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

FEB 16 2017

REPLY TO THE ATTENTION OF:
WW-16J

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDL) for segments within the Cannon River watershed, including support documentation and follow up information. The Cannon River watershed (CRW) is in southeastern Minnesota in parts of Blue Earth, Dakota, Freeborn, Goodhue, LeSueur, Rice, Scott, Steele, and Waseca Counties. The CRW TMDLs address impaired aquatic recreation due to excessive nutrients (total phosphorus) and bacteria, impaired aquatic life use due to excessive sediment (turbidity/TSS) and chloride and impaired drinking water use due to excessive nitrate.

EPA has determined that the CRW TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations set forth at 40 C.F.R. Part 130. Therefore, EPA approves Minnesota's twenty-nine bacteria TMDLs, thirty nutrient TMDLs, fourteen sediment TMDLs, one chloride TMDL and five nitrate TMDLs. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

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

Sincerely,

Christopher Korleski
Director, Water Division

Enclosure

cc: Celine Lyman, MPCA

wq-iw9-19g

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TMDL: Cannon River Watershed bacteria, nutrient, sediment, chloride and nitrate TMDLs, Blue Earth, Dakota, Freeborn, Goodhue, LeSueur, Rice, Scott, Steele, and Waseca Counties, MN
Date: February 16, 2017

DECISION DOCUMENT
FOR THE CANNON RIVER WATERSHED TMDLS, BLUE EARTH, DAKOTA, FREEBORN, GOODHUE, LESUEUR, RICE, SCOTT STEELE & WASECA COUNTIES, MN

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 Cannon River Watershed (CRW) (HUC-8 #07040002) is located in the Mississippi River Basin in southeastern Minnesota. The CRW includes areas within the North Central Hardwood Forest (NCHF) ecoregion and the Western Cornbelt Plain (WCBP) ecoregion. The CRW is approximately 1460 square miles (946,440 acres) and spans portions of nine counties: Blue Earth, Dakota, Freeborn, Goodhue, LeSueur, Rice, Scott, Steele, and Waseca counties. Surface waters in the CRW generally flow from west to east where they empty into the main stem of the Mississippi River. The CRW TMDLs address twenty-nine (29) impaired segments due to excessive bacteria, thirty (30) impaired lakes due to excessive nutrients, fourteen (14) impaired segments due to excessive sediment inputs, one stream segment impaired due to chloride and five (5) impaired segments due to excessive nitrate (Table 1 of this Decision Document).

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

Water body name	Assessment Unit ID	Affected Use	Pollutant or stressor	TMDL
Belle Creek	07040002-734	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Belle Creek	07040002-735	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Unnamed Creek	07040002-699	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Mud Creek	07040002-558	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Chub Creek	07040002-566	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Little Cannon River	07040002-526	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Little Cannon River	07040002-589	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Butler Creek	07040002-590	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Cannon River	07040002-501	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Spring Creek	07040002-569	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Cannon River	07040002-507	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Cannon River	07040002-508	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Heath Creek	07040002-521	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Wolf Creek	07040002-522	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Spring Brook	07040002-557	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL

Spring Brook	07040002-562	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Cannon River	07040002-581	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Cannon River	07040002-582	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Unnamed Creek	07040002-703	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Falls Creek	07040002-704	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Cannon River	07040002-540	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Cannon River	07040002-542	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Waterville Creek	07040002-560	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
MacKenzie Creek	07040002-576	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Devils Creek	07040002-577	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Country Ditch 62	07040002-621	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Unnamed Creek	07040002-702	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Unnamed Creek	07040002-705	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Whitewater Creek	07040002-706	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
			TOTAL bacteria TMDLs	**29**
Chub Lake	19-0020-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Clear Lake	81-0014-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Loon Lake	81-0015-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Byllesby Lake	19-0006-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Circle Lake	66-0027-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Fox Lake	66-0029-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Union Lake	66-0032-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Mazaska Lake	66-0039-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Horseshoe Lake	40-0001-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Upper Sakatah Lake	40-0002-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Sunfish Lake	40-0009-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Dora Lake	40-0010-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL

Mabel Lake	40-0011-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Sabre Lake	40-0014-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Tetonka Lake	40-0031-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Gorman Lake	40-0032-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Silver Lake	40-0048-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Frances Lake	40-0057-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Tustin Lake	40-0061-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Cannon Lake	66-0008-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Wells Lake	66-0010-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Roberds Lake	66-0018-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
French Lake	66-0038-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Lower Sakatah Lake	66-0044-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Hunt Lake	66-0047-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Rice Lake	66-0048-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Caron Lake	66-0050-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Cedar Lake	66-0052-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Shields Lake	66-0055-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
Toners Lake	81-0058-00	Aquatic Recreation	Excess Nutrients (total phosphorus)	TP TMDL
			TOTAL TP TMDLs	**30**
Belle Creek	07040002-734	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Belle Creek	07040002-735	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Chub Creek	07040002-528	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Little Cannon River	07040002-526	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Little Cannon River	07040002-589	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Butler Creek	07040002-590	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Cannon River	07040002-509	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Wolf Creek	07040002-522	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL

Prairie Creek	07040002-504	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Unnamed Creek	07040002-512	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Straight River	07040002-503	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Rush Creek	07040002-505	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Straight River	07040002-515	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
Straight River	07040002-536	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL
			TOTAL TSS TMDLs	**14**
Unnamed Ditch	07040002-555	Aquatic Life (chloride)	Excess Chloride	Chloride TMDL
			TOTAL chloride TMDLs	**1**
Pine Creek	07040002-520	Drinking Water	Nitrate	Nitrate TMDL
Spring Brook	07040002-557	Drinking Water	Nitrate	Nitrate TMDL
Trout Brook	07040002-567	Drinking Water	Nitrate	Nitrate TMDL
Trout Brook	07040002-573	Drinking Water	Nitrate	Nitrate TMDL
Little Cannon River	07040002-589	Drinking Water	Nitrate	Nitrate TMDL
			TOTAL nitrate TMDLs	**5**

Land Use:
Land use in the CRW is mix of agricultural land, forested land and developed land (see Figure 4 of the final TMDL document). Agricultural croplands (corn and soybean dominated croplands) combined with pasture and foraging lands account for approximately 75% of the land in the CRW. Forested and wetland areas in the CRW make up approximately 12.5% of the land use and developed land (i.e., industrial land use, high/medium/low density developed land use) encompasses the remaining 12.5%.

Problem Identification:
Bacteria TMDLs: Bacteria impaired segments identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive bacteria. Water quality monitoring within the CRW indicated that these segments were not attaining their designated aquatic recreation uses due to exceedances of the bacteria criteria. Excessive bacteria can negatively impact recreational uses (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 identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive nutrients (phosphorus). Total phosphorus (TP), chlorophyll-*a* (chl-*a*) and Secchi depth (SD) measurements in the CRW indicated that these waters were not attaining their designated aquatic recreation uses due to exceedances of nutrient criteria. Water quality monitoring was completed throughout the CRW and that data formed the foundation for TP TMDL modeling efforts.

While TP is an essential nutrient for aquatic life, elevated concentrations of TP can lead to nuisance algal blooms that negatively impact aquatic life and recreation (swimming, boating, fishing, etc.). Algal decomposition depletes dissolved oxygen levels within the water column. The decreases in dissolved oxygen can stress benthic macroinvertebrates and fish. Depletion of oxygen in the water column can also lead to conditions where phosphorus is released from bottom sediments (i.e. internal loading). Also, excess algae can shade the water column which limits the distribution of aquatic vegetation. Aquatic vegetation stabilizes bottom sediments, and also is an important habitat for macroinvertebrates and fish.

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

Total suspended solids (TSS) is a measurement of the sediment and organic material that inhibits natural light from penetrating the surface water column. Excessive sediment and organic material within the water column can negatively impact fish and macroinvertebrates within the ecosystem. Excess sediment and organic material may create turbid conditions within the water column and may increase the costs of treating surface waters used for drinking water or other industrial purposes (ex. food processing).

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

Excessive fine sediment also may degrade aquatic habitats, alter natural flow conditions in stream environments and add organic materials to the water column. The potential addition of fine organic materials may lead to nuisance algal blooms which can negatively impact aquatic life and recreation (swimming, boating, fishing, etc.). Algal decomposition depletes oxygen levels which stresses benthic macroinvertebrates and fish. Excess algae can shade the water column and limit the distribution of aquatic vegetation. Established aquatic vegetation stabilizes bottom sediments and provides important habitat areas for healthy macroinvertebrates and fish communities.

Chloride TMDL: The chloride impaired segment identified in Table 1 of this Decision Document was included on the draft 2014 Minnesota 303(d) list due to excessive chloride. Water quality monitoring within the CRW indicated that this segment was not attaining its designated aquatic life uses due to high chloride measurements and the negative impact of those conditions on aquatic life (i.e., fish and macroinvertebrate communities).

Low levels of chloride can be found naturally in the CRW lakes and streams. Chloride is essential for aquatic life to carry out a range of biological functions. However, high concentrations of chloride in the surrounding water can harm cellular osmotic processes in aquatic life. Excessive dissolved chlorides in water may stress aquatic species and prohibit the transport of needed molecules into the cell. If elevated concentrations of chloride persist in the water, aquatic life such as fish, invertebrates and even some plant species may become stressed and/or die.

Excessive dissolved chloride can also alter the density of water in lake environments. Density changes can impact seasonal mixing patterns of lake waters, especially in deeper lakes. Seasonal mixing in lake environments distributes oxygen and nutrients throughout the water column and is necessary for healthy aquatic communities. Mixing pattern disruptions may also impact nutrient cycling, phytoplankton and zooplankton community composition and productivity and fish and macroinvertebrate health.

High levels of salt can also negatively affect infrastructure, vehicles, plants, soils, pets, wildlife and groundwater and drinking water supplies. MPCA acknowledged that groundwater derived drinking water is a vital resource for many Minnesotans and the potential for chlorides to contaminate shallow drinking water wells is a concern in the CRW.

<u>*Nitrate TMDLs:*</u> Nitrate impaired segments identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive nitrate. Water quality monitoring within the CRW indicated that these segments were not attaining their designated aquatic life (macroinvertebrates) use and their drinking water designated use due to elevated nitrate measurements.

Nitrate (NO_3) and nitrite (NO_2) are two of the forms of nitrogen which can be harmful to humans. Nitrite is toxic to humans while nitrate, if ingested, can transform to nitrite. Nitrite has been linked to methemoglobinemia (i.e., blue baby syndrome) in infants. Areas of southeastern Minnesota are particularly susceptible to nitrogen impacting drinking water resources due to the area's karst geology and use of nitrogen based fertilizers in agricultural areas.

MPCA explained that some species of macroinvertebrates and fish are sensitive to nitrate levels in coldwater stream environments (page 10 of the final TMDL document). Certain macroinvertebrate and fish species may experience stress due to high dissolved nitrate levels within their aquatic environments. MPCA does not currently have a nitrate water quality standard to protect aquatic life and instead uses the drinking water standard of 10 mg/L.

Priority Ranking:
The water bodies addressed by the CRW TMDLs were given a priority ranking for TMDL development due to: the impairment impacts on public health and aquatic life, the public value of the impaired water resource, the likelihood of completing the TMDL in an expedient manner, the inclusion of a strong base of existing data, the restorability of the water body, the technical capability and the willingness of local partners to assist with the TMDL, and the appropriate sequencing of TMDLs within a watershed or basin. Areas within the CRW are popular locations for aquatic recreation. Water quality degradation has led to efforts to improve the overall water quality within the CRW, and to the development of TMDLs for these water bodies.

Pollutants of Concern:
The pollutants of concern are bacteria, TP (nutrients), TSS (sediment), chloride and nitrate (NO_3).

Source Identification (point and nonpoint sources):

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

CRW bacteria TMDLs:

National Pollutant Discharge Elimination Systems (NPDES) permitted facilities: NPDES permitted facilities may contribute bacteria loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA determined that there are several wastewater treatment facilities/plants (WWTFs/WWTPs) in the CRW which contribute bacteria from treated wastewater releases (Table 5 of this Decision Document). MPCA assigned each of these facilities a portion of the bacteria wasteload allocation (WLA).

Municipal Separate Storm Sewer System (MS4) communities: Stormwater from MS4s can transport bacteria to surface water bodies during or shortly after storm events. MPCA identified five MS4 permittees (City of Faribault (MS400233), City of Northfield (MS400271), City of Owatonna (MS400244), City of Red Wing (MS400235) and the City Waseca (MS400258)) which were assigned a portion of the WLA for the bacteria TMDLs (Table 5 of this Decision Document).

Concentrated Animal Feedlot Operations (CAFOs): MPCA recognized the presence of forty-six CAFOs in the CRW (Table 26 and Figure 14 of the final TMDL document). CAFO facilities must be designed to contain all surface water runoff (i.e., have zero discharge from their facilities) and have a current manure management plan. MPCA explained that these facilities do not discharge effluent and therefore were not assigned a portion of the WLA (WLA = 0).

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.

CRW phosphorus TMDLs:

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 several WWTFs/WWTPs in the CRW which contribute nutrients (TP) from treated wastewater releases (Tables 6 and 7 of this Decision Document). MPCA assigned each of these facilities a portion of the TP WLA.

MS4 communities: Stormwater from MS4s can transport nutrients to surface water bodies during or shortly after storm events. MPCA identified one MS4 permittee (City Waseca (MS400258) which was assigned a portion of the WLA for the phosphorus TMDLs (Tables 6 and 7 of this Decision Document).

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

CRW sediment (TSS) TMDLs:
NPDES permitted facilities: NPDES permitted facilities may contribute sediment loads to surface waters through discharges of wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA determined that there are nine facilities which contribute sediment from treated wastewater releases (Table 8 of this Decision Document). MPCA assigned each of these facilities a portion of the sediment WLA.

MS4 communities: Stormwater from MS4s can transport sediment to surface water bodies during or shortly after storm events. MPCA identified four MS4 permittees (City of Faribault (MN400233), City of Northfield (MS400271), City of Owatonna (MS400244) and the City Waseca (MS400258)) which were assigned a portion of the WLA for the TSS TMDLs (Table 8 of this Decision Document).

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

CRW chloride TMDL:
NPDES permitted facilities: NPDES permitted facilities may contribute chloride loads to surface waters through discharges of treated wastewater. MPCA identified one NPDES facility, Lonsdale WWTP (MN0031241), as contributing chloride loads to Unnamed Ditch (07040002-555). Permitted facilities must discharge wastewater according to their NPDES permit. MPCA assigned a chloride WLA to this facility (Table 9 of this Decision Document).

