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

REPLY TO ATTENTION OF

WW-16J

February 18, 2021

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

Subject: Approval of the Clearwater River Watershed TMDL

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDLs) for the Clearwater River Watershed, including supporting documentation and follow up information. The Clearwater River Watershed is located in northwest Minnesota. The TMDLs were calculated for total suspended solids, phosphorus, and *E. coli* to address the impaired Aquatic Life Use and Aquatic Recreation Use.

EPA has determined that these TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, EPA hereby approves Minnesota's 24 TMDLs for the Clearwater River Watershed. 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 effort in submitting these TMDLs, and look forward to future submissions by the State of Minnesota. If you have any questions, please contact Christine Urban of the Watersheds and Wetlands Branch at Urban.christine@epa.gov or 312-886-3493.

Sincerely,

Digitally signed by
TERA FONG
Date: 2021.02.18
14:35:51 -06'00'

Tera L. Fong
Division Director, Water Division

Enclosure

cc: Celine Lyman, MPCA

wq-iw5-19g

TMDL: Clearwater River Watershed TMDLs in Clearwater, Polk, Pennington, Red Lake, and Beltrami counties in Minnesota
Date: 2/18/2021

DECISION DOCUMENT FOR THE CLEARWATER RIVER WATERSHED TMDLS, 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 Clearwater River Watershed (CRW) in northwestern Minnesota is a main tributary to the Red River of the North and drains approximately 1,384 square miles (approximately 885,000 acres). The Clearwater River discharges from Lower Long Lake on the White Earth Chippewa Reservation, and flows northeast, then northwest and then west before discharging into the Red Lake River, which in turn flows into the Red River of the North (Figure 3-1 of the TMDL). Several tributaries are located in the watershed, including the Lost River, Hill River, Popular River, and Lower Badger Creek. The watershed includes portions of Clearwater, Polk, Pennington, Red Lake, and Beltrami counties.

The Minnesota Pollution Control Agency (MPCA) 2018 List of Impaired Waters identified a total of 44 aquatic life and aquatic recreation impairments in 32 water bodies in the CRW (Table 1-1 of the TMDL). The impaired water bodies that received TMDLs are listed in Table 1 of this Decision Document and shown in Figure 1-4 of the TMDL. A total of 24 TMDLs were developed for 21 impaired water bodies. Of these 24 TMDLs, 15 are for excessive *E. coli*, 3 are for excessive phosphorus in lakes, 5 for excessive total suspended solids (TSS), and 1 for excessive phosphorus in a river segment.

Table 1: TMDLs Approved in the Clearwater River Watershed TMDL

Water body name	Assessment Unit ID	Affected Use| Use class	Year Listed	Pollutant
Lower Badger Creek	09020305-502	Aquatic Recreation 2B, 3C	2018	*E. coli*
Poplar River	09020305-504	Aquatic Recreation 2B, 3C	2018	*E. coli*
Lost River	09020305-512	Aquatic Recreation 2B, 3C	2018	*E. coli*
Ruffy Brook	09020305-513	Aquatic Recreation 2B, 3C	2008	*E. coli*
Unnamed Creek (Clear Brook)	09020305-526	Aquatic Recreation 2B, 3C	2018	*E. coli*
Silver Creek	09020305-527	Aquatic Recreation 2B, 3C	2006	*E. coli*
Lost River	09020305-529	Aquatic Recreation 2B, 3C	2018	*E. coli*
Lost River	09020305-530	Aquatic Recreation 1B, 2Ag, 3B	2018	*E. coli*
Hill River	09020305-539	Aquatic Recreation 2B, 3C	2018	*E. coli*
Unnamed Creek (Nassett Creek)	09020305-545	Aquatic Recreation 1B, 2Ag, 3B	2018	*E. coli*
Judicial Ditch 73	09020305-550	Aquatic Recreation 2B, 3C	2018	*E. coli*
Terrebonne Creek	09020305-574	Aquatic Recreation 2B, 3C	2010	*E. coli*
Brooks Creek	09020305-578	Aquatic Recreation 2B, 3C	2018	*E. coli*
Clearwater River	09020305-647	Aquatic Recreation 2B, 3C	2018	*E. coli*
Beau Gerlot Creek	09020305-651	Aquatic Recreation 2B, 3C	2018	*E. coli*
			TOTAL bacteria TMDLs	**15**
Long Lake	04-0295-00	Aquatic Recreation 2B, 3C	2018	Phosphorus
Stony Lake	15-0156-00	Aquatic Recreation 2B, 3C	2018	Phosphorus
Cameron Lake	60-0189-00	Aquatic Recreation 2B, 3C	2018	Phosphorus
			TOTAL Lake Phosphorus TMDLs	**3**
Clearwater River	09020305-647	Aquatic Life	2018	Phosphorus
			TOTAL River phosphorus TMDLs	**1**
Clearwater River	09020305-501	Aquatic Life,	2006	TSS
Clearwater River	09020305-511	Aquatic Life,	2008	TSS
Unnamed Creek (Nassett Creek)	09020305-545	Aquatic Life,	2018	TSS
Clearwater River	09020305-647	Aquatic Life, 2B, 3C	2008	TSS
Clearwater River	09020305-648	Aquatic Life, 2B, 3C	2008	TSS
			TOTAL TSS TMDLs	**5**
			TOTAL TMDLs	**24**

The Clearwater River TMDL includes tribal lands for the Red Lake Nation and the White Earth Nation. The CRW TMDLs do not allocate any loadings to tribal lands of the Red Lake Nation nor the White Earth Nation. MPCA provides details on the location of Tribal lands in Section 3.1 of the TMDL.

Land Use:
MPCA describes the CRW land use in Section 3.4 of the TMDL. The land use transitions from forest and rangeland in the eastern portion of the watershed to cultivated cropland in the western portion of the watershed (Figure 3-9 of the TMDL). The overall land use in the watershed is

approximately 34% cultivated crops, 24% woodlands, 18% pasture, 15% wetlands, and 4% developed (Table 2 of this Decision Document).

MPCA noted that wild rice paddies are located in peatlands along a portion of the Clearwater River (Figure 3-10 of the TMDL). MPCA explained that wild rice is grown in paddies which are periodically flooded with water to an average depth of about one foot during specific periods during the growing season, including harvest time. When drained, the runoff can contain sediment and nutrients which discharge to the Clearwater River. Wild rice paddies are mostly located along the reach of the Clearwater River from the Ruffy Brook confluence to the County Road 10 crossing and currently occupy approximately 11,000 acres. In total, there are approximately 15,700 acres of wild rice paddies in the Clearwater River Watershed. Approximately 50% of these paddies are being used to grow rice in a given year. MPCA noted that the paddies have an influence on flow and water quality conditions within the river.

Table 2: Land use summary for the CRW TMDL

Clearwater River Watershed Land Use Summary		
National Land Cover Database Category	Pre-Settlement*	Percent of Watershed - 2011**
Developed, Open Space		3.92%
Developed, Low Intensity		0.44%
Developed, Medium Intensity		0.06%
Developed, High Intensity		0.02%
Barren Land		0.09%
Shrub/Scrub	24.90%	0.87%
Grassland/Herbaceous	9.89%	2.87%
Deciduous Forest	24.55%	19.32%
Evergreen Forest	11.45%	2.65%
Mixed Forest	3.74%	0.01%
Pasture/Hay		18.06%
Cultivated Crops		33.56%
Woody Wetlands	7.53%	5.28%
Emergent Herbaceous Wetlands	17.24%	10.28%
Open Water	0.70%	2.57%

*Land use categories are named differently in the DNR presettlement data and the NLCD data. Presettlement values were placed into the categories that seemed most appropriate. The *Natural Vegetation of Minnesota* document from the DNR was used as guidance.
**2011 National Land Cover Database

Problem Identification:

Bacteria TMDLs:

Bacteria impaired segments identified in Table 1 of this Decision Document were included on the final 2018 Minnesota 303(d) list due to excessive bacteria. Section 4.2 of the TMDL describes water quality monitoring within the CRW and indicates that these segments were not attaining their designated aquatic recreation uses due to exceedances of the bacteria criteria. Excessive bacteria can negatively impact recreational uses (e.g., swimming, wading, boating, fishing, etc.) and public health. At elevated levels, bacteria may cause illness within humans who have contact with or ingest bacteria laden water. Recreation-based contact can lead to ear, nose, and throat infections, and stomach illness.

Phosphorus TMDLs:

Lakes: Three lakes in the Clearwater River Watershed were identified as having an impaired

Aquatic Recreation Use due to high concentrations of phosphorus and chl-*a* and low Secchi disk transparency depths. Cameron Lake, Long Lake, and Stony Lake all have relatively small drainage areas and shallow depths (Table 3-2 in the TMDL). Each lake lies within a headwaters portion of a subwatershed, so the total drainage areas are equal to the direct drainage areas of these lakes (Section 3.2 of the TMDL).

<u>River:</u> One segment of the Clearwater River (-647) was assessed as not meeting the Aquatic Life Use due to excessive phosphorus. MPCA reviewed the water quality data for this segment, and determined that the Clearwater River has a relatively low phosphorus concentration upstream of this segment, but the phosphorus concentrations along with the Biological Oxygen Demand (BOD) and Dissolved Oxygen (DO) flux (short-term change in DO levels) increase significantly in Segment 647.

