA - City of Starbuck WWTP (MN0021415)	0.04	0.04	0.04	0.04	0.04

	WLA - Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000) (2.2%)	0.50	0.20	0.05	0.03	0.01
	WLA Totals	0.62	0.32	0.17	0.15	0.13
Load Allocation	Watershed load	20.10	6.00	2.00	1.00	0.30
Margin Of Safety (10%)		2.30	0.70	0.20	0.10	0.05
	Loading Capacity (TMDL)	**23.02**	**7.02**	**2.37**	**1.25**	**0.48**