CRW nitrate TMDLs:
NPDES permitted facilities: NPDES permitted facilities may contribute nitrate loads to surface waters through discharges of treated wastewater. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA determined that there was one facility which contributes nitrate from treated wastewater releases, Nerstrand WWTP (MN0065668) (Table 10 of this Decision Document). MPCA assigned this facility a portion of the nitrate WLA.

MS4 communities: Stormwater from MS4s can transport nitrate to surface water bodies during or shortly after storm events. MPCA identified one MS4 permittee, City of Northfield (MS400271), which it assigned a portion of the WLA for the nitrate TMDLs (Table 10 of this Decision Document).

Stormwater runoff from permitted construction and industrial areas: Construction and industrial sites may contribute nitrate 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.

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

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

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

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

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

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

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

CRW phosphorus TMDLs:

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

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

Stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of nutrients, organic material and organic-rich sediment which may lead to impairments in the CRW. Manure spread onto fields is often a source of phosphorus, and can be exacerbated by tile drainage lines, which channelize the stormwater. Tile lined fields and channelized ditches enable particles to move more efficiently into surface waters. Phosphorus, organic material and organic-rich sediment may be added via surface runoff from upland areas which are being used for Conservation Reserve Program (CRP) lands, grasslands, and agricultural lands used for growing hay or other crops. Stormwater runoff may contribute nutrients and organic-rich sediment to surface waters from livestock manure, fertilizers, vegetation and erodible soils.

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

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

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

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. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and rural areas.

CRW sediment (TSS) TMDLs:

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

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

Wetland 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.

Atmospheric deposition: Sediment may be added via particulate deposition. Particles from the atmosphere may fall onto surface waters within the CRW.

CRW chloride TMDL:

Natural background chloride load: Chloride is present in soils and minerals and is added to groundwater due to natural weathering processes of minerals and rock.

Snow/ice removal: Chloride may be added to waters of the CRW via the application of deicing compounds from state, county and local entities. Deicing compounds may be mobilized and transported to surface waters during stormwater runoff events (e.g., winter rain events, spring melt, etc.).

Stormwater from areas not covered under a MS4 NPDES permit: Stormwater runoff from areas outside the boundaries of MS4 areas, such as non-permitted urban, residential, commercial or industrial areas, can contribute chloride to surface waters of the CRW. Non-regulated stormwater may drain impervious surfaces and add any residual chlorides from those surfaces to surface waters.

Discharges from SSTS or unsewered communities: Septic systems are a potential source of chloride 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 chloride contribution from these systems. Water softening systems which are in areas not connected to municipal sewer lines likely discharge to septic fields and chloride contributions from those septic systems may ultimately mix with groundwater or surface water near the septic field.

Chloride contributions from agricultural lands: Chloride may be added via use of fertilizers containing chloride anions (ex. potassium chloride (KCl)) and biosolids which are spread onto agricultural areas. Chloride may be liberated from farm fields within stormwater runoff which can be exacerbated by tile drainage lines, which channelize the stormwater flows.

Other nonpoint sources: MPCA cited chloride as a component of dust suppressants on gravel roads and parking areas, as a portion of landfill leachate and as a chemical byproduct of alum chloride treatments for lake sediments or ferric chloride treatments for stormwater.

CRW nitrate TMDLs:
Leaching loss from manure and nitrogen based fertilizer application in agricultural areas: MPCA identified nitrogen based fertilizer and manure usage in agricultural areas as nonpoint sources of nitrogen leaching into shallow groundwater. Nitrate and nitrite can easily mix into groundwater and move through the subsurface soils via interflow and karst pathways which are a part of the geology in southeastern Minnesota.

Stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of nitrates which may lead to impairments in the CRW. Nitrate 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.

Atmospheric deposition: Nitrogen may be added via particulate deposition. Particles from the atmosphere may fall onto surface waters within the CRW.

Future Growth:
MPCA does not anticipate there to be imminent growth in the CRW. Discussions with the MPCA project manager during the development of the CRW TMDLs shared that most of the agricultural areas in the CRW are unlikely to be changing in the near future. The exception being agricultural areas near larger towns and cities which may be annexing surrounding agricultural areas as their population grows over time. The WLA and load allocations (LA) for the CRW TMDLs were calculated for all current and future sources. Any expansion of point or nonpoint sources will need to comply with the respective WLA and LA values calculated in the CRW TMDLs.

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

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

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

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

Comment:

Designated Uses:

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

Minnesota Rule Chapter 7050 designates uses for waters of the state. The segments addressed by the CRW TMDLs are designated as Class 1 waters (1B and 1C) for drinking water use (nitrates) and Class 2 waters for aquatic recreation use (fishing, swimming, boating, etc.) and aquatic life use (*E. coli*, phosphorus, TSS and chloride). 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 7050.0221 (Subp. 3 and 4) set forth the following narrative criteria for Class 1B and 1C waters of the State:

> *"Class 1B waters - The quality of Class 1B waters of the state shall be such that with approved disinfection, such as simple chlorination or its equivalent, the treated water will meet both the primary (maximum contaminant levels) and secondary drinking water standards issued by the United States Environmental Protection Agency as referenced in subpart 1. The Environmental Protection Agency drinking water standards are adopted and incorporated by reference, except as noted in subpart 1.*
> *These standards will ordinarily be restricted to surface and underground waters with a moderately high degree of natural protection and apply to these waters in the untreated state.*
>
> *Class 1C waters - The quality of Class 1C waters of the state shall be such that with treatment consisting of coagulation, sedimentation, filtration, storage, and chlorination, or other equivalent treatment processes, the treated water will meet both the primary (maximum contaminant levels) and secondary drinking water standards issued by the United States Environmental Protection Agency as referenced in subpart 1. The Environmental Protection Agency drinking water standards are adopted and incorporated by reference, except as noted in subpart 1.*

These standards will ordinarily be restricted to surface waters, and groundwaters in aquifers not considered to afford adequate protection against contamination from surface or other sources of pollution. Such aquifers normally would include fractured and channeled limestone, unprotected impervious hard rock where water is obtained from mechanical fractures or joints with surface connections, and coarse gravels subjected to surface water infiltration. These standards shall also apply to these waters in the untreated state."

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

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

Numeric criteria:

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

Table 2: Bacteria Water Quality Standards Applicable to the CRW TMDLs

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

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

Bacteria TMDL Targets: The bacteria TMDL targets employed for the CRW bacteria TMDLs are the *E. coli* standards as stated in Table 2 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.

Phosphorus TMDLs: Numeric criteria for TP, chlorophyll-*a*, and Secchi Disk depth are set forth in Minnesota Rules 7050.0222. These three parameters form the MPCA eutrophication standard that must be achieved to attain the aquatic recreation designated use. The numeric eutrophication standards which are applicable to the CRW lake TMDLs are found in Table 3 of this Decision Document.

Table 3: Minnesota Eutrophication Standards for Deep and Shallow lakes within the North Central Hardwood Forest (NCHF) and Western Cornbelt Plan (WCBP) ecoregions

Parameter	Total Phosphorus *(µg/L)*	Chlorophyll-a *(µg/L)*	Secchi Depth *(m)*
NCHF Eutrophication Standard (shallow lakes)[1]	TP < 60	chl-a < 20	SD > 1.0
NCHF Eutrophication Standard (deep lakes)	TP < 40	chl-a < 14	SD > 1.4
WCBP Eutrophication Standard (shallow lakes)[1]	TP < 90	chl-a < 30	SD > 0.7
WCBP Eutrophication Standard (deep lakes)	TP < 65	chl-a < 20	SD > 0.9

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

In developing the lake nutrient standards for Minnesota lakes, MPCA evaluated data from a large cross-section of lakes within each of the State's ecoregions. Clear relationships were established between the causal factor, TP, and the response variables, chl-*a* and SD depth. MPCA anticipates that by meeting the TP concentrations of NCHF and WCBP 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.

Byllesby Lake Site Specific Criteria: MPCA established site specific criteria (SSC) for Byllesby Lake in 2009-2011 (EPA approved MPCA's Byllesby Lake SSC request in August 2011). The SSC values were based on the WCBP's shallow lake criteria (Section 2.2.1.1. of the final TMDL document).

- Total Phosphorus: TP < 90 µg/L
- Chlorophyll-*a*: Chl-a < 30 µg/L
- Secchi Disk: SD > 0.8 m

Nutrient TMDL Targets: MPCA selected TP targets of 40 µg/L, 60 µg/L, 65 µg/L and 90 µg/L (for WCBP shallow lakes and for Byllesby Lake), where appropriate. MPCA selected TP as the appropriate target parameter to address eutrophication problems because of the interrelationships between TP and chl-*a*, and TP and SD depth. Algal abundance is measured by chl-*a*, which is a pigment found in algal cells. As more phosphorus becomes available, algae growth can increase. Increased algae in the water column will decrease water clarity that is measured by SD depth. EPA finds the nutrient targets employed for the CRW TP TMDLs to be reasonable.

Sediment (TSS) TMDLs: On January 23, 2015, EPA approved MPCA's regionally-based TSS criteria for rivers and streams. The TSS criteria replaced Minnesota's statewide turbidity criterion (measured in

Nephelometric Turbidity Units (NTU)). The TSS criteria provide water clarity targets for measuring suspended particles in rivers and streams.

Sediment (TSS) TMDL Targets: MPCA employed two TSS targets applicable to streams in the CRW. Criterion from streams classified as 2A (coldwater streams) and 2B (coldwater or warmwater, Southern River Nutrient Region (SRNR)) were applied to the sediment (TSS) TMDLs of the CRW (Table 4 of this Decision Document).

Table 4: Total Suspended Solids Water Quality Standards Applicable in the Cannon River Watershed TMDL

Parameter	Units	Water Quality Standard
TSS - Class 2A Waters (Southern MN Region)	mg/L	10
TSS - Class 2B Waters (Southern MN Region)	mg/L	65

Chloride TMDL: The chronic standard for chloride to protect for 2B uses is **230 mg/L**. The chronic standard is defined in Minn. R. 7050.0218, subp. 3.I., as '*the highest water concentration of a toxicant to which organisms can be exposed indefinitely without causing chronic toxicity.*'

The 230 mg/L value is based on a 4-day exposure of aquatic organisms to chloride. The maximum (acute) standard to protect for 2B uses is 860 mg/L. The maximum standard is defined in Minn. R. 7050.0218, subp. 3.T., as '*the highest concentration of a toxicant in water to which organisms can be exposed for a brief time with zero to slight mortality.*' The 860 mg/L value is based on a 24-hour exposure of aquatic organisms to chloride. These criteria are adopted from the EPA's recommended water quality criteria for chloride. EPA believes it is reasonable to believe that by MPCA meeting its chronic chloride water quality standard (230 mg/L) the acute chloride water quality standard (860 mg/L) will also be attained.

Chloride TMDL Target:
The chloride TMDL target for the CRW TMDL is the chronic standard of 230 mg/L.

Nitrate TMDLs: Nitrate impaired waters in the CRW are designated as drinking water sources (Class 1B waters[1]) as well as trout streams. The following CRW segments were designated as trout streams; Pine Creek (07040002-520), Spring Brook (07040002-557), Trout Brook (07040002-573) and Little Cannon River (07040002-589) according to information included in Table 7 of the final TMDL document. The Minnesota nitrate drinking water quality standard is a maximum concentration of 10 mg/L.

Nitrate TMDL Targets: MPCA employed the nitrate drinking water quality standard of 10 mg/L.

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

[1] Cannon River Watershed Total Maximum Daily Load, October 2016, Section 2.2.5.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

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

Comment:

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

Typically loading capacities are expressed as a mass per time (e.g. pounds per day). However, for *E. coli* loading capacity calculations, mass is not always an appropriate measure because *E. coli* is expressed in terms of organism counts. This approach is consistent with the EPA's regulations which define "load" as "an amount of matter that is introduced into a receiving water" (40 CFR §130.2). To establish the loading capacities for the CRW bacteria TMDLs, MPCA used Minnesota's WQS for *E. coli* (126 orgs/100 mL). A loading capacity is, "the greatest amount of loading that a water can receive without violating water quality standards." (40 CFR §130.2). Therefore, a loading capacity set at the WQS will assure that the water does not violate WQS. MPCA's *E. coli* TMDL approach is based upon the premise that all discharges (point and nonpoint) must meet the WQS when entering the water body. If all sources meet the WQS at discharge, then the water body should meet the WQS and the designated use.

Separate flow duration curves (FDCs) were created for the each of the bacteria TMDLs in the CRW. The CRW FDCs were developed using daily simulated flow estimates from Hydrologic Simulation Program-Fortran (HSPF) modeling efforts. MPCA focused on daily modeled flows from 1996-2012. HSPF hydrologic models were developed to simulate flow characteristics within the CRW and flow data focused on dates within the recreation season (April 1 to October 31). Daily stream flows were necessary to implement the load duration curve approach. Two USGS gages were used as calibration locations for the HSPF modeling efforts, USGS Station 05353800 (Straight River at Faribault) and USGS Station 05355200 (Cannon River at Welch).

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

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 (e.g., Figure 22 of the final TMDL document). Individual LDCs are found in Section 4.3.6 of the final TMDL document.

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, MPCA believes and EPA concurs that the strengths outweigh the weaknesses for the LDC method.

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

Bacteria TMDLs for the CRW were calculated and those results are found in Table 5 of this Decision Document. The load allocations were calculated after the determination of the WLA, and the Margin of Safety (MOS) (10% of the loading capacity). Load allocations (ex. stormwater runoff from agricultural land use practices and feedlots, SSTS, wildlife inputs etc.) were not split among individual nonpoint contributors. Instead, load allocations were combined together into a categorical LA ('Watershed Load') to cover all nonpoint source contributions.

Table 5 of this Decision Document reports five points (the midpoints of the designated flow regime) on the loading capacity curve. However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve. The LDC method can be used to display collected bacteria monitoring data and allows for the estimation of load reductions necessary for attainment of the bacteria water quality standard. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for the segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 5 of this Decision Document identifies the loading capacity for the water body at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Table 5: Bacteria (*E. coli*) TMDLs for the Cannon River Watershed is located at the end of this Decision Document

MPCA explained that estimated current conditions and segment reduction calculations are included within the CRW's Watershed Restoration and Protection Strategies (WRAPS) document. Tables within the CRW WRAPS document outline broad goals for bacteria reductions in the CRW which are aimed at ultimately attaining the TMDL goals outlined in Table 5 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.[2]

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

[2] 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.

(June 1 to September 30) average surface water quality. BATHTUB utilizes annual or seasonal time-scales which are appropriate because watershed TP loads are normally impacted by seasonal conditions.