These CRW lakes and stream segment were included on the final 2018 Minnesota 303(d) list due to excessive nutrients as indicated by total phosphorus levels. While phosphorus is an essential nutrient for aquatic life, elevated concentrations of phosphorus can lead to nuisance algal blooms that negatively impact aquatic life and recreation (e.g., swimming, boating, fishing, etc.). Algal decomposition can deplete dissolved oxygen levels within the water column and 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.

<u>*Total Suspended Solids (TSS) TMDLs:*</u>
TSS impaired segments identified in Table 1 of this Decision Document were included on the final 2018 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 TSS measurements and the negative impact of those conditions on fish and macroinvertebrate communities.

TSS is a measurement of the sediment and organic material that inhibits natural light from penetrating the surface water column. When in suspension, sediment can limit visibility and light penetration which may impair foraging and predation activities by certain species. Excess sediment and organic material may create turbid conditions within the water column and may increase the costs of treating surface waters used for drinking water or other industrial purposes (e.g., food processing). Excessive sediment and organic material within the water column can negatively impact fish and macroinvertebrates within the ecosystem via reducing spawning and rearing areas for certain fish species, clogging gills and abrading fish tissue and subjecting sensitive species to unnecessary stress. Excessive amounts of fine sediment in stream environments can degrade aquatic communities.

Excessive fine sediment also may degrade aquatic habitats, alter natural flow conditions in stream environments and add organic materials to the water column. Excess siltation and flow alteration in streams can negatively impact 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. Approximately 47 miles of the Clearwater River were channelized by the United States Army Corps of Engineers (USACE) in the 1950s to reduce flooding and improve drainage for agriculture. Channelization and drain tiles can result in higher peak flows during storm events and flashier flows which erode streambanks and carry sediment loads to streams, settling in the multiple low gradient reaches like those in portions of the CRW.

As discussed in Section 3.5 of the TMDL, much of the Clearwater River is impaired by high concentrations of TSS, beginning with the channelized reach of the Clearwater River and continuing downstream to the river's confluence with the Red Lake River.

Priority Ranking: MPCA's schedule for TMDL completions, as indicated on the 303(d) impaired waters list, reflects Minnesota's priority ranking of this TMDL. MPCA has aligned TMDL priorities with the watershed approach and Watershed Restoration and Protection Strategy (WRAPS) cycle. The schedule for TMDL completion corresponds to the WRAPS report completion on the 10-year cycle. Mainstem river TMDLs, which are not contained in major watersheds and thus not addressed in WRAPS, must also be completed. The MPCA developed a state plan, Minnesota's TMDL Priority Framework Report, to meet the needs of EPA's national measure (WQ-27) under EPA's Long-Term Vision for Assessment, Restoration and Protection under the CWA section 303(d) program. As part of these efforts, the MPCA identified water quality-impaired segments that will be addressed by TMDLs by 2022. The waters of the CRW addressed by this TMDL are part of the MPCA prioritization plan to meet EPA's national measure.

Pollutants of Concern:
The pollutants of concern are bacteria (*E. coli*), phosphorus, and TSS.

Source Identification (point and nonpoint sources):
Point Source Identification: The potential point sources to the CRW are:

<u>Bacteria Point Sources:</u>
National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: MPCA identified four NPDES permitted facilities that impact impaired waters in the CRW watershed. These facilities may contribute bacteria loads to surface waters through discharges of treated wastewater (Section 4.2.1 and Table 4-5 of the TMDL). Permitted facilities must discharge wastewater according to their NPDES permit. MPCA assigned each of these facilities a portion of the bacteria wasteload allocation (WLA).

Municipal Separate Storm Sewer System (MS4) communities: MPCA determined that there are no designated MS4 communities within the CRW.

Concentrated Animal Feedlot Operations (CAFOs): MPCA did not identify any CAFOs in the CRW (Section 5.2.3 of the TMDL). 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).

Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs): MPCA determined that the CRW does not have CSOs nor SSOs which contribute bacteria to waters of the CRW.

Phosphorus Point Sources (Lakes):
NPDES permitted facilities: MPCA determined that there are no NPDES permitted facilities discharging phosphorus within the watersheds for the three lakes (Section 5.4.2 of the TMDL). MPCA also noted that there are no CAFOs or MS4s in the watersheds.

Permitted Construction and Industrial Stormwater: MPCA determined that a small portion of the lake watersheds include lands addressed under a construction stormwater permit. (Section 5.4.2 of the TMDL). MPCA reviewed local records and determined that the approximate annual percentage of land area under construction has been less 0.012% in the watershed (Table 5.54 of the TMDL). MPCA also noted that there is a small percentage of industrial stormwater dischargers in the lake watersheds, and estimated that the land areas were similar for both construction and industrial dischargers. Section 5 of this Decision Document further discusses the WLA for stormwater in the lake TMDLs. 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 and create a Stormwater Pollution Prevention Plan (SWPPP) that summarizes how stormwater will be minimized from the site.

Phosphorus Point Sources (River):
NPDES permitted facilities: NPDES permitted facilities may contribute nutrient loads to surface waters through discharges of wastewater. Permitted facilities must discharge treated wastewater according to their NPDES permit. MPCA determined that there are two WWTPs that discharge to the phosphorus-impaired segment of the Clearwater River (-647) (Section 5.3.3 of the TMDL). MPCA assigned each of these facilities a portion of the phosphorus WLA. Section 5 of this Decision Document contains further information on the WLAs for these WWTPs.

TSS Point Sources:
NPDES permitted facilities: MPCA identified two WWTPs that contribute sediment loads to surface waters through discharges of wastewater (Section 5.1.3 and Table 5-1 of the TMDL). Permitted facilities must discharge wastewater according to their NPDES permit. MPCA assigned each of these facilities a portion of the TSS allocation. Further information regarding the WLAs are found in Section 5 of this Decision Document.

MS4 communities: MPCA determined that there are no MS4 or designated MS4 communities within the CRW (Section 5.1.3 of the TMDL).

Stormwater runoff from permitted construction and industrial areas: MPCA noted that permitted 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 and create a SWPPP that summarizes how stormwater will be minimized from the site. Further information regarding the WLAs are found in Section 5 of this Decision Document.

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

<u>Bacteria NPS sources</u>: MPCA summarized identified sources contributing bacteria in each water body segment in the CRW TMDLs as represented in Table 3 in this Decision Document.

Table 3: *E. coli* Sources in TMDL reaches (Table 4-3 in the TMDL)

E. coli Sources in Impaired Streams		Identifiable Sources				
Assessment Unit	Stream Name	Livestock	Birds	Stormwater	Waterfowl	Septic/ Wastewater
09020305-502	Lower Badger Creek		x		x	
09020305-504	Poplar River	x	x			x
09020305-512	Lost River	x		x		x
09020305-513	Ruffy Brook	x				
09020305-526	Clear Brook			x		x
09020305-527	Silver Creek	x	x	x		x
09020305-529	Lost River	x	x			
09020305-530	Lost River	x				
09020305-539	Hill River	x	x			x
09020305-545	Nassett Creek	x			x	
09020305-550	JD73		x			
09020305-574	Terrebonne Creek	x	x			
09020305-578	Brooks Creek		x			x
09020305-647	Clearwater River	x	x		x	x
09020305-651	Beau Gerlot Creek		x			x

Non-regulated urban runoff: Runoff from urban areas (i.e., 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. Feedlots generate manure which may be spread onto and be transported by stormwater to water bodies. fields. Tile drainage lines increase stormwater flow velocities 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 surfaces waters or resuspend particles on the stream bottom causing 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. Failing SSTS are specifically defined as systems that are failing to protect groundwater from contamination. 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 via contaminated runoff from animal habitats, such as urban park areas, forest, and rural areas.

Phosphorus NPS Sources (river): Section 4.3 of the TMDL identifies major sources of total phosphorus to impaired streams by using a number of techniques including identifying where phosphorus loads to water bodies are highest. The nonpoint sources of phosphorus in the river were similar to the sources of sediment (Section 4.1.2. of the TMDL). MPCA noted that phosphorus concentrations from the natural reaches of the river greatly increased downstream of Clearwater Lake (AUIDs -649 and -650) to the channelized reach (AUID -647).

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. MPCA noted that a significant portion of Segment 647 watershed has been channelized, increasing flow rates and volumes.

Wild Rice Paddies: MPCA explained that a significant portion of the Segment -647 watershed has wild rice paddies present (Section 4.3.2 of the TMDL). Water is diverted into the paddies and drained out at various times of the year to facilitate growth and harvest of wild rice. The paddies can contribute nutrients, particularly phosphorus, during various times of the year.

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.

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.

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 via contaminated runoff from animal habitats, such as urban park areas, forest, and rural areas.

Phosphorus NPS Sources (lakes): In addition to the phosphorus sources noted above, MPCA identified additional nonpoint sources for the lakes.

Internal loading: The release of phosphorus from lake sediments, the release of phosphorus from lake sediments via physical disturbance from benthic fish (rough fish, e.g., 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.

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.

TSS NPS Sources:
MPCA explained in Section 4.1 of the TMDL the various sources of sediment impacting the CRW TMDLs. A detailed analysis for each segment is found in this section of the TMDL; a summary is below.