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

The loading capacity of the lake was determined through the use of BATHTUB and the Canfield-Bachmann subroutine and then allocated to the WLA, LA, and MOS (Section 4.2.1 of the Decision Document). To simulate the load reductions needed to achieve the WQS, a series of model simulations were performed. Each simulation reduced the total amount of TP entering each of the water bodies during the growing season (or summer season, June 1 through September 30) and computed the anticipated water quality response within the lake. The goal of the modeling simulations was to identify the loading capacity appropriate (i.e., the maximum allowable load to the system, while allowing it to meet WQS) from June 1 to September 30. The modeling simulations focused on reducing the TP to the system.

The BATHTUB modeling efforts were used to calculate the loading capacity for each lake. The loading capacity is the maximum phosphorus load which each of these water bodies can receive over an annual period and still meet the shallow and general lake nutrient WQS (Table 6 of this Decision Document). Loading capacities on the annual scale (kilograms per year (kg/year)) were calculated to meet the WQS during the growing season (June 1 through September 30). The time period of June to September was chosen by MPCA as the growing season because it corresponds to the eutrophication criteria, contains the months that the general public typically uses lakes in the CRW for aquatic recreation, and is the time of the year when water quality is likely to be impaired by excessive nutrient loading. Loading capacities were divided by 365 to calculate the daily loading capacities.

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

MPCA subdivided the loading capacity among the WLA, LA, and MOS components of the TMDL (Tables 6 and 7 of this Decision Document). These calculations were based on the critical condition, the summer growing season, which is typically when the water quality in each lake is typically degraded and phosphorus loading inputs are the greatest. TMDL allocations assigned during the summer growing season will protect the CRW lakes during the worst water quality conditions of the year. MPCA assumed that the loading capacities established by the TMDL will be protective of water quality during the remainder of the calendar year (October through May).

Byllesby Lake TP TMDL: The BATHTUB modeling efforts to calculate the TMDL to address the Byllesby Lake is described in Section 4.2.1 of the final TMDL document. MPCA utilized a larger water quality monitoring data set in its calculation of the Byllesby Lake TMDL and relied on the FLUX model to compile this larger data set and estimate phosphorus inputs to the Byllesby Lake watershed system (Appendices B and D). Further details on the modeling assumptions and interconnectivity of the FLUX and BATHTUB models in their calculation of the Byllesby Lake TMDL are in Section 4.2 of the final TMDL document.

Table 6: Total phosphorus TMDLs for the Cannon River Watershed is located at the end of this Decision Document

Table 7: The total phosphorus TMDL for Byllesby Lake in the Cannon River Watershed is located at the end of this Decision Document

Tables 6 and 7 of this Decision Document communicate MPCA's estimates of the reductions required for the lakes of the CRW and Byllesby Lake to meet their water quality targets. These loading reductions (i.e., the percentage column) were estimated from existing and TMDL load calculations. MPCA expects that these reductions will result in the attainment of the water quality targets and the lake water quality will return to a level where the designated uses are no longer considered impaired.

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

CRW sediment (TSS) TMDLs: MPCA developed LDCs to calculate sediment TMDLs for the fourteen impaired segments of the CRW. The same LDC development strategies were employed for the sediment and bacteria TMDLs (ex. 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 by multiplying individual flow values by the Class 2A target (10 mg/L) or the Class 2B target (65 mg/L) and then multiplying that value by a conversion factor.

Sediment (TSS) TMDLs were calculated (Table 8 of this Decision Document). The load allocation was calculated after the determination of the WLA, and the MOS. Load allocations (ex. stormwater runoff from agricultural land use practices) was not split among individual nonpoint contributors. Instead, load allocations were combined together into one value to cover all nonpoint source contributions. Table 8 of this Decision Document reports five points (the midpoints of the designated flow regime) on the loading capacity curve. However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve.

The LDC method can be used to display collected sediment monitoring data and allows for the estimation of load reductions necessary for attainment of the Class 2A or 2B TSS water quality standard. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for each segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 8 of this Decision Document identifies the loading capacity for each segment at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Table 8: Total Suspended Solids (TSS) TMDLs for the Cannon River Watershed is located at the end of this Decision Document

MPCA explained that estimated current conditions and segment reduction calculations are included within the CRW's WRAPS document. Tables within the CRW WRAPS document outline broad goals for sediment (TSS) reductions in the CRW which are aimed at ultimately attaining the TMDL goals outlined in Table 8 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 sediment (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 sediment (TSS) TMDLs to be reasonable and consistent with EPA guidance.

CRW chloride TMDLs: MPCA developed a LDC to calculate the chloride TMDL for the Unnamed Ditch (07040002-555) segment. This same TMDL development strategy was employed for bacteria, sediment and nitrate TMDLs (ex. 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 by multiplying individual flow values by the chloride TMDL target (230 mg/L) and then multiplying that value by a conversion factor.

The chloride loading capacity was calculated (Table 9 of this Decision Document) and MPCA assigned a WLA to one facility (Lonsdale WWTP, MN0031241), calculated a 10% MOS and allocated the remainder of the loading capacity to the LA. The LA was not split among individual nonpoint contributors, instead, the LA was represented as one value which addresses all nonpoint source contributions. Table 9 of this Decision Document reports five points (the midpoints of the designated flow regime) on the loading capacity curve. However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve.

The LDC method can be used to display collected chloride monitoring data and allows for the estimation of load reductions necessary for attainment of the chronic chloride WQS (230 mg/L). Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for the Unnamed Ditch (07040002-555) segment for each of the five flow regimes of the LDC. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 9 of this Decision Document identifies the loading capacity for each segment at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Table 9: Chloride TMDL for the Cannon River Watershed is located at the end of this Decision Document

MPCA explained that estimated current conditions and segment reduction calculations are included within the CRW's WRAPS document. Tables within the CRW WRAPS document outline the necessary practices and goals for chloride reductions in the CRW which are aimed at ultimately attaining the TMDL goals outlined in Table 9 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 chloride TMDL. Additionally, EPA concurs with the loading capacities calculated by the MPCA in the chloride TMDL. EPA finds MPCA's approach for calculating the loading capacity for the chloride TMDL to be reasonable and consistent with EPA guidance.

CRW nitrate TMDLs: MPCA developed LDCs to calculate nitrate TMDLs for the five impaired segments of the CRW. The same LDC development strategies were employed for the nitrate TMDLs as they were for the sediment and bacteria TMDLs (ex. 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 by multiplying individual flow values by the nitrate target of 10 mg/L and then multiplying that value by a conversion factor.

Nitrate TMDLs were calculated (Table 10 of this Decision Document) and load allocations for each impaired segment were calculated after the determination of the WLA, and the MOS. Similar to the bacteria TMDLs, load allocations were not split into individual nonpoint contributors, but combined together into one value to cover all nonpoint source contributions. Table 10 of this Decision Document reports five points (the midpoints of the designated flow regime) on the loading capacity curve. However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve.

The LDC method can be used to display collected nitrate monitoring data and allows for the estimation of load reductions necessary for attainment of the nitrate target. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for each segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 10 of this Decision Document identifies the loading capacity for each segment at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Table 10: Nitrate TMDLs for the Cannon River Watershed is located at the end of this Decision Document

MPCA explained that estimated current conditions and segment reduction calculations are included within the CRW's WRAPS document. Tables within the CRW WRAPS document outline the necessary practices and goals for nitrate reductions in the CRW which are aimed at ultimately attaining the TMDL goals outlined in Table 10 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 nitrate TMDLs. Additionally, EPA concurs with the loading capacities calculated by the MPCA in the nitrate TMDLs. EPA finds MPCA's approach for calculating the loading capacity for the nitrate TMDLs to be reasonable and consistent with EPA guidance.

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

4. Load Allocations (LA)

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

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

CRW bacteria TMDLs: The calculated LA values for the bacteria TMDLs are applicable across all flow conditions in the CRW (Table 5 of this Decision Document). 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 (deer, geese, ducks, raccoons, turkeys and other animals) and bacteria contributions from upstream subwatersheds. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations, but aggregated the nonpoint sources into a categorical LA value.

CRW phosphorus TMDLs: MPCA identified several nonpoint sources which contribute nutrient loading to the lakes of the CRW (Tables 6 and 7 of this Decision Document). These nonpoint sources included: watershed contributions from each lake's direct watershed, watershed contributions from upstream watersheds, internal loading and atmospheric deposition. MPCA did not calculate individual load allocation values for each of these potential nonpoint source considerations. Instead MPCA combined the LA sources into one 'watershed load' LA calculation (Tables 6 and 7).

Byllesby Lake TP TMDL LA calculation: MPCA explained that CRW HSPF modeling efforts incorporated three main nonpoint source assumptions in its simulations (Section 4.2.3.1 of the final TMDL document);

- Cover crops coverage was applied to approximately 12.4% of cropland acres with the highest sediment yields in the Byllesby Lake Watershed;
- Conversion of all cropland acres classified as "marginal lands" and all cropland acres falling within a 50 feet buffer of rivers/streams to perennial vegetation; and
- Reduction in the low flow TP concentrations (to approximately 0.10 mg-P/L) in the Straight River upstream of the Owatonna WWTF, and elsewhere in the Straight River subwatershed.

MPCA noted that reduction in TP loads from nonpoint sources shall be considered when setting point source effluent limits (Section 4.2.3 of the final TMDL document).

CRW sediment (TSS) TMDLs: The calculated LA values for the sediment (TSS) TMDLs are applicable across all flow conditions. MPCA identified several nonpoint sources which contribute sediment loads to the surface waters in the CRW (Table 8 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, wetland and forest sources, and atmospheric deposition. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations, but aggregated the nonpoint sources into one LA value ('Watershed Load').

CRW chloride TMDLs: The calculated LA values for the chloride TMDL are applicable across all flow conditions. MPCA identified several nonpoint sources which contribute chloride nonpoint source loads to the surface waters in the CRW (Table 9 of this Decision Document). Load allocations were recognized as originating from many diverse nonpoint sources including; stormwater contributions from agricultural lands, discharges from SSTS, and stormwater runoff liberating salt from roads, parking lots, commercial/industrial areas and or sidewalks. 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 ('Watershed Load').

CRW nitrate TMDLs: The calculated LA values for the nitrate TMDLs are applicable across all flow conditions. MPCA identified several nonpoint sources which contribute nitrate loads to the surface waters in the CRW (Table 10 of this Decision Document). Load allocations were recognized as originating from; nonpoint source leaching loss, runoff from agricultural land use practices, nitrate contributions from upstream watersheds, and atmospheric deposition. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations, but aggregated the nonpoint sources into one LA value ('Watershed Load').

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

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

5. Wasteload Allocations (WLAs)

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

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

Comment:

CRW bacteria TMDLs: MPCA identified NPDES permitted facilities within the CRW and assigned those facilities a portion of the WLA (Table 5 of this Decision Document). The WLAs for each of these individual facilities were calculated based on the facility's wet weather design flow and the *E. coli* WQS (126 orgs /100 mL). 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.

MS4 allocations were calculated for the CRW bacteria TMDLs based on the following equation:

$$\text{MS4 bacteria WLA} = \%\ \text{MS4 Area} * (\text{TLC} - \text{MOS} - \text{WLA}_{\text{NPDES Facilities}})$$

Where:

% MS4 Area: The ratio of the total MS4 area to the total drainage area for the given AUID.
TLC: Total loading capacity for the individual segment
MOS: Margin of safety calculation (10% of the TLC)
WLA (NPDES Facilities): The total WLA for all permitted industrial and municipal NPDES facilities that discharge into the AUID's drainage area

MPCA acknowledged the presence of CAFOs in the CRW in Section 3.7.3.1 of the final TMDL document. CAFOs and other feedlots are generally not allowed to discharge to waters of the State (Minnesota Rule 7020.2003). CAFOs were assigned a WLA of zero (WLA = 0) for the CRW bacteria TMDLs.

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

CRW phosphorus TMDLs: MPCA identified NPDES permitted facilities within the CRW and assigned those facilities a portion of the WLA (Tables 6 and 7 of this Decision Document). The WLAs for each of these individual facilities were calculated based on the described approaches in Section 4.2.3.1 of the final TMDL document. Further detail on effluent limits employed in the calculation of WLAs can be found in Appendix G of the final TMDL document.

MS4 allocations for the CRW phosphorus TMDLs were calculated in the same manner as the MS4 allocations for the CRW bacteria, TSS and nitrate TMDLs (i.e., see calculative method in ***Section 5 - CRW bacteria TMDLs***, within this Decision Document).

MPCA also calculated a portion of the WLA for construction and industrial stormwater. This WLA was represented as a categorical WLA for construction stormwater and a categorical WLA for 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. 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 (e.g., Blue Earth, Dakota, Freeborn, Goodhue, LeSueur, Rice, Scott, Steele, and Waseca Counties) (https://stormwater.pca.state.mn.us/index.php/Construction_activity_by_county). This estimate was approximately 0.075%, which MPCA rounded up to 0.1% and then applied that 0.1% to the loading capacity for the lake/segment.

Attaining the construction stormwater and industrial stormwater loads described in the CRW TP TMDLs is the responsibility of construction and industrial site managers. For example, for the Clear Lake (81-0014-00) TP TMDL, the City of Waseca's MS4 program is responsible for overseeing construction stormwater loads which impact water quality in Clear Lake. The City of Waseca is required to have a construction stormwater ordinance at least as stringent as the State's NPDES/SDS General Stormwater Permit for Construction Activity (MNR100001). In the final TMDL document MPCA explained that if a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit (MNR100001) and properly selects, installs and maintains all BMPs required under MNR1000001 and applicable local construction stormwater ordinances, including those related to impaired waters discharges and any applicable additional requirements found in Appendix A of the Construction General Permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL. 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 TP 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.

Byllesby Lake TP TMDL WLA calculation: WLA calculations for facilities contributing TP to Byllesby Lake (i.e., Byllesby Reservoir) can be found in Appendix G of the final TMDL report. MPCA calculated TP WLAs on a seasonal (May to September) and an annual basis (October to April) based on simulations of the CRW HSPF model.

MPCA outlined its approach for calculating TP WLAs for specific municipal and industrial facilities (e.g., certain WWTPs (Owatonna WWTP, Northfield WWTP and Faribault WWTPs), stabilization ponds, pit dewatering quarries, contact cooling water discharges for industrial facilities, non-contact cooling water discharges for industrial facilities, etc.) in Section 4.2.3.1 of the final TMDL document and in the footnotes of Appendix G. MPCA employed these TP WLA calculative strategies on a case-by-case basis, dependent on the facility type and discharge characteristics (e.g., the facility discharges to a stabilization pond). MPCA accounted for unique conditions applicable to each facility (e.g., stabilization ponds are only authorized to discharge March 1 to June 15 and September 15 to December 31, and outside of those time frames stabilization pond WLAs are set to 0 kg/day)[3] during its development of TP WLAs for facilities contributing to the Byllesby Lake TP TMDL.