Stream channelization and streambank erosion: Eroding streambanks and channelization efforts 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. Additionally, MPCA presented results of longitudinal sampling that recorded large increases in TSS from County Highway 11 in AUID 650 to the sites in AUID 647 during wild rice paddy discharge (Figure 4-11 of the TMDL). Monitoring at the outlets of wild rice paddies during drawdown in late summer has shown that surface drainage within wild rice paddies has a very detrimental effect upon water quality in the Clearwater River.

Wetland and Forest Sources: Sediment may be added to surface waters by stormwater flows through wetland or forested areas in the CRW. Storm events may mobilize decomposing vegetation, organic soil particles through the transport of suspended solids and other organic debris.

Future Growth:
MPCA describes reserve capacity for the TMDLs in Sections 5.1.6, 5.2.6, and 5.3.6 and 5.4.5 of the TMDL respectively. Reserve capacity (5%) was applied to TMDLs for streams that received discharge from WWTFs. MPCA explained that the populations of the cites and towns in the watersheds are not expected to increase significantly. 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 1, 2, and 3 waters, with Class 2 being the most restrictive for the pollutants being addressed by the TMDLs (Section 2 of the TMDL). 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:

In Section 2 of the TMDL, MPCA describes the applicable numeric water quality standards (Tables 2-1 and 2-2 of the TMDL, Tables 4-6 of this Decision Document).

Bacteria Criteria: The bacteria water quality standards which apply to CRW TMDLs are:
Bacteria TMDL Targets: The bacteria TMDL targets employed for the CMRW bacteria TMDLs are the *E. coli* standards as stated in Table 4 of this Decision Document. The focus of this TMDL is on the **126 organisms (orgs) per 100 mL** (126 orgs/100 mL) portion of the standard. 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.

Table 4: *E. coli* Numeric Criteria

Parameter	Units	Water Quality Standard
***E. coli* ***	# 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

* - Standards apply only between April 1 and October 31

Phosphorus Criteria (rivers and lakes): Numeric criteria for phosphorus, 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 5 of this Decision Document.

Table 5: Minnesota Eutrophication Standards for Deep and Shallow lakes within the CRW TMDL watershed

Water Quality Characteristic	Region	Applicable Time Period	Criteria	TP Standard	Response Variables			
					chl-*a*	Secchi Disk	Diel DO Flux	BOD
River Eutrophication	Central River Nutrient Region	June 1 – September 30	Summer Average	100 µg/L	18 µg/L		3.5 mg/L	2.0 mg/L
Lake Eutrophication (Cameron and Stony Lakes)	North Central Hardwood Forest, Shallow Lakes (Class 2B)	June 1 – September 30	Summer average	60 µg/L	20 µg/L	1.0 m		
Lake Eutrophication (Long Lake)	Northern Lakes and Forests (Class 2B)	June 1 – September 30	Summer average	30 µg/L	9 µg/L	2.0 m		

Phosphorus TMDL Targets (lakes): MPCA selected phosphorus targets of **30 µg/L**, and **60 µg/L** for lakes identified in this Decision Document. MPCA selected phosphorus as the appropriate target parameter to address eutrophication problems because of the interrelationships between phosphorus and chl-*a*, and phosphorus and Secchi Depth (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. These criteria apply from June 1-September 30.

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, phosphorus, and the response variables, chl-*a* and SD depth. MPCA anticipates that by meeting the phosphorus concentrations of North Central Hardwood Forest and Northern Lakes and Forest WQS the response variables chl-*a* and SD will be attained and the lakes of the CRW TMDL 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.

Phosphorus TMDL target (stream): MPCA employed the phosphorus target of **100 µg/L** for the Central River Nutrient Region to the Clearwater River. The total phosphorus and response variable (i.e., chl-*a* (sestonic), DO_{FLUX}, BOD_5 and pH) values in Table 5 are the EPA approved water quality standards for the Central River Nutrient Region. These standards apply June 1 to September 30.

TSS TMDLs: Numeric criteria for TSS are set forth in Minnesota Rules 7050.0222 and in Table 6 of this Decision Document. These criteria are based upon the appropriate region of the state.

Table 6: TSS Criteria for the CRW TMDLs

Parameter	Use Class	Water Quality Standard	Criteria	Standard's Applicable Time Period
Total Suspended Solids – Trout Streams	2A	Not to exceed 10 mg/L	Maximum = 10% of Samples	April 1 – September 30
Total Suspended Solids – North River Nutrient Region	1C, 2B, 2Bd, 2Bg, 3C	Not to exceed 15 mg/l	Maximum = 10% of Samples	April 1 – September 30
Total Suspended Solids – Central River Nutrient Region	1C, 2B, 2Bd, 2Bg, 3C	Not to exceed 30 mg/l	Maximum = 10% of Samples	April 1 – September 30

The applicable TSS standard varies by River Nutrient Region and stream classification, as noted in Table 6 of this Decision Document. The impaired portions of the Clearwater River are subject to the **30 mg/L TSS** standard for streams in the Central River Nutrient Region. Nassett Creek is a designated trout stream and is required to meet the **10 mg/L TSS** standard for Class 2A waters.

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:

Bacteria TMDLs: MPCA used the geometric mean (126 orgs/100 mL) of the *E. coli* water quality standard to calculate loading capacity values for the bacteria TMDLs as described in Section 5 of the TMDL. MPCA believes the geometric mean 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. MPCA compiled flow data from a variety of sources. Measured or simulated daily stream flows were used to develop load duration curves (LDC) and calculate TMDLs. Average daily flow records were compiled for the sites that were chosen for TMDL establishment. Water level loggers had been deployed at some of the sites by the Red Lake Watershed District (RLWD) to record stage and flow record. For ungauged reaches and where supplementation of measured data was useful, flow records from the 1996 through 2016 Clearwater River HSPF model were used to create LDCs. Where HSPF subbasin pour points did not match with monitoring site locations, drainage area weighting was used to adjust discharge records. The USGS StreamStats website was used to calculate the drainage areas for sampling sites and the pour points of HPSF reaches.

Flows were ranked from highest to lowest. Average daily flow values were assigned a flow rank value. The probability of exceedance of each average daily flow value was calculated as a percentage. This created the information needed to create a flow duration curve by plotting probability of exceedance (X-axis) against the flow level (logarithmic Y-axis). Using the allowable concentration of 126 orgs per 100 ml and conversion factors, a LDC was developed to show the allowable billions of organisms per day of *E. coli* bacteria for each level of flow along the curve. The curved line on a LDC graph represents the TMDL of the respective flow conditions observed at that location.

The LDC data was used to determine the median LC for each flow regime. Some low flow regimes were incomplete due to a lack of flow and zero-flow conditions that made up more than 10% of the LDC. Median values for flows and loads were calculated from the remaining records in those flow regimes after zero-flow records were excluded.

Water quality monitoring was completed in the CRW and 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

The LDC plots were subdivided into five flow regimes; very high flow conditions (exceeded 0–10% of the time), high flow conditions (exceeded 10–40% of the time), mid-range flow conditions (exceeded 40–60% of the time), low flow conditions (exceeded 60–90% of the time), and very 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, EPA concurs with MPCA 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.

In Section 5.2.1 of the TMDL MPCA provides a TMDL summary table for each bacteria TMDL in the CRW TMDL. The loading capacities, load allocations (LA), margins of safety, reserve capacities, and WLAs that were calculated are included for sites along *E. coli*-impaired streams within the CRW. The results found in Tables 7-21 below in this Decision Document. The load allocations were calculated after the determination of the WLA, and the Margin of Safety (MOS) (5% of the loading capacity). Load allocations (e.g., 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 to cover all nonpoint source contributions.

The TMDLs using LDCs in this Decision Document report 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. Tables 7-21 of this Decision Document identify the loading capacity for individual water body segments at each flow regime. Although there are numeric loads for each flow regime, the complete LDC is being approved for this TMDL.

Bacteria (*E. coli*) TMDL Summary Tables (Tables 7-21 at the end of this Decision Document).

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]

<u>TSS TMDLs:</u> MPCA developed LDCs to calculate sediment TMDLs for the impaired segments in Tables 22-26 presented below in this Decision Document (Section 5.1 of the TMDL). The

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[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.

LDC development strategies employed for the bacteria TMDLs were also used to develop sediment TMDLs (e.g., the incorporation of HSPF model simulated flows to develop FDCs, water quality monitoring information collected within the CRW informing the LDC, etc.). The FDC were transformed into LDC for each stream AUID segment by multiplying individual flow values by the appropriate TSS target and then multiplying that value by a conversion factor.

The load allocation was calculated after the determination of the WLA, and the MOS. Load allocations (e.g., 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. Tables 22-26 in 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. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

TSS TMDL Summary Tables (Tables 22-26 at the end of this Decision Document).

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 sediment TSS TMDLs. EPA finds MPCA's approach for calculating the loading capacity for the TSS TMDLs to be reasonable and consistent with EPA guidance.