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

CRW sediment (TSS) TMDLs: MPCA identified NPDES permitted facilities within the CRW and assigned those facilities a portion of the WLA (Table 8 of this Decision Document). The WLAs for each of these individual facilities were calculated based on the facility's wet weather design flow and the facility's permit limit (ex. 30 mg/L or 45 mg/L) (See Appendix H of the final TMDL document. MS4 allocations for the CRW TSS TMDLs were calculated in the same manner as the MS4 allocations for the CRW bacteria, TP and nitrate TMDLs (i.e., see calculative method in ***Section 5 - CRW bacteria TMDLs***, within this Decision Document).

Similar to the TP TMDLs, MPCA calculated a portion of the WLA for construction and industrial stormwater for the sediment (TSS) TMDLs. This WLA was represented as a categorical WLA for construction 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. 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 TP TMDLs (i.e., see calculative method in ***Section 5 – CRW TP TMDLs***, within this decision document).

MPCA's expectations and responsibilities for overseeing construction and industrial stormwater loads for the TP TMDLs are the same for the sediment 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

[3] Appendix G, page 242 of the final TMDL document.

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.

CRW chloride TMDLs: MPCA identified one NPDES permitted facility (Lonsdale WWTP) within watershed for the Unnamed Ditch (07040002-555) which received a WLA for the chloride TMDL. MPCA calculated a WLA for this facility based on the facility's wet weather design flow and the chloride TMDL target concentration (230 mg/L) (Table 9 of this Decision Document).

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

CRW nitrate TMDLs: MPCA identified one NPDES permitted facility in the CRW which was contributing to a nitrate impaired segment (Nerstrand WWTP, MN0065668) and assigned this facility a portion of the WLA (Table 10 of this Decision Document). The WLA for the Nerstrand WWTP was calculated based on the facility's wet weather design flow and the nitrate target (10 mg/L).

MS4 allocations for the CRW nitrate TMDLs were calculated in the same manner as the MS4 allocations for the CRW bacteria, TP and TSS TMDLs (i.e., see calculative method in ***Section 5 - CRW bacteria TMDLs***, within this Decision Document).

Similar to the TP and TSS TMDLs, MPCA calculated a portion of the WLA for construction and industrial stormwater for the nitrate TMDLs. This WLA was represented as a categorical WLA for construction 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. The construction and industrial stormwater allocations for the CRW nitrate TMDLs were calculated in the same manner as the construction and industrial stormwater allocations for the CRW TP TMDLs (i.e., see calculative method in ***Section 5 – CRW TP TMDLs***, within this decision document).

MPCA's expectations and responsibilities for overseeing construction and industrial stormwater loads for the nitrate TMDLs are the same for the TP and 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 nitrate 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 nitrate TMDLs to be reasonable and consistent with EPA guidance.

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

6. Margin of Safety (MOS)

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

Comment:
The final TMDL submittal outlines the determination of the Margin of Safety for the bacteria, nutrient, sediment (TSS), chloride and nitrate TMDLs. All five parameters employed an explicit MOS set at 10% of the loading capacity.

CRW bacteria, phosphorus, sediment (TSS), chloride and nitrate TMDLs: The CRW TMDLs incorporated a 10% explicit MOS applied to the total loading capacity calculation for each flow regime of the LDC. Ten percent of the total loading capacity was reserved for MOS with the remaining load allocated to point and nonpoint sources (Tables 5, 6, 7, 8, 9 and 10 of this Decision Document). MPCA explained that the explicit MOS was set at 10% due to the following factors discovered during TMDL development for these pollutants:

- Environmental variability in pollutant loading;
- Variability in water quality data (i.e., collected water quality monitoring data, field sampling error, etc.);
- Calibration and validation processes of LDC modeling efforts, uncertainty in modeling outputs, and conservative assumptions made during the modeling efforts;
- Conservative assumptions made during the modeling efforts; and
- MPCA's confidence in the BATHTUB model's performance during the development of TP TMDLs.

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.

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

7. Seasonal Variation

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

Comment:

CRW bacteria TMDLs: Bacterial loads vary by season, typically reaching higher numbers in the dry summer months when low flows and bacterial growth rates contribute to their abundance, and reaching relatively lower values in colder months when bacterial growth rates attenuate and loading events, driven by stormwater runoff events aren't as frequent. Bacterial WQS need to be met between April 1st to October 31st, regardless of the flow condition. The development of the LDCs utilized simulated 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).

CRW phosphorus TMDLs: Seasonal variation was considered for the CRW TP TMDLs as described in Section 4.2.5 of the final TMDL document. The nutrient targets employed in the CRW TP TMDLs were based on the average nutrient values collected during the growing season (June 1 to September 30). The water quality targets were designed to meet the NCHF and WCBP eutrophication WQS during the period of the year where the frequency and severity of algal growth is the greatest.

The Minnesota eutrophication standards state that total phosphorus WQS are defined as the mean concentration of phosphorus values measured during the growing season. In the CRW 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-late summer time period is typically when eutrophication standards are exceeded and water quality within the CRW is deficient. By calibrating the modeling efforts to protect these water bodies during the worst water quality conditions of the year, it is assumed that the loading capacities established by the TMDLs will be protective of water quality during the remainder of the calendar year (October through May).

CRW sediment (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 4.6.5 of the final TMDL document). 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 seasons 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.

CRW chloride TMDL: MPCA explained that the CRW chloride TMDL considered chloride sources across all seasons since chloride is added to the system on a seasonal basis as well as an annual basis. Spring snowmelt and subsequent runoff contribute chloride to local waterbodies during the spring time period, summer storms may contribute chlorides via stormwater runoff and continuous year-round sources of chloride are present in the CRW due to contributions from WWTPs and water softening systems in areas which are not tied into municipal sanitary sewer systems. Chloride loadings to streams vary seasonally. Stream water quality responds to loadings on a seasonal basis and the highest chloride concentrations tend to occur during the spring snowmelt.

CRW nitrate TMDLs: Critical conditions which may impact nitrate's introduction to surface water are likely very similar to sediment in that these conditions are influences by precipitation events. Nitrate and manure fertilizer application to agricultural areas in the CRW can introduce nitrate concentrations to local surface waters during precipitation events. Critical conditions that impact loading, or the rate that nitrate 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, nutrient, sediment (TSS), chloride and nitrate TMDLs provide reasonable assurance that actions identified in the implementation section of the final TMDL (i.e., Sections 6 and 8 of the final TMDL document), will be applied to attain the loading capacities and allocations calculated for the impaired reaches within the CRW. The recommendations made by MPCA will be successful at improving water quality if the appropriate local groups work to implement these recommendations. Those mitigation suggestions, which fall outside of regulatory authority, will require commitment from state agencies and local stakeholders to carry out the suggested actions.

MPCA has identified several local partners which have expressed interest in working to improve water quality within the CRW. Implementation practices will be implemented over the next several years. It is anticipated that staff from Soil and Water Conservation District (SWCDs) (e.g., the Dakota County SWCD) staff, local Minnesota Board of Soil and Water Resources (BWSR) offices, and other local watershed groups (e.g., the Cannon River Watershed Partnership (CRWP)), will work together to reduce pollutant inputs to the CRW. MPCA has authored a Cannon River WRAPS document (October 2016) which 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.[4]

The CRWP is a committed local group in the CRW which aims to take action to improve water quality in the CRW and bring local water issues to the forefront of discussion at the local government and community levels. The CRWP has outreach programs for working with farmers to establish cover crops

[4] Cannon River WRAPS document (October 2016), page 8.

and improve overall soil health. The CRWP has other efforts which are targeted at connecting properties, which are currently serviced by septic systems, to municipal sewage treatment systems. The CRWP assists community members to explore options, pursue funding, navigate local and state rules, and offers financial assistance to partners to help keep projects moving forward.

There are various county water plans (e.g., Goodhue County, Le Sueur County, Rice County, Northern Dakota County, Steele County, Waseca County)[5] which exist in the CRW. These plans have been authored over the past 10 years and are specifically focused on county level water challenges (e.g., reducing priority pollutants (bacteria and nutrients), septic system improvements, working with local agricultural partners on feedlot maintenance, erosion and runoff minimization, etc.). The water plans are grounded on sound hydrologic management practices, environmental protection efforts and efficient management practices. These water plans demonstrate that at the county level there is great interest in improving water quality and restoring impaired waterbodies as well as protecting waters which are threatened with potential further degradation. Between the county level water plans and planning efforts of local county SWCDs, EPA acknowledges that there is significant local interest in preserving and restoring water quality in the CRW.

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, sediment, chloride and nitrate loading into the surface waters of the watershed. Local watershed managers would be able to reflect on the progress of the various pollutant removal strategies and would have the opportunity to change course if observed progress is unsatisfactory.

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

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

[5] Cannon River Watershed Partnership website, http://crwp.net/library/plans/

MPCA is responsible for applying federal and state regulations to protect and enhance water quality within the TMDL study area. MPCA oversees all regulated MS4 entities (ex. City of Waseca) in stormwater management accounting activities. MS4 permits require permittees to implement BMPs to reduce pollutants in stormwater runoff to the Maximum Extent Practicable (MEP).

All regulated MS4 communities are required to satisfy the requirements of the MS4 general permit which requires the permittee to develop a SWPPP which addresses all permit requirements, including the following six minimum control measures:

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

The MS4 General Permit, which became effective August 1, 2013, requires permittees to develop compliance schedules for any TMDL that received U.S. EPA-approval prior to the effective date of the General Permit. This schedule must identify BMPs that will be implemented over the five-year permit term, timelines for their implementation, an assessment of progress, and a long term strategy for continued progress toward ultimately achieving those WLAs. Because this TMDL will be approved after the effective date of the General Permit, MS4s will not be required to report on WLAs contained in this TMDL until the effective date of the next General Permit, expected in 2018.

MPCA requires MS4 applicants to submit their application materials and SWPPP documentation to MPCA for review. Prior to extension of coverage under the general permit, all application materials are placed on 30-day public notice by the MPCA, to ensure adequate opportunity for the public to comment on each permittee's stormwater management program. Upon extension of coverage by the MPCA, the permittees are to implement the activities described within their SWPPP, and submit annual reports to MPCA by June 30 of each year. These reports document the implementation activities which have been completed within the previous year, analyze implementation activities already undertaken, and outline any changes within the SWPPP from the previous year.

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 (Section 7 of the final TMDL document). 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., the Dakota County SWCD, LeSueur County SWCD and Waseca County SWCD) 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.

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

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

The EPA finds that this criterion has been adequately addressed.

10. Implementation

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

Comment:
The findings from the CRW TMDLs will be used to inform the selection of implementation activities as part of the Cannon River watershed WRAPS process. The purpose of the WRAPS report is to support local working groups and jointly develop scientifically-supported restoration and protection strategies to be used for subsequent implementation planning.

The TMDL outlined some implementation strategies in Section 8 of the final TMDL document. MPCA outlined the importance of prioritizing areas within the CRW, education and outreach efforts with local partners, and partnering with local stakeholders to improve water quality within the watershed. The CRW WRAPS document includes additional detail regarding specific recommendations from MPCA to aid in the reduction of bacteria, nutrients, sediment (TSS), chloride and nitrate to surface waters of the CRW. Additionally, MPCA referenced the Statewide Nutrient Reduction Strategy (https://www.pca.state.mn.us/water/nutrient-reduction-strategy) for focused implementation efforts targeting phosphorus and nitrate nonpoint sources in CRW. The reduction goals for the bacteria, nutrient, sediment (TSS), chloride and nitrate TMDLs may be met via components of the following strategies:

CRW bacteria TMDLs:

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

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

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

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

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

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

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

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

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

CRW phosphorus TMDLs:

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

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

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

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

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

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

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

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

CRW sediment (TSS) TMDLs:

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

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

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

CRW chloride TMDLs:
MPCA explained in its Cannon River WRAPs document[6] that its implementation efforts for addressing the chloride TMDL (segment 07040002-555) would focus on attaining the WLA assigned to Lonsdale WWTP (MN0031241). MPCA did not include other proposed implementation actions to address chloride inputs to this segment.

CRW nitrate TMDLs:
Septic Field Maintenance: Septic systems are believed to be a source of nitrate 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 nitrates inputs into the CRW.

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

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

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)).

[6] Cannon River WRAPS document, October 2016, Table 19 – Strategies and Actions Proposed for the Middle Cannon River Watershed.

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

Comment:
The public participation section of the TMDL submittal is found in Section 9 of the final TMDL document. Throughout the development of the CRW TMDLs the public was given various opportunities to participate. As part of the strategy to communicate the goals of the TMDL project and to engage with members of the public, MPCA formed various technical committees to discuss goals of the TMDL, strategies and approaches to reducing pollutant inputs to waters in the CRW and ongoing and future implementation efforts in the CRW. A full description of civic engagement activities associated with the TMDL process is available within in the CRW WRAPS report.

MPCA posted the draft TMDL online at (http://www.pca.state.mn.us/water/tmdl) for a public comment period. The 30-day public comment period was started on May 23, 2016 and ended on June 23, 2016. MPCA received eight public comments during the public comment period.

Samantha Kaster of Mathy Construction Company requested that MPCA update its reference to Mathy Construction-Aggregate (MNG490081) within the TMDL document. Ms. Kaster requested that MPCA update the Mathy Construction-Aggregate name to Milestone Materials Spinler Quarry (Spinler Quarry). Ms. Kaster also provided a revised design flow value for the facility and asked that the revised flow be used in the calculation of the WLA assigned to Spinler Quarry. MPCA agreed to the requested changes and updated the final CRW TMDL appropriately.

Travis Block of the City of Faribault asked whether the City of Faribault could increase its allocated WLA in the Byllesby Lake TP TMDL since the City recently accepted additional sewage from the previously unsewered Roberds Lake service district. Mr. Block explained that the City's connection to the Roberds Lake service district had eliminated the septic systems on the properties in the service district and therefore, had increased the overall influent to the City's water treatment facility. MPCA acknowledged this request and indicated that a portion of the reserve capacity (119 kg/yr) would be set aside for the City of Faribault and that this reserve capacity could be considered in the City of Faribault's next permit reissuance.

Jeff Weiss of the Minnesota Department of Natural Resources (MDNR) submitted comments on the TMDL and the WRAPS documents. Mr. Weiss requested that MPCA clarify information within the draft TMDL document related to highlighting segments sampled and addressed in the CRW TMDLs against segments which were not sampled or assessed, improving MPCA's discussion of littoral area and light penetration in lake systems, to improving MPCA's chloride source discussion, adding description on MPCA's discussion of internal loading and the effect of anoxic conditions on releasing TP from lake sediments, adding description of which state agencies are responsible for oversight of smaller feedlots and more in depth discussion of bacteria sources. MPCA answered each of Mr. Weiss's questions and updated the final CRW TMDL appropriately.

Robert Brown of Bolton & Menk, Inc., on behalf of Faribault Foods (MN0050491), requested that MPCA reconsider its proposed phosphorus effluent limit (0.09 mg/L) for the Faribault Foods facility.

MPCA acknowledged its proposed effluent limit in the draft TMDL was made in error and recalculated the WLA assigned to Faribault Foods. MPCA updated the final TMDL document accordingly.

Betsy Lawton, of the Minnesota Center for Environmental Advocacy (MCEA), submitted comments to MPCA on the CRW TMDL developmental efforts. MCEA highlighted a few different topics within the draft TMDL which it felt needed additional clarification. MCEA's nitrate comments focused on: the lack of TMDLs for all of the aquatic life impaired segments in the CRW and MPCA's failure to establish nitrate TMDLs to protect all designated uses in the CRW. MCEA's comments on point and nonpoint source loading in the CRW focused on whether MPCA had appropriately considered current loads from point sources and the location and magnitude of nonpoint source loads. MCEA's TSS and TP comments focused on: the calculation of WLAs assigned to facilities which are contributing to sediment and nutrient impaired segments, whether TMDLs will ultimately meet water quality standards and greater clarification on nonpoint source reductions and reasonable assurance that LA will be achievable. MPCA answered each of MCEA's comments in a letter dated October 12, 2016.

Nitrate comments from MCEA:
In its response to MCEA, MPCA explained that nitrate TMDLs for the CRW were developed for segments where there are promulgated nitrate WQS (i.e., the 10 mg/L drinking water standard). MPCA noted that there are currently no promulgated WQS addressing aquatic toxicity due to excessive nitrate/nitrogen for coldwater and warmwater stream environments. Therefore, until an aquatic life toxicity standard for nitrate/nitrogen is promulgated by the State, MPCA cannot propose TMDLs for coldwater and warmwater segments which have been identified by the State as being impaired due to excessive nitrate/nitrogen. MPCA communicated that it anticipates that the 2017 triennial standards review (TSR) will prioritize the development of a nitrate/nitrogen WQS to address aquatic toxicity.

MPCA provided references to the TMDL and WRAPS documents which outline MPCA discussions related to its efforts to characterize nitrate/nitrogen point and nonpoint source pollution in the CRW, hydrologic transport mechanisms in the CRW, surface and groundwater interactions in the CRW related to nitrogen mobility, and overall reduction goals for nitrate/nitrogen in the CRW (i.e., a 20% reduction by 2025). MPCA also referenced sections of the WRAPS document which describe example BMPs and suites of BMPs, which MPCA believes will help local entities attain the nitrate/nitrogen reduction goals of the TMDL and the watershed reduction goals of the WRAPS. Additionally, MPCA directed the commenter to portions of the WRAPS document which outlined nitrogen sources in the CRW, to maps in the WRAPS document which highlight subwatersheds in the CRW which disproportionately contribute nitrogen to the surface waters of the CRW and to tables which outline BMPs which MPCA advocates should be employed to reduce nitrogen inputs to the CRW. MPCA believes that nitrogen reduction efforts outlined in the WRAPS will have a positive impact water quality in the CRW, whether those impacts are directly tied to approved TMDL segments addressing nitrate drinking water impairments or nitrogen stressed coldwater and warmwater stream environments which do not have approvable TMDLs.

Point and nonpoint source load comments from MCEA:
EPA believes that MPCA presents an appropriate discussion of point and nonpoint sources in the TMDL and subsequent WRAPS document. MPCA discusses point and nonpoint sources within Section 3 of the TMDL and summarizes sources within the WRAPS document (Section 2 and Appendix E). MPCA also cites nitrate and TP source information which was presented in the Minnesota Nutrient Reduction

Strategy (September 2014) and incorporated into the CRW WRAPS document. MPCA responded to MCEA's comments on point and nonpoint source discussions by highlighting current source loading information and magnitude and location information which are referenced in the TMDL and nitrate/nitrogen source materials within the WRAPS document.

TSS and TP WLA comments from MCEA:
MPCA explained its approach to calculating WLAs within the CRW TMDL document and answered specific questions in its response to MCEA's comments. TSS and TP WLAs were based on the appropriate water quality standard 'target' value and the facility's design flow. The WLA calculation (i.e., water quality standard multiplied by the design flow) is a starting point for determining the maximum amount which a facility can discharge under variable flow conditions. MPCA explained that the calculated WLA and TMDL does not 'authorize' a permittee to increase its discharge from its facility and does not authorize the permittee to discharge above its current permit limit. EPA supports this approach for calculating WLA for permitted facilities. MPCA indicated that for permitted facilities in the CRW, individual facility permit limits are more stringent than water quality standards applied to downstream waters. Therefore, assuming that the facility is in compliance with the discharge limits of its NPDES permit, the facility will not cause nor contribute an impairment downstream of its effluent discharge. MPCA NPDES permit writers are expected to translate WLAs to NPDES permit limits which are consistent with the assumptions and requirements of the TMDL (See 40 CFR § 122.44(d)(1)(vii)(B)).

TSS and TP nonpoint source load reduction comments from MCEA:
MPCA referenced implementation tables in the WRAPS document which outline proposed suites of BMPs and actions which it believes will cumulatively result in attainment of nonpoint source reductions necessary to attain the reductions called for the TMDL. EPA believes that the detail provided in the WRAPS document is a sound starting point for providing a focused, comprehensive implementation plan on the watershed scale. Subsequent work in the watershed by the Minnesota Board of Water and Soil Resource (BWSR) to further refine implementation on the local level via its One Watershed, One Plan (1W1P) document should also serve to enhance implementation discussions included in the WRAPS document.

Reasonable Assurance comments from MCEA:
MPCA addressed reasonable assurance topics in Sections 6 and 8 of the final TMDL document. Also, MPCA has included further discussion of specific BMPs to target point and nonpoint sources of bacteria, TP, sediment (TSS), chloride and nitrate in its WRAPS document (October 2016). EPA notes that MPCA has a process in place which supplements the reasonable assurance and implementation discussions of the TMDL with an MPCA-authored WRAPS document and BWSR-authored 1W1P document. These documents will provide additional specific detail regarding ongoing and planned implementation efforts within the CRW. Specifically, the WRAPS document will include a summary of current conditions, sources, goals, timelines, milestones, responsible parties for implementation efforts, and will describe restoration and protection strategies. EPA understands that the 1W1P document will continue to build off of the TMDL and WRAPS documents and provide a focused, comprehensive implementation plan on the watershed scale.[7]

[7] Minnesota Board of Water & Soil Resources webpage - http://www.bwsr.state.mn.us/planning/1W1P/index.html

Additional detail on these issues is provided in MPCA's October 12, 2016 response to MCEA's comments. EPA believes that MPCA adequately addressed the comments received from MCEA during the public notice period and where necessary updated the final TMDL document in response to those comments.

In an August 11, 2016 letter[8] to EPA, MCEA requested that EPA review MPCA's responses to MCEA's comments from the public notice period, and require MPCA to correct deficiencies identified by MCEA in the final draft of the CRW TMDL. MCEA reiterated some of the same comments it had submitted to MPCA during the public notice period. EPA reviewed MPCA's responses to MCEA's comments from the public notice period and determined that MPCA's assumptions and rationale for calculating the CRW TMDLs, especially WLAs and LAs, were consistent with EPA expectations of an approvable TMDL.

Two commenters, Cathy Larson and Heidi Peterson of the Minnesota Department of Agriculture, provided comments on the details within MPCA's CRW WRAPS document. MPCA answered each of these comments and revised the CRW WRAPS document accordingly. Additionally, Kristi Pursell submitted a comment which expressed appreciation for the detail included in the CRW WRAPS document.

EPA believes that MPCA adequately addressed the comments received during the public notice period and where necessary updated the final TMDL and WRAPS documents in response to those comments. All public comments and MPCA responses to publically 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 Cannon River watershed TMDL document, submittal letter and accompanying documentation from MPCA on November 7, 2016. The transmittal letter explicitly stated that the final TMDLs referenced in Table 1 of this Decision Document were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval.

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[8] MCEA letter to Dave Werbach, U.S. EPA R5, *Re: Draft Root River and Cannon River Watershed TMDLs*, August 11, 2016.

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 Cannon 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 29 bacteria TMDLs, the 30 TP TMDLs, the 14 sediment (TSS) TMDLs, the 1 chloride TMDL and the 5 nitrate TMDLs satisfy all elements for approvable TMDLs. This TMDL approval is for **seventy-nine TMDLs**, addressing segments for aquatic recreational, aquatic life and drinking water use impairments (Table 1 of this Decision Document).

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

ATTACHMENTS

Attachment #1: **Table 5: Bacteria (*E. coli*) TMDLs for the Cannon River Watershed**

Attachment #2: **Table 6: Total Phosphorus TMDLs for the Cannon River Watershed**

Attachment #3: **Table 7: Total Phosphorus TMDLs for the Lake Byllesby**

Attachment #4: **Table 8: Total Suspended Solid (TSS) TMDLs for the Cannon River Watershed**

Attachment #5: **Table 9: Chloride TMDL for the Cannon River Watershed**

Attachment #6: **Table 10: Nitrate TMDLs for the Cannon River Watershed**

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Table 5: Bacteria (*E. coli*) TMDLs for the Cannon River Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		E. coli (billions of bacteria/day)				
TMDL for Belle Creek (07040002-734)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	599.60	136.04	84.16	64.92	41.54
Margin Of Safety (10%)		66.62	15.12	9.35	7.21	4.62
	Loading Capacity (TMDL)	**666.22**	**151.16**	**93.51**	**72.13**	**46.16**
TMDL for Belle Creek (07040002-735)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	539.45	120.92	74.98	57.66	37.64
Margin Of Safety (10%)		59.94	13.44	8.33	6.41	4.18
	Loading Capacity (TMDL)	**599.39**	**134.36**	**83.31**	**64.07**	**41.82**
TMDL for Unnamed Creek (07040002-699)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	100.23	22.74	14.41	11.16	7.16
Margin Of Safety (10%)		11.14	2.53	1.60	1.24	0.80
	Loading Capacity (TMDL)	**111.37**	**25.27**	**16.01**	**12.40**	**7.96**
TMDL for Mud Creek (07040002-558)						
Wasteload Allocation	Northfield MS4 (MS400271)	3.38	0.90	0.49	0.29	0.17
	WLA Totals	3.38	0.90	0.49	0.29	0.17
Load Allocation	Watershed Load	56.75	15.05	8.21	4.94	2.92
	LA Totals	56.75	15.05	8.21	4.94	2.92
Margin Of Safety (10%)		6.68	1.77	0.97	0.58	0.34
	Loading Capacity (TMDL)	**66.81**	**17.72**	**9.67**	**5.81**	**3.43**
TMDL for Chub Creek (07040002-566)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00

Load Allocation	Watershed load	109.40	30.12	19.34	12.68	8.27
Margin Of Safety (10%)		12.16	3.35	2.15	1.41	0.92
Loading Capacity (TMDL)		**121.56**	**33.47**	**21.49**	**14.09**	**9.19**
TMDL for Little Cannon River (07040002-526)						
Wasteload Allocation	Nerstrand WWTP (MN0065668)	0.20	0.20	0.20	0.20	0.20
	WLA Totals	0.20	0.20	0.20	0.20	0.20
Load Allocation	Watershed load	639.30	165.37	98.24	74.36	52.83
	LA Totals	639.30	165.37	98.24	74.36	52.83
Margin Of Safety (10%)		71.06	18.40	10.94	8.28	5.89
Loading Capacity (TMDL)		**710.56**	**183.97**	**109.38**	**82.84**	**58.92**
TMDL for Little Cannon River (07040002-589)						
Wasteload Allocation	Nerstrand WWTP (MN0065668)	0.20	0.20	0.20	0.20	0.20
	WLA Totals	0.20	0.20	0.20	0.20	0.20
Load Allocation	Watershed load	369.20	97.91	58.28	43.19	30.62
Margin Of Safety (10%)		41.04	10.90	6.50	4.82	3.42
Loading Capacity (TMDL)		**410.44**	**109.01**	**64.98**	**48.21**	**34.24**
TMDL for Butler Creek (07040002-590)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	67.82	16.98	10.96	8.84	5.42
Margin Of Safety (10%)		7.54	1.89	1.22	0.98	0.60
Loading Capacity (TMDL)		**75.36**	**18.87**	**12.18**	**9.82**	**6.02**
TMDL for Lower Cannon River (07040002-501)						
Wasteload Allocation	Cannon Falls WWTP (MN0022993)	4.388	4.388	4.388	4.388	4.388
	Dennison WWTP (MN0022195)	1.240	1.240	1.240	1.240	1.240
	Ellendale WWTP (MNG580014)	6.057	6.057	6.057	6.057	6.057
	Elysian WWTP (MN0041114)	6.487	6.487	6.487	6.487	6.487
	Faribault WWTP (MN0030121)	33.387	33.387	33.387	33.387	33.387
	Geneva WWTP (MN0021008)	3.100	3.100	3.100	3.100	3.100
	Hope-Somerset Township WWTP (MN0068802)	0.049	0.049	0.049	0.049	0.049
	Kilkenny WWTP (MNG580084)	1.512	1.512	1.512	1.512	1.512
	Lonsdale WWTP (MN0031241)	3.277	3.277	3.277	3.277	3.277
	Medford WWTP (MN0024112)	0.668	0.668	0.668	0.668	0.668
	Meriden Township WWTP (MN0068713)	0.978	0.978	0.978	0.978	0.978
	MNDOT - Heath Creek Rest Area (MN0069639)	0.215	0.215	0.215	0.215	0.215