Phosphorus TMDL (river): One reach of the Clearwater River is impaired by river eutrophication (-647) due to high phosphorus and high BOD. The river also experienced daily DO fluctuations as recorded via continuous DO data. MPCA calculated a TMDL at Station S002-916, which is located near the downstream end of Segment -647 (Table 27 of this Decision Document). The language of the river eutrophication standard (RES) explains that the RES must be maintained for the long-term summer concentration (June-September) of phosphorus. MPCA explained that to align with the language of the RES, the loading capacity value was based on the seasonal (June 1 to September 30) average of midpoint flows of five equally spaced flow regimes (0% to 20%, 20% to 40%, 40% to 60%, 60% to 80% and 80% to 100%) multiplied by the river eutrophication phosphorus target of 100 µg/L. The average of those values was 51.36 pounds/day, which is the loading capacity of the segment (Section 5.3 of the TMDL).

Total Phosphorus TMDL Summary (Table 27 at the end of this Decision Document).

Phosphorus TMDLs (lakes): The phosphorus TMDLs developed for the three impaired lakes were calculated using the U.S. Army Corps of Engineers (USACE) BATHTUB Model (Section 5.4 of the TMDL; Tables 28-30 of this Decision Document). The BATHTUB model was used to calculate loading capacities for these lakes and to link observed phosphorus water quality conditions and estimate phosphorus loads to determine in-lake water quality. 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 seasonal time-scales which are appropriate because watershed phosphorus loads are normally impacted by seasonal conditions.

MPCA explains in Section 5.4.1 of the TMDL how the BATHTUB model was used to estimate the current amount of internal loading based on modeled tributary inputs. The current conditions were identified by finding the minimum amount of loading from watershed runoff (tributary inflow) and internal loading at which the predicted phosphorus equaled observed phosphorus. The tributary inflows and internal loading rates were adjusted to achieve a simulated scenario with the maximum total phosphorus and ortho-phosphorus loading rates from tributaries and internal loading that could occur without causing average lake phosphorus concentrations to exceed the applicable standard. LC was identified by finding maximum allowable pollutant loading rates from all sources when attaining the appropriate phosphorus criteria.

Loading capacities (pounds per year (lbs/year)) were calculated during the growing season (June 1 through September 30) using the BATHTUB Canfield-Bachmann subroutine and then allocated to the WLA, LA, and MOS. The results are summarized in Tables 28-30 of this Decision Document. To simulate the load reductions needed to achieve the WQS, a series of model simulations were performed. Each simulation reduced the total current amount of TP entering each of the water bodies from June 1 through September 30 and computed the anticipated water quality response within the lake. Section 5.4.1 of the TMDL contains a detailed description of how the model was utilized.

The June to September growing season was chosen by MPCA 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 divided by 365 to calculate the daily loading capacities.

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 bacteria, TSS and phosphorus TMDLs. Additionally, EPA concurs with the loading capacities calculated by the MPCA for these TMDLs. EPA finds MPCA's approach for calculating the loading capacity for the 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.

Bacteria TMDLs: MPCA explains its method for determining the *E. coli* LA in Section 5.2.2 of the TMDL. 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, wildlife (e.g., 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. The calculated LA values for each bacteria TMDL segment for each of 5 flow regimes are available in TMDL summary Tables 7-21 of this Decision Document.

TSS TMDLs: The calculated LA values for the TSS TMDLs are applicable across all flow conditions. MPCA identified several nonpoint sources which contribute sediment loads to the surface waters in the CRW (Tables 22-26 of this Decision Document). Load allocations were recognized as originating from many diverse nonpoint sources including; stormwater contributions from agricultural lands, stream channelization and streambank erosion, and wetland and forest sources. MPCA included allocations for upstream boundary conditions in the TSS TMDLs to account for upstream unimpaired reaches of the Clearwater River (AUID -650) and unimpaired, monitored tributaries. The result was to focus the LA and load reductions within the immediate drainage area of Clearwater River and tributaries TSS-impaired reaches. Nearly all the exceedance of the 30 mg/L TSS standard occurred during the high-flow events during months of April through June when spring runoff and early-summer storms can cause high flows, channel erosion, and runoff from bare or freshly planted fields. LC and LA calculations for Nassett Creek were very small. Non-zero values lower than 0.005 tons/day were represented with a double asterisk in the TSS TMDL summary tables. (Tables 22-26 of this Decision Document). 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.

Phosphorus TMDL (river): MPCA explains its method for determining the phosphorus LA in Section 5.3.2 of the TMDL. MPCA identified several nonpoint sources which contribute phosphorus loads to the Clearwater River, including; non-regulated urban stormwater runoff, stormwater from agricultural and feedlot areas, failing septic systems, wildlife. 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. The calculated LA value for the phosphorus TMDL river segment for each of 5 flow regimes are available in TMDL summary Table 27 of this Decision Document.

A load was reserved from the LC to account for boundary conditions upstream of AUID 647. A boundary condition allocation was calculated for AUID 650 with an estimated concentration of 0.50 mg/L. (Section 5.3.2 of the TMDL)

<u>Phosphorus TMDLs (lake):</u> MPCA identified several nonpoint sources which contribute nutrient loading to the lakes of the CRW (Section 5.4.2 of the TMDL and Tables 28-30 of this Decision Document). These nonpoint sources included: watershed contributions from each lake or streams' direct watershed, internal loading and atmospheric deposition. For the lake nutrient TMDLs, MPCA, calculated individual load allocation values for watershed runoff and atmospheric deposition.

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.

<u>Comment:</u>
<u>Bacteria TMDLs:</u> MPCA identified NPDES permitted facilities within the CRW and assigned those facilities a portion of the WLA (Tables 7 -21 of this Decision Document). The WLAs for these individual facilities were calculated based on the facility's permitted daily discharge and the average number of days each year the facility discharges (averaged over the last 10 years) and the *E. coli* WQS (126 orgs /100 mL) (Section 5.2.3 of the TMDL

MPCA explained that the WLA for each individual WWTP was calculated based on the *E. coli* WQS but WWTF permits are regulated for the fecal coliform WQS (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 did not identify any CAFOs 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 bacteria TMDLs.

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

Phosphorus TMDLs (lakes): MPCA stated that there are no NPDES permitted facilities within the lake watersheds in the CRW TMDL.

MPCA also calculated a portion of the WLA and assigned it to both construction stormwater and industrial stormwater. Overall, the construction and industrial stormwater WLA make up a very small portion of the overall loading capacity but MPCA wanted to recognize their contributions. Both of these WLAs were represented as a categorical WLA and WLAs were not subdivided out into individual WLAs. The industrial stormwater WLA was set equal to the construction stormwater WLA.

MPCA's calculation of construction and industrial stormwater WLAs was based on their review of the *Minnesota Stormwater Manual's* estimate of average construction activity within the counties of the CRW. This estimate was area weighted for each impaired watershed. For each lake TMDL, the construction stormwater WLA was calculated as the construction stormwater percent area multiplied by the existing watershed load. It is assumed that loads from permitted construction stormwater sites that operate in compliance with their permits are meeting the WLA.

Attaining the construction stormwater and industrial stormwater loads described in the phosphorus TMDLs is the responsibility of construction and industrial site managers. 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 MNR100001 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. BMPs and other stormwater control measures which act to limit the discharge of the pollutant of concern (phosphorus) are defined in MNR100001.

The MPCA is responsible for overseeing industrial stormwater loads which impact water quality to lakes in the CRW. Industrial sites within these lake subwatersheds are expected to comply with the requirements of the State's 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). MPCA explained that if a facility owner/operator obtains coverage under the appropriate NPDES/SDS General Stormwater Permit and properly selects, installs and maintains all BMPs required under the permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL. BMPs and other stormwater control measures which act to limit the discharge of the pollutant of concern (phosphorus) are defined in MNR050000 and MNG490000.

The NPDES program requires construction and industrial sites 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 phosphorus TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18-months of the approval of the TMDL by the U.S. EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

Phosphorus TMDL (river): MPCA identified one NPDES permitted facility in the contributing watershed for the CRW stream phosphorus TMDL. MPCA calculated the WLA for individual permittee as outlined in Section 5.3.3 of the TMDL and is in Table 27 of this Decision Document. The WLA assigned to this facility was calculated by taking the maximum permitted daily flow multiplied by the flow-weighted mean (1.75 mg/L) multiplied by the number of summer days of discharge. MPCA noted that the Clearbrook facility is a pond system, and is only allowed to discharge at certain times of the year.

Similar to the phosphorus lake TMDLs, MPCA calculated a portion of the WLA and assigned it to both construction stormwater and industrial stormwater. Overall, the construction and industrial stormwater WLA make up a very small portion of the overall loading capacity but MPCA wanted to recognize their contributions. Both of these WLAs were represented as a categorical WLA and WLAs were not subdivided out into individual WLAs. The construction and industrial stormwater allocations for the CRW stream phosphorus TMDLs were calculated in the same manner as the construction and industrial stormwater allocations for the CRW lake phosphorus TMDLs (i.e., see calculative method in *Section 5 – Phosphorus TMDLs (lakes)*, within this Decision Document).

MPCA's expectations and responsibilities for overseeing construction and industrial stormwater loads for the CRW stream phosphorus TMDLs are the same for the CRW lake phosphorus TMDLs. Construction and industrial sites are expected 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 sediment (TSS) TMDLs for CRW. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18-months of the approval of the TMDL by the U.S. EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

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

TSS TMDLs: MPCA identified two NPDES permitted facilities within the CRW and assigned those facilities a portion of the WLA (Table 5-1 of the TMDL; Tables 22-26 of this Decision Document). Individual WLAs were calculated for each of these individual facilities based the maximum permitted daily discharge, the average number of days of discharge, and the permit effluent limit of 45 mg/L of TSS.