	MNDOT Straight River Rest Area (MN0049514)	0.434	0.434	0.434	0.434	0.434
	Morristown WWTP (MN0025895)	1.002	1.002	1.002	1.002	1.002
	Nerstrand WWTP (MN0065668)	0.200	0.200	0.200	0.200	0.200
	Northfield WWTP (MN0024368)	24.802	24.802	24.802	24.802	24.802
	Owatonna WWTP (MN0051284)	23.848	23.848	23.848	23.848	23.848
	Waterville WWTP (MN0025208)	2.838	2.838	2.838	2.838	2.838
	Faribault MS4 (MS400233)	92.35	28.74	15.88	9.26	5.04
	Northfield MS4 (MS400271)	52.05	16.20	8.95	5.22	2.84
	Owatonna MS4 (MS400244)	86.48	26.91	14.87	8.67	4.72
	Red Wing MS4 (MS400235)	44.50	13.85	7.65	4.46	2.43
	Waseca MS4 (MS400258)	25.19	7.84	4.33	2.52	1.38
	WLA Totals	415.05	208.02	166.16	144.61	130.89
Load Allocation	Watershed Load	8095.17	2518.77	1392.18	811.53	441.99
	LA Totals	8095.17	2518.77	1392.18	811.53	441.99
Margin Of Safety (10%)		945.58	302.97	173.15	106.24	63.65
Loading Capacity (TMDL)		**9455.80**	**3029.76**	**1731.49**	**1062.38**	**636.53**
TMDL for Spring Creek (07040002-569)						
Wasteload Allocation	Red Wing MS4 (MS400235)	22.04	5.93	4.01	3.13	2.30
Load Allocation	Watershed load	103.06	27.71	18.74	14.64	10.75
Margin Of Safety (10%)		13.90	3.74	2.53	1.97	1.45
Loading Capacity (TMDL)		**139.00**	**37.38**	**25.28**	**19.74**	**14.50**
TMDL for Cannon River (07040002-507)						
Wasteload Allocation	Ellendale WWTP (MNG580014)	6.057	6.057	6.057	6.057	6.057
	Elysian WWTP (MN0041114)	6.487	6.487	6.487	6.487	6.487
	Faribault WWTP (MN0030121)	33.387	33.387	33.387	33.387	33.387
	Geneva WWTP (MN0021008)	3.100	3.100	3.100	3.100	3.100
	Hope-Somerset Township WWTP (MN0068802)	0.049	0.049	0.049	0.049	0.049
	Kilkenny WWTP (MNG580084)	1.512	1.512	1.512	1.512	1.512
	Medford WWTP (MN0024112)	0.668	0.668	0.668	0.668	0.668
	Meriden Township WWTP (MN0068713)	0.978	0.978	0.978	0.978	0.978
	MNDOT Straight River Rest Area (MN0049514)	0.434	0.434	0.434	0.434	0.434
	Morristown WWTP (MN0025895)	1.002	1.002	1.002	1.002	1.002
	Owatonna WWTP (MN0051284)	23.848	23.848	23.848	23.848	23.848

	Waterville WWTP (MN0025208)	2.838	2.838	2.838	2.838	2.838
	Faribault MS4 (MS400233)	95.45	29.16	14.90	8.11	3.35
	Northfield MS4 (MS400271)	5.30	1.62	0.83	0.45	0.19
	Owatonna MS4 (MS400244)	89.62	27.38	13.99	7.61	3.14
	Waseca MS4 (MS400258)	26.52	8.10	4.14	2.25	0.93
	WLA Totals	297.25	146.62	114.22	98.78	87.97
Load Allocation	Watershed Load	5086.11	1553.86	793.94	431.90	178.34
	LA Totals	5086.11	1553.86	793.94	431.90	178.34
Margin Of Safety (10%)		598.15	188.94	100.91	58.96	29.59
Loading Capacity (TMDL)		**5981.51**	**1889.42**	**1009.07**	**589.64**	**295.90**
TMDL for Cannon River (07040002-508)						
Wasteload Allocation	Ellendale WWTP (MNG580014)	6.057	6.057	6.057	6.057	6.057
	Elysian WWTP (MN0041114)	6.487	6.487	6.487	6.487	6.487
	Faribault WWTP (MN0030121)	33.387	33.387	33.387	33.387	33.387
	Geneva WWTP (MN0021008)	3.100	3.100	3.100	3.100	3.100
	Hope-Somerset Township WWTP (MN0068802)	0.049	0.049	0.049	0.049	0.049
	Kilkenny WWTP (MNG580084)	1.512	1.512	1.512	1.512	1.512
	Lonsdale WWTP (MN0031241)	3.277	3.277	3.277	3.277	3.277
	Medford WWTP (MN0024112)	0.668	0.668	0.668	0.668	0.668
	Meriden Township WWTP (MN0068713)	0.978	0.978	0.978	0.978	0.978
	MNDOT - Heath Creek Rest Area (MN0069639)	0.215	0.215	0.215	0.215	0.215
	MNDOT Straight River Rest Area (MN0049514)	0.434	0.434	0.434	0.434	0.434
	Morristown WWTP (MN0025895)	1.002	1.002	1.002	1.002	1.002
	Owatonna WWTP (MN0051284)	23.848	23.848	23.848	23.848	23.848
	Waterville WWTP (MN0025208)	2.838	2.838	2.838	2.838	2.838
	Faribault MS4 (MS400233)	95.77	29.10	14.99	8.19	3.45
	Northfield MS4 (MS400271)	21.72	6.60	3.40	1.86	0.78
	Owatonna MS4 (MS400244)	89.65	27.24	14.04	7.66	3.23
	Waseca MS4 (MS400258)	26.73	8.12	4.18	2.28	0.96
	WLA Totals	317.72	154.91	120.46	103.84	92.27
Load Allocation	Watershed Load	5334.42	1620.67	835.16	455.99	192.25
	LA Totals	5334.42	1620.67	835.16	455.99	192.25
Margin Of Safety (10%)		628.01	197.29	106.18	62.20	31.61
Loading Capacity (TMDL)		**6280.15**	**1972.87**	**1061.80**	**622.03**	**316.13**

TMDL for Heath Creek (07040002-521)						
Wasteload Allocation	Lonsdale WWTP (MN0031241)	3.277	3.277	3.277	3.277	3.277
	MNDOT - Heath Creek Rest Area (MN0069639)	0.215	0.215	0.215	0.215	0.215
	Northfield MS4 (MS400271)	3.120	0.840	0.460	0.290	0.160
	WLA Totals	6.61	4.33	3.95	3.78	3.65
Load Allocation	Watershed load	228.91	61.80	33.86	21.35	11.92
	LA Totals	228.91	61.80	33.86	21.35	11.92
Margin Of Safety (10%)		26.17	7.35	4.20	2.79	1.73
Loading Capacity (TMDL)		**261.69**	**73.48**	**42.01**	**27.92**	**17.30**
TMDL for Wolf Creek (07040002-522)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	249.62	70.80	35.49	19.96	5.25
Margin Of Safety (10%)		27.74	7.87	3.94	2.22	0.58
Loading Capacity (TMDL)		**277.36**	**78.67**	**39.43**	**22.18**	**5.83**
TMDL for Spring Brook (07040002-557)						
Wasteload Allocation	Northfield MS4 (MS400271)	0.08	0.02	0.01	0.01	0.00
Load Allocation	Watershed load	36.97	10.13	5.63	3.47	2.04
Margin Of Safety (10%)		4.12	1.13	0.63	0.39	0.23
Loading Capacity (TMDL)		**41.17**	**11.28**	**6.27**	**3.87**	**2.27**
TMDL for Spring Brook (07040002-562)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	23.80	6.37	3.37	1.89	1.06
Margin Of Safety (10%)		2.64	0.71	0.37	0.21	0.12
Loading Capacity (TMDL)		**26.44**	**7.08**	**3.74**	**2.10**	**1.18**
TMDL for Cannon River (07040002-581)						
Wasteload Allocation	Ellendale WWTP (MNG580014)	6.057	6.057	6.057	6.057	6.057
	Elysian WWTP (MN0041114)	6.487	6.487	6.487	6.487	6.487
	Faribault WWTP (MN0030121)	33.387	33.387	33.387	33.387	33.387
	Geneva WWTP (MN0021008)	3.100	3.100	3.100	3.100	3.100
	Hope-Somerset Township WWTP (MN0068802)	0.049	0.049	0.049	0.049	0.049
	Kilkenny WWTP (MNG580084)	1.512	1.512	1.512	1.512	1.512
	Medford WWTP (MN0024112)	0.668	0.668	0.668	0.668	0.668
	Meriden Township WWTP (MN0068713)	0.978	0.978	0.978	0.978	0.978
	MNDOT Straight River Rest Area (MN0049514)	0.434	0.434	0.434	0.434	0.434
	Morristown WWTP (MN0025895)	1.002	1.002	1.002	1.002	1.002

	Owatonna WWTP (MN0051284)	23.848	23.848	23.848	23.848	23.848
	Waterville WWTP (MN0025208)	2.838	2.838	2.838	2.838	2.838
	Faribault MS4 (MS400233)	80.15	24.85	12.62	6.72	2.67
	Owatonna MS4 (MS400244)	88.64	27.48	13.96	7.43	2.96
	Waseca MS4 (MS400258)	25.93	8.04	4.08	2.17	0.87
	WLA Totals	275.08	140.73	111.02	96.68	86.86
Load Allocation	Watershed Load	4520.03	1401.41	711.93	378.73	150.79
	LA Totals	4520.03	1401.41	711.93	378.73	150.79
Margin Of Safety (10%)		532.79	171.35	91.44	52.82	26.41
Loading Capacity (TMDL)		**5327.90**	**1713.49**	**914.39**	**528.23**	**264.06**
TMDL for Cannon River (07040002-582)						
Wasteload Allocation	Ellendale WWTP (MNG580014)	6.057	6.057	6.057	6.057	6.057
	Elysian WWTP (MN0041114)	6.487	6.487	6.487	6.487	6.487
	Faribault WWTP (MN0030121)	33.387	33.387	33.387	33.387	33.387
	Geneva WWTP (MN0021008)	3.100	3.100	3.100	3.100	3.100
	Hope-Somerset Township WWTP (MN0068802)	0.049	0.049	0.049	0.049	0.049
	Kilkenny WWTP (MNG580084)	1.512	1.512	1.512	1.512	1.512
	Medford WWTP (MN0024112)	0.668	0.668	0.668	0.668	0.668
	Meriden Township WWTP (MN0068713)	0.978	0.978	0.978	0.978	0.978
	MNDOT Straight River Rest Area (MN0049514)	0.434	0.434	0.434	0.434	0.434
	Morristown WWTP (MN0025895)	1.002	1.002	1.002	1.002	1.002
	Owatonna WWTP (MN0051284)	23.848	23.848	23.848	23.848	23.848
	Waterville WWTP (MN0025208)	2.838	2.838	2.838	2.838	2.838
	Faribault MS4 (MS400233)	95.07	29.34	14.99	8.07	3.29
	Owatonna MS4 (MS400244)	89.13	27.51	14.05	7.57	3.08
	Waseca MS4 (MS400258)	26.24	8.10	4.14	2.23	0.91
	WLA Totals	290.80	145.31	113.54	98.23	87.64
Load Allocation	Watershed Load	4741.15	1463.28	747.58	402.47	163.92
	LA Totals	4741.15	1463.28	747.58	402.47	163.92
Margin Of Safety (10%)		559.11	178.73	95.68	55.63	27.95
Loading Capacity (TMDL)		**5591.06**	**1787.32**	**956.80**	**556.33**	**279.51**
TMDL for Unnamed Creek (07040002-703)						
Wasteload Allocation	Faribault MS4 (MS400233)	12.94	3.45	1.85	1.21	0.72
Load Allocation	Watershed load	44.64	11.90	6.37	4.18	2.50
Margin Of Safety (10%)		6.40	1.71	0.91	0.60	0.36

	Loading Capacity (TMDL)	**63.98**	**17.06**	**9.13**	**5.99**	**3.58**
TMDL for Falls Creek (07040002-704)						
Wasteload Allocation	Faribault MS4 (MS400233)	1.66	0.45	0.24	0.13	0.07
Load Allocation	Watershed load	84.86	22.89	11.99	6.67	3.55
Margin Of Safety (10%)		9.61	2.59	1.36	0.76	0.40
	Loading Capacity (TMDL)	**96.13**	**25.93**	**13.59**	**7.56**	**4.02**
TMDL for Cannon River (07040002-540)						
Wasteload Allocation	Elysian WWTP (MN0041114)	6.487	6.487	6.487	6.487	6.487
	Kilkenny WWTP (MNG580084)	1.512	1.512	1.512	1.512	1.512
	Morristown WWTP (MN0025895)	1.002	1.002	1.002	1.002	1.002
	Waterville WWTP (MN0025208)	2.838	2.838	2.838	2.838	2.838
	Faribault MS4 (MS400233)	28.52	28.52	28.52	28.52	28.52
	WLA Totals	40.36	40.36	40.36	40.36	40.36
Load Allocation	Watershed Load	1565.77	508.07	243.67	132.38	17.99
	LA Totals	1565.77	508.07	243.67	132.38	17.99
Margin Of Safety (10%)		178.46	60.94	31.56	19.19	6.48
	Loading Capacity (TMDL)	**1784.59**	**609.37**	**315.59**	**191.93**	**64.83**
TMDL for Cannon River (07040002-542)						
Wasteload Allocation	Elysian WWTP (MN0041114)	6.487	6.487	6.487	6.487	6.487
	Kilkenny WWTP (MNG580084)	1.512	1.512	1.512	1.512	1.512
	Morristown WWTP (MN0025895)	1.002	1.002	1.002	1.002	1.002
	Waterville WWTP (MN0025208)	2.838	2.838	2.838	2.838	2.838
	WLA Totals	11.84	11.84	11.84	11.84	11.84
Load Allocation	Watershed Load	1186.96	388.04	193.08	108.56	27.54
	LA Totals	1186.96	388.04	193.08	108.56	27.54
Margin Of Safety (10%)		133.20	44.43	22.77	13.38	4.38
	Loading Capacity (TMDL)	**1332.00**	**444.31**	**227.69**	**133.78**	**43.76**
TMDL for Waterville Creek (07040002-560)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	125.66	32.79	19.91	13.23	6.43
Margin Of Safety (10%)		13.96	3.64	2.21	1.47	0.71
	Loading Capacity (TMDL)	**139.62**	**36.43**	**22.12**	**14.70**	**7.14**
TMDL for MacKenzie Creek (07040002-576)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	164.60	43.99	23.04	12.92	6.76
Margin Of Safety (10%)		18.29	4.89	2.56	1.44	0.75
	Loading Capacity (TMDL)	**182.89**	**48.88**	**25.60**	**14.36**	**7.51**