Similar to the CRW lake phosphorus TMDLs, MPCA calculated a portion of the WLA and assigned it to both construction stormwater and industrial stormwater. Overall, the construction and industrial stormwater WLA make up a very small portion of the overall loading capacity but MPCA wanted to recognize their contributions. Both of these WLAs were represented as a categorical WLA and WLAs were not subdivided out into individual WLAs. The construction and industrial stormwater allocations for the CRW sediment (TSS) TMDLs were calculated in the same manner as the construction and industrial stormwater allocations for the CRW lake phosphorus TMDLs (i.e., see calculative method in *Section 5 – Phosphorus TMDLs (lakes)*, within this decision document).

MPCA's expectations and responsibilities for overseeing construction and industrial stormwater loads for the CRW lake phosphorus TMDLs are the same for the CRW sediment (TSS) TMDLs. Construction and industrial sites are expected 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 sediment (TSS) TMDLs for CRW. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18-months of the approval of the TMDL by the U.S. EPA. This applies to sites under permits for MNR100001, MNR050000 and MNG490000.

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

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:
Bacteria TMDLs: The bacteria TMDLs incorporated an explicit MOS of 20% which was applied to the loading capacity (Section 5.2.4 of the TMDL, Tables 7-21 of this Decision Document). MPCA explained that the explicit MOS was set at 20% due to the level of variability in sample results discovered during TMDL development.

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.

TSS, phosphorus (lakes), and phosphorus (river) TMDLs: MPCA explained that the TSS and phosphorus TMDLs utilized an explicit MOS of 10% (Sections 5.1.4, 5.3.4, and 4.4.3 of the TMDL and Tables 22-30 of this Decision Document). This accounts for the variability of sampling results and pollutant loading in the natural systems. The HSPF model used to generate loading information as well a flow results indicated generally good calibration, as did the BATHTUB model (Section 5.4.1 of the TMDL).

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:
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 flow data which were validated and calibrated with local 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).

Phosphorus TMDLs (lakes and river): Seasonal variation was considered for the CRW phosphorus TMDLs via the nutrient targets which 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 ecoregion eutrophication WQS during the period of the year where the frequency and severity of algal growth is the greatest. For the lake TMDLs, MPCA revised the data for the TMDL lakes in the CRW, and noted that Stony Lake shows a clear trend in increasing phosphorus concentration later in the summer. The other two lakes are more consistent in phosphorus values (Figure 5-28 of the TMDL).

For the phosphorus river TMDL, Figure 5-27 of the TMDL shows the seasonal variation in phosphorus concentration in the impaired segment, as well as identifying the significant change in phosphorus values in the portion of the segment that is channelized.

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 nutrient 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 to 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).

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 (Section 5.1.5 and Figure 5-7 of the TMDL). Sediment loading in the CRW varies depending on surface water flow, land cover and climate/season. Spring is typically associated with large flows from snowmelt, the summer is associated with the growing season as well as periodic storm events and receding streamflows, and the fall brings increasing precipitation and rapidly changing agricultural landscapes. In all season's sediment inputs to surface waters typically occur primarily through wet weather events. Critical conditions that impact the response of CRW water bodies to sediment inputs may typically occur during periods of low flow. During low flow periods, sediment can accumulate within the impacted water bodies, there is less assimilative capacity within the water body, and generally sediment is not transported through the water body at the same rate it is under normal flow conditions.

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

The EPA finds that the TMDL document submitted by 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 TMDL (i.e., Sections 7 and 9 of the TMDL), 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. Watershed districts (WD) and watershed management organizations (WMO) have a significant role in the CRW in terms of monitoring, planning and implementation efforts. It is anticipated that WDs, WMOs and other local watershed groups will work together to reduce pollutant inputs to the CRW. MPCA has authored a CRW WRAPS document, which was approved by MPCA in January 2021. The WRAPS provides information on the development of scientifically-supported restoration and protection strategies for implementation planning and action. MPCA sees 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.

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 bacteria, nutrient and sediment 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 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 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 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).

MPCA noted that several local partners have been implementing actions and activities to control pollutants in the CRW for many years. One example discussed by the State is improvements in wild rice production methods (Section 7 of the TMDL). MPCA and Red Lake County, and in cooperation with the Red Lake Nation, have encouraged the installation of main-line tile drainage in the paddies. This process allows for more control of paddy drainage throughout the year, and reduces the development of ruts and gullies that form in the previous internally-drained wild rice fields (Page 29 of the *Red Lake River Watershed Farm to Stream Tile Drainage Water Quality Study;* 2009). MPCA reviewed water quality data results from the Clearwater River, and noted significant water quality improvements where the BMPs have been emplaced (Section 7 of the TMDL).

MPCA listed numerous projects impacting all three pollutants in the TMDL watershed that have been developed over that last several years. MPCA noted that many of the BMPS and projects will impact multiple pollutants. For example, streambank stabilization efforts will not only reduce sediment eroding from the streambanks, but also reduce the phosphorus loads, as particulate phosphorus is often attached to the soil particles. The construction of wetlands reduced sediment loading, can sequester phosphorus, and allow bacteria to be filters out of the flow. Streambank reconstruction not only reduces sediment erosion, but keeps cattle out of the streams, reducing bacteria loads.

MPCA also highlighted the recent Buffer Law now in effect in Minnesota. This law requires perennial grass buffers to be planted along public waters. The width of the buffer depends upon the type and size of water body, and provides for financial support in installing these buffers. The buffers can filter out sediment and nutrients, as well as other pollutants.

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 CRW. 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., WDs and WMOs) and volunteers, as long as there is sufficient funding to support the efforts of these local entities. 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.

River and stream monitoring in the CRW, has been completed by a variety of organizations (i.e., WDs and WMOs) and funded by Clean Water Partnership Grants, and other available local funds. Table 8-1 and Figure 8-1 of the TMDL list many of the water bodies in the CRW and the agency performing the monitoring. MPCA noted that since there are many BMPs that have been developed, monitoring has not only focused on water quality, but BMP effectiveness monitoring as well. MPCA also identified several additional sites that should be monitored to provide additional data on the TMDLs.

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.

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 CRW 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.

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. The CRW WRAPS document includes additional detail regarding specific recommendations from MPCA to aid in the reduction of bacteria, nutrients, and TSS and to surface waters of the CRW. Efforts to reduce pollutant loads in the watershed are discussed below.

Pasture management/livestock exclusion plans: Reducing livestock access to stream environments will lower the opportunity for direct transport of bacteria and phosphorus 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 phosphorus, and erosion of streambanks to 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 and phosphorus inputs.

Manure Collection and Storage Practices: Manure has been identified as a source of bacteria and phosphorus. These pollutants can be transported to surface water bodies via stormwater runoff. Bacteria and phosphorus laden water can also leach into groundwater resources. Improved strategies for the collection, storage and management of manure can minimize impacts of bacteria and phosphorus entering the surface and groundwater system. Repairing manure storage facilities or building roofs over manure storage areas may decrease the amount of bacteria and phosphorus 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 pollutants 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 pollutants to surface water environments. Additionally, cleaner stormwater runoff can be diverted away from feedlots so as to not liberate bacteria.

Septic Field Maintenance: Septic systems are believed to be a source of bacteria and 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 bacteria and nutrient 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.

Education and Outreach Efforts: Increased education and outreach efforts to the general public bring greater awareness to the issues surrounding pollutant 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 pollutant sources.

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 (e.g., 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.

Internal Loading Reduction Strategies (lakes): Internal nutrient loads may be addressed to meet the TMDL allocations outlined in the CRW lake 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 (e.g., 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.

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:
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 worked with county, WD and WMO staff to promote water quality, to gain input from landowners via surveys and interviews and to better understand the social dynamics of stakeholders in the CRW. MPCA's goal was to create civic engagement and discussion which would enhance the content of the TMDL and WRAPS documents. A full description of civic engagement activities associated with the TMDL process is available in Section 10 of the TMDL.

MPCA posted the draft TMDL online at (http://www.pca.state.mn.us/water/tmdl) for a public comment period. The public comment period was started on November 16, 2020 and ended on December 16, 2020. MPCA received one public comment regarding the TMDL, to revise two maps. MPCA revised the TMDL as appropriate.

The Clearwater River Watershed includes tribal lands for the Red Lake Nation and the White Earth Nation. EPA invited representatives of the Red Lake Nation and White Earth Nation to consult with EPA regarding EPA's review of the final CRW TMDLs. Representatives from the Red Lake Nation and White Earth Nation did not respond to EPA's invitation to consult on EPA's review and decision of the CRW TMDLs. EPA understood this as the Red Lake Nation and the White Earth Nation deferring on EPA's invitation to consult.

EPA believes that MPCA adequately addressed the comment received during the public notice period and where necessary updated the final TMDL in response to the comment. All public comments and MPCA responses to publicly submitted comments were shared with EPA.

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 Clearwater River Watershed TMDLs, the submittal letter and accompanying documentation from MPCA on January 19, 2021. 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 final 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 Clearwater 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 15 bacteria TMDLs, the 3 phosphorus lake TMDLs, the 1 phosphorus river TMDL, and the 5 TSS TMDLs satisfy all elements for approvable TMDLs. This TMDL approval is for **twenty-four (24) TMDLs**, addressing segments for aquatic recreational and aquatic life use impairments (Table 1of 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.

Bacteria TMDLs

Table 7: *E. coli* TMDL summary for Lower Badger Creek (AUID 502) at CR 114 (station S004-837)

2008-2016 measured stage/flow record from Station S004837 was used to develop flow regimes & loading capacities Drainage Area (square miles): 121.77 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-502 Lower Badger Creek at CR 114 (S004-837) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**No Flow**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**306.21**	**122.01**	**34.49**	**17.53**	**0.00**
Median Flow	99.33	39.58	11.19	5.69	0.00
Median Flow Exceedance	5%	25%	50%	70.51%	90.48%
Wasteload Allocations					
NPDES Permitted WWTF	N/A	N/A	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A	N/A	N/A
Daily Load Allocation	244.97	97.61	27.59	14.02	0.00
Daily Margin of Safety	61.24	24.40	6.90	3.51	0.00

Table 8: *E. coli* TMDL for Poplar River (AUID 504) at CR 118 (station S007-608)

2013-2016 measured stage/flow record from Station S007608 was used to develop flow regimes & loading capacities Drainage Area (square miles): 116.69 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 7.445	**AUID 09020305-504 Poplar River at County Road 118 (S007-608) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**No Flow**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**280.44**	**135.64**	**55.82**	**24.35**	0.00
Median Flow	90.97	44.00	18.11	7.90	0.00
Median Flow Exceedance	5%	25%	50%	71.73%	91.73%
Wasteload Allocations*					
Fosston WWTF MN022128-SD-001	17.09	17.09	17.09	**	**
Fosston WWTF MN022128-SD-002	15.31	15.31	15.31	**	**
McIntosh WWTF MNG585031-SD-001	3.11	3.11	3.11	**	**
Reserve Capacity	14.02	6.78	2.79	1.22	0.00
Daily Load Allocation	**174.82**	**66.22**	**6.36**	**18.26**	**0.00**
Daily Margin of Safety	56.09	27.13	11.16	4.87	0.00

*Wasteload Allocations are rounded to the nearest 2 digits (1/100th)
**The WLAs for WWTFs requiring NPDES permits were based on design flows and exceeded the daily loading capacity of this flow regime. Instead, the WLA and LA allocations were determined by the formula: *E. coli Allocation = (flow volume contribution from a given source) x (126 org./100 ml E. coli)*

Table 9: *E. coli* TMDL summary for the Lost River (AUID 512) at 139th Avenue (station S000-924)

Flow record: Simulated 1996-2016 data from an HSPF model Drainage Area (square miles): 54.56 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.100	**AUID 09020305-512 Lost River at 139th Ave (S000-924) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**Very Low**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**254.36**	**62.41**	**19.27**	**4.97**	**0.46**
Median Flow	82.51	20.25	6.25	1.61	0.15
Median Flow Exceedance	5%	25%	50%	75.0%	95.0%
Wasteload Allocations*					
Gonvick WWTF MN0020541-SD-001	0.48	0.48	0.48	0.48	**
Reserve Capacity	12.72	3.12	0.96	0.25	0.02
Daily Load Allocation	**190.29**	**46.33**	**13.98**	**3.25**	**0.35**
Daily Margin of Safety	50.87	12.48	3.85	0.99	0.09

*Wasteload Allocations are rounded to the nearest 2 digits (1/100th)
**The WLAs for WWTFs requiring NPDES permits were based on design flows and exceeded the daily loading capacity of this flow regime. Instead, the WLA and LA allocations were determined by the formula: *E. coli Allocation = (flow volume contribution from a given source) x (126 org./100 ml E. coli)*

Table 10: *E. coli* TMDL Summary for Ruffy Brook (AUID 513) at CSAH 11 (station S008-057)

Flow record: Measured 2014-2016 stage and flow data from Station S008-057 Drainage Area (square miles): 51.13 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 1.102	**AUID 09020305-513 Ruffy Brook at CSAH 11 (S008-057) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**No Flow**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**349.08**	**131.13**	**37.11**	**14.71**	0.00
Median Flow	113.24	42.54	12.04	4.77	0.00
Median Flow Exceedance	5%	25%	50%	70.08%	90.03%
Wasteload Allocations*					
Clearbrook WWTF MNG580098-SD-002	5.25	5.25	5.25	5.25	0.00
Reserve Capacity	17.45	6.56	1.86	0.74	0.00
Daily Load Allocation	**256.56**	**93.09**	**22.58**	**5.78**	**0.00**
Daily Margin of Safety	69.82	26.23	7.42	2.94	0.00

*Wasteload Allocations are rounded to the nearest 2 digits (1/100th)

Table 11: *E. coli* TMDL Summary for Clear Brook (AUID 526) at CSAH 92 (station S004-044)

Flow record: Area-weighted HSPF-simulated 1996-2016 flow data from HSPF Reach 435 and discrete measurements from Station S004-044 Drainage Area (square miles): 5.95 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-526 Clear Brook at CSAH 92 (S004-044) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**Very Low**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**29.38**	**7.20**	**2.00**	**0.55**	**0.06**
Median Flow	9.53	2.34	0.65	0.18	0.02
Median Flow Exceedance	5%	25%	50%	75%	95%
Wasteload Allocations					
NPDES Permitted WWTF (none)	N/A	N/A	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A	N/A	N/A
Daily Load Allocation	**23.50**	**5.76**	**1.60**	**0.44**	**0.05**
Daily Margin of Safety	5.88	1.44	0.40	0.11	0.01

Table 12: *E. coli* TMDL Summary for Silver Creek (AUID 527) at CR 111 (station S002-082)

2002-2016 measured stage/flow data from Station S002082 was used to develop flow regimes & loading capacities Drainage Area (square miles): 31.56 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-527 Silver Creek at CR 111 (S002-082) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**No Flow**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**120.76**	**30.49**	**9.71**	**2.23**	**0.00**
Median Flow	39.18	9.89	3.15	0.73	0.00
Median Flow Exceedance	5%	25%	50%	66.57%	86.58%
Wasteload Allocations					
NPDES Permitted WWTF (none)	N/A	N/A	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A	N/A	N/A
Daily Load Allocation	**96.61**	**24.39**	**7.77**	**1.78**	**0.00**
Daily Margin of Safety	24.15	6.10	1.94	0.45	0.00

Table 13: *E. coli* TMDL Summary for the Lost River (AUID 529) 109th Street (station S005-283)

2009-2016 measured stage/flow data from Station S005283 was used to develop flow regimes & loading capacities Drainage Area (square miles): 28.53 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-529 Lost River at 109th Street (S005-283) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**No Flow**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**179.16**	**101.39**	**47.22**	**14.30**	**0.00**
Median Flow	58.12	32.89	15.32	4.64	0.00
Median Flow Exceedance	5%	25%	50%	73.62%	93.58%
Wasteload Allocations					
NPDES Permitted WWTF	N/A	N/A	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A	N/A	N/A
Daily Load Allocation	**143.33**	**81.11**	**37.78**	**11.44**	**0.00**
Daily Margin of Safety	35.83	20.28	9.44	2.86	0.00

Table 14: *E. coli* TMDL Summary for Lost River (AUID 530) Lindberg Lake Road (station S005-501)

Flow regimes and loading capacities developed from area weighted, HSPF-simulated 1996-2016 flow data from HSPF Reach 441 Drainage Area (square miles): 20.5 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-530 Lost River at Lindberg Lake Road (S005-501) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**Very Low**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**102.00**	**23.12**	**6.56**	**1.82**	**0.17**
Median Flow	33.09	7.50	2.13	0.59	0.06
Median Flow Exceedance	5%	25%	50%	75.0%	95.0%
Wasteload Allocations					
NPDES Permitted WWTF	N/A	N/A	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A	N/A	N/A
Daily Load Allocation	**81.60**	**18.50**	**5.25**	**1.46**	**0.14**
Daily Margin of Safety	20.40	4.62	1.31	0.36	0.03

Table 15: *E. coli* TMDL Summary for the Hill River (AUID 539) CR 119 (station S002-134)

2013-2016 continuously measured stage/flow data and 2001-2012 discrete stage/flow data from Station S002-134 were used to develop flow regimes and loading capacities. Drainage Area (square miles): 151.87 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-539 Hill River at County Road 119 (S002-134) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**No Flow**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**373.47**	**125.37**	**58.57**	**11.89**	**0.00**
Median Flow	121.15	40.67	19.00	3.86	0.00
Median Flow Exceedance	5%	25%	50%	73.75%	93.71%
Wasteload Allocations					
NPDES Permitted WWTF	N/A	N/A	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A	N/A	N/A
Daily Load Allocation	**298.78**	**100.30**	**46.86**	**9.51**	**0.00**
Daily Margin of Safety	74.69	25.07	11.71	2.38	0.00

Table 16: *E. coli* TMDL Summary for Nassett Creek (AUID 545) (station S004-205)

Flow regimes and loading capacities developed from area-weighted, HSPF-simulated 1996-2016 flow data from HSPF Reach 441 Drainage Area (square miles): 6.15 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-545 Nassett Creek (S004-205) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**Very Low**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**30.60**	**6.94**	**1.97**	**0.55**	**0.05**
Median Flow	9.93	2.25	0.64	0.18	0.02
Median Flow Exceedance	5%	25%	50%	75.0%	95.0%
Wasteload Allocations					
NPDES Permitted WWTF (Clearbrook)	N/A	N/A	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A	N/A	N/A
Daily Load Allocation	**24.48**	**5.55**	**1.58**	**0.44**	**0.04**
Daily Margin of Safety	6.12	1.39	0.39	0.11	0.01

Table 17: *E. coli* TMDL Summary for the JD 73 (AUID 550) at 343rd St. (station S003-318)

2014-2016 continuously measured stage/flow data and 2004-2013 discrete stage/flow data from Station S003318 were used to develop flow regimes and loading capacities. Drainage Area (square miles): 49.7 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-550 Judicial Ditch 73 at 343rd St. (S003-318) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**No Flow**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**368.37**	**140.71**	**43.35**	**7.92**	**0.00**
Median Flow	119.50	45.64	14.06	2.57	0.00
Median Flow Exceedance	5%	25%	50%	69.47%	89.44%
Wasteload Allocations					
NPDES Permitted WWTF	N/A	N/A	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A	N/A	N/A
Daily Load Allocation	**294.70**	**112.57**	**34.68**	**6.34**	**0.00**
Daily Margin of Safety	73.67	28.14	8.67	1.58	0.00

Table 18: *E. coli* TMDL Summary for Terrebonne Creek (AUID 574) at CSAH 92 (station S004-819)

2014-2016 continuously measured stage/flow data and additional discrete stage/flow data from Station S004819 were used to develop flow regimes and loading capacities. Drainage Area (square miles): 14.93 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-574 Terrebonne Creek at CSAH 92 (S004-819) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**		
	Very High	**High**	**No Flow**
Values expressed as billions of organisms per day			
TOTAL DAILY LOADING CAPACITY	**34.27**	**3.37**	**0.00**
Median Flow	11.12	1.09	0.00
Median Flow Exceedance	5%	18.47%	63.40%
Wasteload Allocations			
NPDES Permitted WWTF	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A
Daily Load Allocation	**27.42**	**2.70**	**0.00**
Daily Margin of Safety	6.85	0.67	0.00

Table 19: *E. coli* TMDL Summary for Brooks Creek (AUID 578) at CSAH 92 (station S006-056)

Flow regimes and loading capacities developed from area-weighted, HSPF-simulated 1996-2016 flow data from HSPF Reach 529 Drainage Area (square miles): 23.49 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-578 Brooks Creek (S006-056) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**Very Low**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**82.72**	**21.04**	**5.79**	**1.53**	**0.17**
Median Flow	26.83	6.82	1.88	0.49	0.05
Median Flow Exceedance	5%	25%	50%	75.0%	95.0%
Wasteload Allocations					
NPDES Permitted WWTF (Clearbrook)	N/A	N/A	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A	N/A	N/A
Daily Load Allocation	**66.18**	**16.83**	**4.63**	**1.22**	**0.14**
Daily Margin of Safety	16.54	4.21	1.16	0.31	0.03

Table 20: *E. coli* TMDL Summary for the Clearwater River (AUID 647) at CR 127 (station S002-916)

Flow regimes and loading capacities developed from area-weighted, HSPF-simulated 1996-2016 flow data from HSPF Reach 350 & measurements from Station S002-916 Drainage Area (square miles): 483.5 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-647 Clearwater River at CR 127 (S002-916) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**Very Low**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**2082.59**	**508.70**	**138.08**	**36.57**	**6.57**
Median Flow	675.58	165.02	44.79	11.86	2.13
Median Flow Exceedance	5%	25%	50%	75.0%	95.0%
Wasteload Allocations*					
Clearbrook WWTF MNG580098-SD-002	5.25	5.25	5.25	5.25	**
Reserve Capacity	104.13	25.44	6.90	1.83	0.33
Upstream Waters (Clearwater River AUID 650)	1030.42	249.50	65.13	14.71	1.47
Daily Load Allocation	**526.27**	**126.78**	**33.18**	**7.47**	**3.46**
Daily Margin of Safety	416.52	101.74	27.62	7.31	1.31

Table 21: *E. coli* TMDL Summary for Beau Gerlot Creek (AUID 651) at CSAH 92 (station S004-816)

2014-2016 continuously measured stage/flow data from Station S004-816 and 1996-2016 HSPF-modeled stage/flow data from HSPF Reach 601 were used to develop flow regimes and loading capacities. Drainage Area (square miles): 23.76 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	**AUID 09020305-651 Beau Gerlot Creek at CSAH 92 (S004-816) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone**				
	Very High	**High**	**Mid-Range**	**Low**	**Very Low**
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**224.87**	**55.17**	**14.62**	**3.97**	**0.03**
Median Flow	72.95	17.91	4.74	1.30	0.01
Median Flow Exceedance	5%	25%	50%	75.0%	95.0%
Wasteload Allocations					
NPDES Permitted WWTF	N/A	N/A	N/A	N/A	N/A
Reserve Capacity	N/A	N/A	N/A	N/A	N/A
Daily Load Allocation	**179.90**	**44.14**	**11.70**	**3.18**	**0.02**
Daily Margin of Safety	44.97	11.03	2.92	0.79	0.01

TSS TMDLs

Table 22. TSS TMDL Summary for the Clearwater River at Red Lake Falls (station S002-118) on AUID 501

EQuIS Site ID: S002-118 Flow Data from USGS gage 05078500	**Loading Capacity and Load Allocations for Total Suspended Solids in the Clearwater River in Red Lake Falls AUID: 09020305-501**				
Total Suspended Solids Standard: 30 mg/l Drainage Area (square miles): 1,380 % MS4: 0.00% Total WWTF Design Flow (mgd): 0.489	**Duration Curve Zone**				
	Very High	**High**	**Mid**	**Low**	**Very Low**
TMDL Component	Values Expressed as Tons per Day of Sediment				
TOTAL DAILY LOADING CAPACITY	**114.08**	**24.27**	**9.71**	**5.26**	**2.43**
Wasteload Allocation*					
Plummer WWTF MN0024520-SD-2	0.09	0.09	0.09	0.09	0.09
Oklee WWTF MNG580038-SD-1	0.10	0.10	0.10	0.10	0.10
Construction and Industrial Stormwater	0.02	**	**	**	**
Reserve Capacity	5.70	1.21	0.49	0.26	0.12
Upstream Waters (Clearwater River AUID 650, Poplar River, Hill River, Terrebonne Creek, and Lower Badger Creek)	43.48	11.00	3.05	0.78	0.09
Daily Load Allocation***	**53.28**	**9.44**	**5.01**	**3.50**	**1.79**
Daily Margin of Safety	11.41	2.43	0.97	0.53	0.24

*Wasteload Allocations are rounded to the nearest 2 digits (1/100th of a ton)
**The values of some construction and industrial stormwater WLAs were less than 0.005. Though non-zero values were calculated, these values were too small to affect the LA.
***Load allocation includes nonpoint sources contributing to TSS loads in AUIDs 647, 648, 511, 513, and 501 (Clearwater River downstream of AUID 650) and excludes unimpaired upstream tributaries

Table 23: TSS TMDL Summary for the Clearwater River at CSAH 12 (station S002-914) on AUID 511

EQuIS Site ID: S002-914 HSPF and Discrete, Measured Stage/Flow Data	Loading Capacity and Load Allocations for Total Suspended Solids in the Clearwater River at CSAH 12 (S002-914) AUID: 09020305-511				
Total Suspended Solids Standard: 30 mg/l Drainage Area (square miles): 1,158.46 % MS4: 0.00% Total WWTF Design Flow (mgd): 0.489	Duration Curve Zone				
	Very High	High	Mid	Low	Very Low
TMDL Component	Values Expressed as Tons per Day of Sediment				
TOTAL DAILY LOADING CAPACITY	**128.28**	**32.61**	**9.73**	**2.74**	**0.48**
Wasteload Allocation*					
Plummer WWTF MN0024520-SD-2	0.09	0.09	0.09	0.09	0.09
Oklee WWTF MNG580038-SD-1	0.10	0.10	0.10	0.10	0.10
Construction and Industrial Stormwater	0.02	0.01	**	**	**
Reserve Capacity	6.41	1.63	0.49	0.14	0.02
Upstream Waters (Clearwater River AUID 650, Poplar River, and Hill River)	32.70	8.61	2.40	0.60	0.08
Daily Load Allocation***	**76.13**	**18.91**	**5.68**	**1.54**	**0.14**
Daily Margin of Safety	12.83	3.26	0.97	0.27	0.05

*Wasteload Allocations are rounded to the nearest 2 digits (1/100th of a ton)
**The values of some construction and industrial stormwater WLAs were less than 0.005. Though non-zero values were calculated, these values were too small to affect the LA.
***Load allocation includes nonpoint sources contributing to TSS loads in AUIDs 647, 648, and 511 (Clearwater River downstream of AUID 650) and excludes unimpaired upstream tributaries

Table 24: TSS TMDL Summary for the Clearwater River near Plummer (station S002-124) on AUID 648

EQuIS Site ID: S002-124 Flow Data from USGS Site 05078000	Loading Capacity and Load Allocations for Total Suspended Solids in the Clearwater River at Plummer (S002-124) AUID: 09020305-648				
Total Suspended Solids Standard: 30 mg/l Drainage Area (square miles): 555 % MS4: 0.00% Total WWTF Design Flow (mgd): 0.00	Duration Curve Zone				
	Very High	High	Mid	Low	Very Low
TMDL Component	Values Expressed as Tons per Day of Sediment				
TOTAL DAILY LOADING CAPACITY	**53.24**	**13.92**	**6.31**	**3.88**	**2.27**
Wasteload Allocation*					
Construction and Industrial Stormwater	0.01	**	**	**	**
Reserve Capacity	2.66	0.70	0.32	0.19	0.11
Upstream Waters (Clearwater River AUID 650)	13.52	3.27	0.85	0.19	0.02
Daily Load Allocation***	**31.73**	**8.56**	**4.51**	**3.11**	**1.91**
Daily Margin of Safety	5.32	1.39	0.63	0.39	0.23

*Wasteload Allocations are rounded to the nearest 2 digits (1/100th of a ton)
**The values of some construction and industrial stormwater WLAs were less than 0.005. Though non-zero values were calculated, these values were too small to affect the LA.
***Load allocation applies to nonpoint sources contributing to TSS loads in AUIDs 647 and 648, downstream of AUID 650

Table 25. TSS Load Allocation Summary for the Clearwater River at County Road 127 (station S002-916) on AUID 647

EQuIS Site ID: S002-916 Flow record: Simulated 1996-2016 data from an HSPF model and discrete stage/flow measurements	Loading Capacity and Load Allocations for Total Suspended Solids in the Clearwater River at County Road 127 (S002-916) AUID: 09020305-647				
Total Suspended Solids Standard: 30 mg/l Drainage Area (square miles): 483.5 % MS4: 0.00% Total WWTF Design Flow (mgd): 0.00	**Duration Curve Zone**				
	Very High	**High**	**Mid**	**Low**	**Very Low**
TMDL Component	Values Expressed as Tons per Day of Sediment				
TOTAL DAILY LOADING CAPACITY	**54.66**	**13.35**	**3.62**	**0.96**	**0.17**
Wasteload Allocation*					
Construction and Industrial Stormwater	0.01	**	**	**	**
Reserve Capacity	2.73	0.67	0.18	0.05	0.01
Upstream Waters (Clearwater River AUID 650)	13.52	3.27	0.85	0.19	0.02
Daily Load Allocation* **	**32.93**	**8.07**	**2.23**	**0.62**	**0.12**
Daily Margin of Safety	5.47	1.34	0.36	0.10	0.02

*Wasteload Allocations are rounded to the nearest 2 digits (1/100th of a ton)
**The values of some construction and industrial stormwater WLAs were less than 0.005. Though non-zero values were calculated, these values were too small to affect the LA.
***Load allocation applies to nonpoint sources contributing to TSS loads in AUIDs 647, downstream of AUID 650

Table 26: TSS TMDL Summary for Nassett Creek (station S004-205) on AUID 545 Nesset Creek

EQuIS Site ID: S004-205 Flow record: Simulated and area-weighted 1996-2016 data from an HSPF model	Loading Capacity and Load Allocations for Total Suspended Solids in the Nassett Creek at Nesset Creek Drive (S004-205) AUID: 09020305-545				
Total Suspended Solids Standard: 10 mg/l Drainage Area (square miles): 6.15 % MS4: 0.00% Total WWTF Design Flow (mgd): 0.00	**Duration Curve Zone**				
	Very High	**High**	**Mid**	**Low**	**Very Low**
TMDL Component	Values Expressed as Tons per Day of Sediment				
TOTAL DAILY LOADING CAPACITY	**0.27**	**0.06**	**0.02**	**	**
Wasteload Allocation*					
Construction and Industrial Stormwater	**	**	**	**	**
Daily Load Allocation	**0.24**	**0.05**	**0.02**	**	**
Daily Margin of Safety	0.03	0.01	**	**	**

*Wasteload Allocations are rounded to the nearest 1/10,000th of a ton
**The values of some construction and industrial stormwater WLAs and other LA values were less than 0.005. Though nonzero values were calculated, these values were too small to affect the LA.

Phosphorus TMDL - River

Table 27: Phosphorus TMDL summary for the Clearwater River (AUID 647) at CR 127 (station S002-916)

Total Phosphorus Total Maximum Daily Load Clearwater River at County Road 127 (S002-916) AUID 09020305-647		
Total Phosphorus Loading Capacity and Allocations		
TMDL Parameter		**TP Load (lbs./day)**
Loading Capacity		**51.36**
Total WLA		1.51
WLA	Clearbrook MNG580098-SD-2	1.50
	Construction and Industrial Stormwater = 0.018% x (LC-MOS)	0.01
Boundary Conditions (AUID 650)		22.13
Reserve Capacity		2.57
Margin of Safety		5.14
Load Allocation		**20.01**

Phosphorus TMDLs – Lakes

Table 28: Phosphorus TMDL Summary Table for Cameron Lake (60-0189-00)

TMDL parameter		**Existing TP load**		**Allowable TP load**		**Estimated load reduction**	
Sources		**lbs/year**	**lbs/day**	**lbs/year**	**lbs/day**	**lbs/year**	**%**
Wasteload	Construction/Industrial Stormwater WLA	0.09	**	0.09	**	0	0%
	Total WLA	**0.09**	**	**0.09**	**	**0**	**0**
Load	Nonpoint runoff	209.13	0.57	73.99	0.20	135.14	65%
	Estimated SSTS	0.44	**	0	0	0.44	100%
	Upstream lakes	0	0	0	0	0	0%
	Atmospheric deposition	21.38	0.06	21.38	0.06	0	0%
	Groundwater	0	0	0	0	0	0%
	Internal load	696.22	1.91	280.54	0.77	415.68	60%
	Total Load Allocations	**927.17**	**2.54**	**375.91**	**1.03**	**551.26**	**59%**
Calculated Margin of Safety				**41.78**	**0.11**		
Total Loads		**927.26**	**2.54**	**417.78***	**1.14***	**509.48**	**55%**

*Loading capacity, estimated as total inflow by the BATHTUB model
**The values of some sources like construction and industrial stormwater WLAs and SSTS were lower than 0.005 pounds/day. Though non-zero values were calculated, these values were too small to affect the LA.

Table 29: Phosphorus TMDL Summary Table for Long Lake (04-0295-00)

TMDL parameter		Existing TP load		Allowable TP load		Estimated load reduction	
Sources		lbs/year	lbs/day	lbs/year	lbs/day	lbs/year	%
Wasteload	Construction/Industrial Stormwater WLA	0.01	**	0.01	**	0.00	0%
	Total WLA	**0.01**	**	**0.01**	**	**0**	**0%**
Load	Nonpoint runoff	303.57	0.84	194.66	0.54	108.91	36%
	Estimated SSTS	0.44	**	0.00	0.00	0.44	100%
	Upstream lakes	0.00	0.00	0.00	0.00	0.00	0%
	Atmospheric deposition	9.04	0.02	9.04	0.02	0.00	0%
	Groundwater	0.00	0.00	0.00	0.00	0.00	0%
	Internal load	87.96	0.24	13.56	0.03	74.40	85%
	Total Load Allocations	**401.00**	**1.10**	**217.25**	**0.59**	**183.75**	**46%**
Margin of Safety				**24.14**	**0.07**		
Total Loads		**401.02**	**1.10**	**241.41***	**0.66***	**159.61**	**40%**

* Loading capacity, estimated as total inflow by the BATHTUB model
**The values of some sources like construction and industrial stormwater WLAs and SSTS were lower than 0.005 pounds/day. Though non-zero values were calculated, these values were too small to affect the LA.

Table 30: Phosphorus TMDL Summary Table for Stony Lake (15-0156-00)

TMDL parameter		Existing TP load		Allowable TP load		Estimated load reduction	
Sources		lbs/year	lbs/day	lbs/year	lbs/day	lbs/year	%
Wasteload	Construction/Industrial Stormwater WLA	0.01	**	0.01	**	0.00	0%
	Total WLA	**0.01**	**	**0.01**	**	**0**	**0**
Load	Nonpoint runoff	91.00	0.25	25.78	0.07	65.22	72%
	Estimated SSTS	0.26	**	0.00	0.00	0.26	100%
	Upstream lakes	0.00	0.00	0.00	0.00	0.00	0%
	Atmospheric deposition	7.28	0.02	7.28	0.02	0.00	**0%**
	Groundwater	0.00	0.00	0.00	0.00	0.00	0%
	Internal load	352.29	0.97	73.08	0.20	279.21	**79%**
	Total Load Allocations	**450.83**	**1.24**	**106.14**	**0.29**	**344.69**	**76%**
Margin of Safety		n/a	n/a	**11.80**	**0.03**		
Total Loads		**450.84**	**1.24**	**117.95***	**0.32***	**332.89**	**74%**

* Loading capacity, estimated as total inflow by the BATHTUB model
**The values of some sources like construction and industrial stormwater WLAs and SSTS were lower than 0.005 pounds/day. Though non-zero values were calculated, these values were too small to affect the LA.