TMDL for Devils Creek (07040002-577)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	104.94	34.05	18.54	9.39	4.82
Margin Of Safety (10%)		11.66	3.78	2.06	1.04	0.54
Loading Capacity (TMDL)		**116.60**	**37.83**	**20.60**	**10.43**	**5.36**
TMDL for County Ditch 63 (07040002-621)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	38.81	9.47	5.40	3.42	2.04
Margin Of Safety (10%)		4.31	1.05	0.60	0.38	0.23
Loading Capacity (TMDL)		**43.12**	**10.52**	**6.00**	**3.80**	**2.27**
TMDL for Unnamed Creek (07040002-702)						
Wasteload Allocation	Faribault MS4 (MS400233)	11.73	3.08	1.67	1.08	0.65
Load Allocation	Watershed load	60.86	15.96	8.65	5.60	3.35
Margin Of Safety (10%)		8.07	2.12	1.15	0.74	0.44
Loading Capacity (TMDL)		**80.66**	**21.16**	**11.47**	**7.42**	**4.44**
TMDL for Unnamed Creek (07040002-705)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	53.40	14.07	7.97	4.86	2.44
Margin Of Safety (10%)		5.93	1.56	0.89	0.54	0.27
Loading Capacity (TMDL)		**59.33**	**15.63**	**8.86**	**5.40**	**2.71**
TMDL for Whitewater Creek (07040002-706)						
Wasteload Allocation	NPDES permitted facilities	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed load	105.37	25.97	15.57	10.31	4.93
Margin Of Safety (10%)		11.71	2.89	1.73	1.15	0.55
Loading Capacity (TMDL)		**117.08**	**28.86**	**17.30**	**11.46**	**5.48**

Table 6: Total Phosphorus TMDLs for Cannon River Watershed

Allocation	**Source**	**Existing TP Load**		**TMDL**		**Load Reduction**	
		(kg/yr)	*(kg/day)*	*(kg/yr)*	*(kg/day)*	*(kg/yr)*	*(%)*
TMDL for Chub Lake (19-0020-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.25	0.0007	0.25	0.001	0.0	0%
	WLA Totals	***0.25***	***0.0007***	***0.25***	***0.001***	***0.0***	***0%***
Load Allocation	Watershed Load	764.03	2.0932	123.26	0.3377	640.8	84%
	LA Totals	***764.03***	***2.0932***	***123.26***	***0.338***	***640.8***	***84%***
Margin Of Safety (10%)		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**764.28**	**2.09**	**123.51**	**0.34**	**640.77**	**84%**

TMDL for Circle Lake (66-0027-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	2.78	0.0076	2.78	0.008	0.0	0%
	WLA Totals	***2.78***	***0.0076***	***2.78***	***0.008***	***0.0***	***0%***
Load Allocation	Watershed Load	15068.39	41.2833	1386.88	3.7997	13681.5	91%
	LA Totals	***15068.39***	***41.2833***	***1386.88***	***3.800***	***13681.5***	***91%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**15071.17**	**41.29**	**1389.66**	**3.81**	**13681.51**	**91%**
TMDL for Clear Lake (81-0014-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	1.23	0.0034	1.23	0.003	0.0	0%
	Waseca MS4 (MS400258)	399.20	1.0937	245.88	0.674	153.3	38%
	WLA Totals	***400.43***	***1.10***	***247.11***	***0.68***	***153.32***	***38%***
Load Allocation	Watershed Load	597.57	1.6372	367.59	1.0071	230.0	38%
	LA Totals	***597.57***	***1.6372***	***367.59***	***1.007***	***230.0***	***38%***
Margin Of Safety (10%)		--	--	68.30	0.19	--	--
Loading Capacity (TMDL)		**998.00**	**2.73**	**683.00**	**1.87**	**383.30**	**38%**
TMDL for Loon Lake (81-0015-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.20	0.0005	0.20	0.001	0.0	0%
	Waseca MS4 (MS400258)	338.52	0.9275	93.74	0.257	244.8	72%
	WLA Totals	***338.72***	***0.93***	***93.94***	***0.26***	***244.78***	***72%***
Load Allocation	Watershed Load	25.28	0.0693	6.85	0.0188	18.4	73%
	LA Totals	***25.28***	***0.0693***	***6.85***	***0.019***	***18.4***	***73%***
Margin Of Safety (10%)		--	--	11.20	0.03	--	--
Loading Capacity (TMDL)		**364.00**	**1.00**	**111.99**	**0.31**	**263.21**	**73%**
TMDL for Fox Lake (66-0029-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	1.48	0.0041	1.48	0.004	0.00	0%
	WLA Totals	***1.48***	***0.00***	***1.48***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	1777.77	4.8706	740.62	2.0291	1037.2	58%
	LA Totals	***1777.77***	***4.8706***	***740.62***	***2.029***	***1037.2***	***58%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**1779.25**	**4.87**	**742.10**	**2.03**	**1037.15**	**58%**
TMDL for Union Lake (66-0032-00)							

Wasteload Allocation	Lonsdale WWTP (MN0031241)	202.93	0.6600	285.00	2.910	--	--
	Sanders North - SD0012 (Millersburg S&G) (MNG490273)			75.93			
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	3.58	0.0100	3.58	0.010	0.0	0%
	WLA Totals	***206.51***	***0.67***	***364.51***	***2.92***	***0.00***	***0%***
Load Allocation	Watershed Load	18115.49	49.5000	1424.79	2.5200	16690.7	92%
	LA Totals	***18115.49***	***49.5000***	***1424.79***	***2.520***	***16690.7***	***92%***
Margin Of Safety		--*	--*	198.70	0.54	--*	--*
Loading Capacity (TMDL)		**18322.00**	**50.17**	**1988.00**	**5.98**	**16690.70**	**92%**

TMDL for Mazaska Lake (66-0039-00)

Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.89	0.0024	0.89	0.002	0.0	0%
	WLA Totals	***0.89***	***0.00***	***0.89***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	3580.44	9.80	443.42	1.21	3137.0	88%
	LA Totals	***3580.44***	***9.80***	***443.42***	***1.21***	***3137.0***	***88%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**3581.33**	**9.80**	**444.31**	**1.21**	**3137.02**	**88%**

TMDL for Horseshoe Lake (40-0001-00)

Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.88	0.0024	0.88	0.002	0.0	0%
	WLA Totals	***0.88***	***0.00***	***0.88***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	938.39	2.57	437.82	1.20	500.57	53%
	LA Totals	***938.39***	***2.57***	***437.82***	***1.20***	***500.57***	***53%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**939.27**	**2.57**	**438.70**	**1.20**	**500.57**	**53%**

TMDL for Upper Sakatah Lake (40-0002-00)

Wasteload Allocation	CenterPoint Energy WWTS (MN0041114)	232.00	0.6356	2.49	0.007	--	--
	Waterville WWTP (MN0025208)		0.0000	387.00	1.060		
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	16.06	0.0440	16.06	0.044	0.0	0%
	WLA Totals	***248.06***	***0.68***	***405.55***	***1.11***	***0.00***	***0%***
Load Allocation	Watershed Load	56587.94	154.93	7626.05	23.32	48961.89	87%
	LA Totals	***56587.94***	***154.93***	***7626.05***	***23.32***	***48961.89***	***87%***
Margin Of Safety		--*	--*	892.40	2.44	--*	--*

	Loading Capacity (TMDL)	**56836.00**	**155.61**	**8924.00**	**26.87**	**48961.89**	**87%**
TMDL for Sunfish Lake (40-0009-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.57	0.0016	0.57	0.002	0.0	0%
	WLA Totals	***0.57***	***0.00***	***0.57***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	840.38	2.3024	286.69	0.7855	553.7	66%
	LA Totals	***840.38***	***2.3024***	***286.69***	***0.785***	***553.7***	***66%***
	Margin Of Safety	--*	--*	--*	--*	--*	--*
	Loading Capacity (TMDL)	**840.95**	**2.30**	**287.26**	**0.79**	**553.69**	**66%**
TMDL for Dora Lake (40-0010-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	1.68	0.0046	1.68	0.005	0.0	0%
	WLA Totals	***1.68***	***0.00***	***1.68***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	9373.27	25.6802	839.69	2.3005	8533.6	91%
	LA Totals	***9373.27***	***25.6802***	***839.69***	***2.301***	***8533.6***	***91%***
	Margin Of Safety	--*	--*	--*	--*	--*	--*
	Loading Capacity (TMDL)	**9374.95**	**25.68**	**841.37**	**2.31**	**8533.58**	**91%**
TMDL for Mable Lake (40-0011-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.26	0.0007	0.26	0.001	0.0	0%
	WLA Totals	***0.26***	***0.00***	***0.26***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	367.87	1.0079	127.25	0.3486	240.6	65%
	LA Totals	***367.87***	***1.0079***	***127.25***	***0.349***	***240.6***	***65%***
	Margin Of Safety	--*	--*	--*	--*	--*	--*
	Loading Capacity (TMDL)	**368.13**	**1.01**	**127.51**	**0.35**	**240.62**	**65%**
TMDL for Sabre Lake (40-0014-00)							
Wasteload Allocation	Kilkenny WWTP (MNG580084)	31.00	0.0849	31.00	1.210	0.0	0%
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	4.61	0.0126	4.61	0.013	0.0	0%
	WLA Totals	***35.61***	***0.10***	***35.61***	***1.22***	***0.00***	***0%***
Load Allocation	Watershed Load	35441.24	95.91	2270.45	5.09	33170.8	94%
	LA Totals	***35441.24***	***95.91***	***2270.45***	***5.09***	***33170.8***	***94%***
	Margin Of Safety	--*	--*	--*	--*	--*	--*
	Loading Capacity (TMDL)	**35476.85**	**96.01**	**2306.06**	**6.31**	**33170.79**	**94%**
TMDL for Tetonka Lake (40-0031-00)							

Wasteload Allocation	Elysian WWTP (MN0041114)	54.00	2.27	134.79	5.19	--	--
	Kilkenny WWTP (MNG580084)	31.00	1.21	31.00	1.21	0.0	0%
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	7.83	0.0215	7.83	0.021	0.0	0%
	WLA Totals	***92.83***	***3.50***	***173.62***	***6.42***	***0.00***	***0%***
Load Allocation	Watershed Load	82686.62	223.14	3739.38	4.30	78947.2	95%
	LA Totals	***82686.62***	***223.14***	***3739.38***	***4.30***	***78947.2***	***95%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**82779.45**	**226.64**	**3913.00**	**10.72**	**78947.24**	**95%**

TMDL for Gorman Lake (40-0032-00)

Wasteload Allocation	Kilkenny WWTP (MNG580084)	31.00	1.21	31.00	1.210	0.0	0%
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	3.52	0.0096	3.52	0.010	0.0	0%
	WLA Totals	***34.52***	***1.22***	***34.52***	***1.22***	***0.00***	***0%***
Load Allocation	Watershed Load	26994.30	72.78	1726.23	3.60	25268.07	94%
	LA Totals	***26994.30***	***72.78***	***1726.23***	***3.60***	***25268.07***	***94%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**27028.82**	**74.00**	**1760.75**	**4.82**	**25268.07**	**94%**

TMDL for Silver Lake (40-0048-00)

Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.02	0.0001	0.02	0.000	0.0	0%
	WLA Totals	***0.02***	***0.00***	***0.02***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	33.70	0.0923	12.18	0.0334	21.5	64%
	LA Totals	***33.70***	***0.0923***	***12.18***	***0.033***	***21.5***	***64%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**33.72**	**0.09**	**12.20**	**0.03**	**21.52**	**64%**

TMDL for Frances Lake (40-0057-00)

Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.98	0.0027	0.98	0.003	0.0	0%
	WLA Totals	***0.98***	***0.00***	***0.98***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	2279.84	6.2461	489.63	1.3415	1790.2	79%
	LA Totals	***2279.84***	***6.2461***	***489.63***	***1.341***	***1790.2***	***79%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**2280.82**	**6.25**	**490.61**	**1.34**	**1790.21**	**79%**

TMDL for Tustin Lake (40-0061-00)

Wasteload Allocation	Elysian WWTP (MN0041114)	54.00	2.27	134.79	5.19	--	--
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.36	0.0010	0.36	0.001	0.0	0%
	WLA Totals	***54.36***	***2.27***	***135.15***	***5.19***	***0.00***	***0%***
Load Allocation	Watershed Load	878.04	0.28	45.48	0.1200	832.6	95%
	LA Totals	***878.04***	***0.28***	***45.48***	***0.120***	***832.6***	***95%***
Margin Of Safety		--	--	20.07	0.05	--	--
Loading Capacity (TMDL)		**932.40**	**2.55**	**200.70**	**5.37**	**832.56**	**95%**
TMDL for Cannon Lake (66-0008-00)							
Wasteload Allocation	Elysian WWTP (MN0041114)	54.00	2.27	134.79	5.190	--	--
	Kilkenny WWTP (MNG580084)	31.00	1.21	31.00	1.210	0.0	0%
	CenterPoint Energy WWTS (MN0063967)	378.69	0.6400	2.49	0.007	--	--
	Morristown WWTP (MN0025895)		0.7900	145.00	0.783		
	Waterville WWTP (MN0025208)			387.00	1.060		
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	19.20	0.0526	19.20	0.053	0.0	0%
	WLA Totals	***482.89***	***4.96***	***719.48***	***8.30***	***0.00***	***0%***
Load Allocation	Watershed Load	78223.71	210.53	8883.00	17.99	69340.71	89%
	LA Totals	***78223.71***	***210.53***	***8883.00***	***17.99***	***69340.71***	***89%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**78706.60**	**215.49**	**9602.48**	**26.29**	**69340.71**	**89%**
TMDL for Wells Lake (66-0010-00)							
Wasteload Allocation	Elysian WWTP (MN0041114)	54.00	2.27	134.79	5.190	--	--
	Kilkenny WWTP (MNG580084)	31.00	1.21	31.00	1.210	0.0	0%
	CenterPoint Energy WWTS (MN0063967)	378.69	0.6400	2.49	0.007	--	--
	Morristown WWTP (MN0025895)		0.7900	145.00	0.783		
	Waterville WWTP (MN0025208)			387.00	1.060		
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	16.92	0.0464	16.92	0.046	0.0	0%
	WLA Totals	***480.61***	***4.96***	***717.20***	***8.30***	***0.00***	***0%***
Load Allocation	Watershed Load	59477.03	159.20	7743.07	14.86	51733.96	87%
	LA Totals	***59477.03***	***159.20***	***7743.07***	***14.86***	***51733.96***	***87%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**59957.64**	**164.16**	**8460.27**	**23.16**	**51733.96**	**87%**
TMDL for Roberds Lake (66-0018-00)							

Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.99	0.0027	0.99	0.003	0.0	0%
	WLA Totals	***0.99***	***0.00***	***0.99***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	9528.12	26.1044	495.72	1.3581	9032.4	95%
	LA Totals	***9528.12***	***26.1044***	***495.72***	***1.358***	***9032.4***	***95%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**9529.11**	**26.11**	**496.71**	**1.36**	**9032.40**	**95%**
TMDL for French Lake (66-0038-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	1.16	0.0032	1.16	0.003	0.0	0%
	WLA Totals	***1.16***	***0.00***	***1.16***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	7618.67	20.8731	579.03	1.5864	7039.6	92%
	LA Totals	***7618.67***	***20.8731***	***579.03***	***1.586***	***7039.6***	***92%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**7619.83**	**20.88**	**580.19**	**1.59**	**7039.64**	**92%**
TMDL for Lower Sakatah Lake (66-0044-00)							
Wasteload Allocation	CenterPoint Energy WWTS (MN0063967)	233.69	0.6402	2.49	0.007	--	--
	Waterville WWTP (MN0025208)		0.0000	387.00	1.060		
	Elysian WWTP (MN0041114)	54.00	2.27	134.79	5.19	--	--
	Kilkenny WWTP (MNG580084)	31.00	1.21	31.00	1.21	0.0	0%
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	11.53	0.0316	11.53	0.032	0.0	0%
	WLA Totals	***330.22***	***4.15***	***566.81***	***7.50***	***0.00***	***0%***
Load Allocation	Watershed Load	45854.54	122.30	5196.38	8.29	40658.2	89%
	LA Totals	***45854.54***	***122.30***	***5196.38***	***8.29***	***40658.2***	***89%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**46184.76**	**126.45**	**5763.19**	**15.79**	**40658.16**	**89%**
TMDL for Hunt Lake (66-0047-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.15	0.0004	0.15	0.000	0.0	0%
	WLA Totals	***0.15***	***0.00***	***0.15***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	408.03	1.1179	72.60	0.1989	335.4	82%
	LA Totals	***408.03***	***1.1179***	***72.60***	***0.199***	***335.4***	***82%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**408.18**	**1.12**	**72.75**	**0.20**	**335.43**	**82%**
TMDL for Rice Lake (66-0048-00)							

Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	1.18	0.0032	1.18	0.003	0.0	0%
	WLA Totals	***1.18***	***0.00***	***1.18***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	7636.22	20.9212	590.70	1.6184	7045.5	92%
	LA Totals	***7636.22***	***20.9212***	***590.70***	***1.618***	***7045.5***	***92%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**7637.40**	**20.92**	**591.88**	**1.62**	**7045.52**	**92%**
TMDL for Caron Lake (66-0050-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.84	0.0023	0.84	0.002	0.0	0%
	WLA Totals	***0.84***	***0.00***	***0.84***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	4778.66	13.0922	420.50	1.1521	4358.2	91%
	LA Totals	***4778.66***	***13.0922***	***420.50***	***1.152***	***4358.2***	***91%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**4779.50**	**13.09**	**421.34**	**1.15**	**4358.16**	**91%**
TMDL for Cedar Lake (66-0052-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	1.40	0.0038	1.40	0.004	0.0	0%
	WLA Totals	***1.40***	***0.00***	***1.40***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	1122.40	3.0751	700.32	1.9187	422.1	38%
	LA Totals	***1122.40***	***3.0751***	***700.32***	***1.919***	***422.1***	***38%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**1123.80**	**3.08**	**701.72**	**1.92**	**422.08**	**38%**
TMDL for Shields Lake (66-0055-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	1.14	0.0031	1.14	0.003	0.0	0%
	WLA Totals	***1.14***	***0.00***	***1.14***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	13535.31	37.0830	570.85	1.5640	12964.5	96%
	LA Totals	***13535.31***	***37.0830***	***570.85***	***1.564***	***12964.5***	***96%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**13536.45**	**37.09**	**571.99**	**1.57**	**12964.46**	**96%**
TMDL for Toner's Lake (81-0058-00)							
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.08	0.0002	0.08	0.000	0.0	0%

	WLA Totals	***0.08***	***0.00***	***0.08***	***0.00***	***0.00***	***0%***
Load Allocation	Watershed Load	291.05	0.7974	38.94	0.1067	252.1	87%
	LA Totals	***291.05***	***0.7974***	***38.94***	***0.107***	***252.1***	***87%***
Margin Of Safety		--*	--*	--*	--*	--*	--*
Loading Capacity (TMDL)		**291.13**	**0.80**	**39.02**	**0.11**	**252.11**	**87%**

--* = 10% MOS was subtracted from the WQ target concentration and was considered as implicit in the loading capacity calculation

Table 7: Total Phosphorus TMDL for Lake Byllesby

Allocation	**Source**	**Low Flow TP Load**		**High Flow TP Load**	
		(kg/yr)	*(kg/day)*	*(kg/yr)*	*(kg/day)*
TMDL for Lake Byllesby (19-0006-00)					
Wasteload Allocation	Faribault WWTP (MN0030121)	8378.0	15.900	8378.0	26.500
	Northfield WWTP (MN0024368)	6223.0	11.810	6223.0	19.680
	Owatonna WWTP (MN0051284)	5984.0	11.360	5984.0	18.930
	Hope Creamery (MN0001317)	2.0	0.005	2.0	0.005
	CenterPoint Energy WWTS (MN0063967)	2.0	0.007	2.0	0.007
	MNDOT - Heath Creek Rest Area (MN0069639)	8.0	0.170	8.0	0.170
	Faribault Dairy Co. Inc. Faribault (MNG255092)	12	0.034	12	0.034
	Genova-Minnesota Inc. (MN0046957)	24	0.060	24	0.060
	Mathiowetz Construction (MNG490137)	29	0.080	29	0.080
	Kilkenny WWTP (MNG580084)	31	1.210	31	1.210
	MNDOT - Straight River Rest Area (MN0049514)	33	0.720	33	0.720
	Meriden Township WWTP (MN0068713)	44	1.590	44	1.590
	Faribault Foods - Faribault Division (MN0050491)	691	1.890	691	1.890
	Dennison WWTP (MN0022195)	69	1.970	69	1.970
	Hope-Somerset Township WWTP (MN0068802)	70	0.190	70	0.190
	Sanders North - SD012 (Millersburg S&G) (MNG490273)	75	0.310	75	0.310
	Sanders North - SD002 (Medford North S&G) (MNG490273)	89	0.410	89	0.410
	Elysian WWTP (MN0041114)	135	5.190	135	5.190
	Morristown WWTP (MN0025895)	145	0.790	145	0.790
	Viracon (MNG255078)	190	0.520	190	0.520
	Geneva WWTP (MN0021008)	191	4.770	191	4.770
	Medford WWTP (MN0024112)	263	0.720	263	0.720
	OMG Midwest Inc./Southern MN Construction (Owatonna Quarry, Steele Country) (MNG490131)	269	0.740	269	0.740
	Ellendale WWTP (MNG580014)	277	9.610	277	9.610

	Lonsdale WWTP (MN0031241)	285	2.600	285	2.600
	Waterville WWTP (MN0025208)	387.00	1.510	387.00	1.510
	Wondra Pit (MNG490130)	394.00	1.080	394.00	1.080
	Spinler Quarry (MNG490081)	562.00	3.140	562.00	3.140
	OMG Midwest Inc./Southern MN Construction (Dundas Was Plant S&G, Rice) (MNG490131)	582.00	1.590	582.00	1.590
	OMG Midwest Inc./Southern MN Construction (Thomas S&G, Rice) (MNG490131)	582.00	1.590	582.00	1.590
	Lakeside Foods Inc. - Owatonna Plant (MN0001571)	775.00	2.120	775.00	2.120
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	97.54	0.2700	164.74	0.450
	Faribault MS4 (MS400233)	366.42	1.2300	803.18	2.420
	Northfield MS4 (MS400271)	197.30	0.6600	432.48	1.310
	Owatonna MS4 (MS400244)	338.23	1.1300	741.40	2.240
	Waseca MS4 (MS400258)	84.56	0.2800	185.35	0.560
	WLA Totals	***27885.05***	***87.26***	***29128.15***	***116.71***
Load Allocation	Watershed Load	20612.95	45.52	52966.86	134.10
	LA Totals	***20612.95***	***45.52***	***52966.86***	***134.10***
Margin Of Safety (10%)		5419.00	14.84	9152.00	25.06
Reserve Capacity		272.00	0.74	272.00	0.74
Loading Capacity (TMDL)		**54189.00**	**148.36**	**91519.01**	**276.61**

Table 8: Total Suspended Solids (TSS) TMDLs for the Cannon River Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		TSS (tons/day)				
TMDL for Belle Creek (07040002-734)						
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.01	0.00	0.00	0.00	0.00
	WLA Totals	0.01	0.00	0.00	0.00	0.00
Load Allocation	Watershed Load	5.24	1.19	0.74	0.57	0.36
	LA Totals	5.24	1.19	0.74	0.57	0.36
Margin Of Safety (10%)		0.58	0.13	0.08	0.06	0.04
Loading Capacity (TMDL)		**5.83**	**1.32**	**0.82**	**0.63**	**0.40**
TMDL for Belle Creek (07040002-735)						
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.03	0.01	0.00	0.00	0.00
	WLA Totals	0.03	0.01	0.00	0.00	0.00
Load Allocation	Watershed Load	30.65	6.87	4.26	3.28	2.14

	LA Totals	30.65	6.87	4.26	3.28	2.14
Margin Of Safety (10%)		3.41	0.76	0.47	0.36	0.24
	Loading Capacity (TMDL)	**34.09**	**7.64**	**4.73**	**3.64**	**2.38**
TMDL for Chub Creek (07040002-528)						
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.03	0.01	0.00	0.00	0.00
	Northfield MS4 (MS400271)	0.17	0.05	0.03	0.02	0.01
	WLA Totals	0.20	0.06	0.03	0.02	0.01
Load Allocation	Watershed Load	26.30	7.19	4.46	2.88	1.83
	LA Totals	26.30	7.19	4.46	2.88	1.83
Margin Of Safety (10%)		2.94	0.80	0.50	0.32	0.21
	Loading Capacity (TMDL)	**29.44**	**8.05**	**4.99**	**3.22**	**2.05**
TMDL for Little Cannon River (07040002-526)						
Wasteload Allocation	Nerstrand WWTP (MN0065668)	0.01	0.01	0.01	0.01	0.01
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.04	0.01	0.01	0.00	0.00
	WLA Totals	0.05	0.02	0.02	0.01	0.01
Load Allocation	Watershed Load	36.32	9.40	5.59	4.23	3.01
	LA Totals	36.32	9.40	5.59	4.23	3.01
Margin Of Safety (10%)		4.04	1.05	0.62	0.47	0.34
	Loading Capacity (TMDL)	**40.41**	**10.47**	**6.23**	**4.71**	**3.36**
TMDL for Little Cannon River (07040002-589)						
Wasteload Allocation	Nerstrand WWTP (MN0065668)	0.005	0.005	0.005	0.005	0.005
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.0032	0.0009	0.0005	0.0004	0.0003
	WLA Totals	0.0082	0.0059	0.0055	0.0054	0.0053
Load Allocation	Watershed Load	3.22	0.85	0.51	0.37	0.26
	LA Totals	3.22	0.85	0.51	0.37	0.26
Margin Of Safety (10%)		0.36	0.10	0.06	0.04	0.03
	Loading Capacity (TMDL)	**3.59**	**0.96**	**0.58**	**0.42**	**0.30**
TMDL for Butler Creek (07040002-590)						
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.00	0.00	0.00	0.00	0.00
	WLA Totals	0.00	0.00	0.00	0.00	0.00
Load Allocation	Watershed Load	3.85	0.96	0.62	0.50	0.31
	LA Totals	3.85	0.96	0.62	0.50	0.31
Margin Of Safety (10%)		0.43	0.11	0.07	0.06	0.03
	Loading Capacity (TMDL)	**4.28**	**1.07**	**0.69**	**0.56**	**0.34**
TMDL for Cannon River (07040002-509)						
Wasteload Allocation	CenterPoint Energy WWTS (MN0063967)	0.003	0.003	0.003	0.003	0.003
	Ellendale WWTP (MNG580014)	0.238	0.238	0.238	0.238	0.238
	Elysian WWTP (MN0041114)	0.255	0.255	0.255	0.255	0.255

Faribault Dairy Co Inc. - Faribault (MNG255092)	0.013	0.013	0.013	0.013	0.013
Faribault Foods - Faribault Division (MN0050491)	0.063	0.063	0.063	0.063	0.063
Faribault WWTP (MN0030121)	0.876	0.876	0.876	0.876	0.876
Geneva WWTP (MN0021008)	0.122	0.122	0.122	0.122	0.122
Genova-Minnesota Inc. (MN0046957)	0.015	0.015	0.015	0.015	0.015
Hope - Somerset Township WWTP (MN0068802)	0.001	0.001	0.001	0.001	0.001
Hope Creamery (MN0001317)	0.0042	0.0042	0.0042	0.0042	0.0042
Kilkenny WWTP (MNG580084)	0.06	0.06	0.06	0.06	0.06
Lakeside Foods Inc. - Owatonna Plant (MN0001571)	0.07	0.07	0.07	0.07	0.07
Lonsdale WWTP (MN0031241)	0.086	0.086	0.086	0.086	0.086
Mathiowetz Construction (MNG490137)	0.095	0.095	0.095	0.095	0.095
Spinler Quarry (MNG490081)	0.566	0.566	0.566	0.566	0.566
Medford WWTP (MN0024112)	0.018	0.018	0.018	0.018	0.018
Meriden Township WWTP (MN0068713)	0.038	0.038	0.038	0.038	0.038
MNDOT - Heath Creek Rest Area (MN0069639)	0.008	0.008	0.008	0.008	0.008
MNDOT Straight River Rest Area (MN0049514)	0.017	0.017	0.017	0.017	0.017
Morristown WWTP (MN0025895)	0.026	0.026	0.026	0.026	0.026
Northfield WWTP (MN0024368)	0.651	0.651	0.651	0.651	0.651
OMG Midwest Inc./Southern MN Construction (Dundas Wash Plant S&G, Rice) (MNG490131)	0.586	0.586	0.586	0.586	0.586
OMG Midwest Inc./Southern MN Construction (Owatonna Quarry, Steele County) (MNG490131)	0.27	0.27	0.27	0.27	0.27
OMG Midwest Inc./Southern MN Construction (Thomas S&G, Rice) (MNG490131)	0.586	0.586	0.586	0.586	0.586
Owatonna WWTP (MN0051284)	0.626	0.626	0.626	0.626	0.626
Sanders North - SD002 (Medford North S&G) (MNG490273)	0.15	0.15	0.15	0.15	0.15
Sanders North - SD002 (Millersburg S&G) (MNG490273)	0.113	0.113	0.113	0.113	0.113
Viracon (MNG255078)	0.034	0.034	0.034	0.034	0.034
Waterville WWTP (MN0025208)	0.074	0.074	0.074	0.074	0.074
Wondra Pit (MNG490130)	0.397	0.397	0.397	0.397	0.397
Faribault MS4 (MS400233)	5.43	1.66	0.86	0.47	0.20
Northfield MS4 (MS400271)	2.86	0.87	0.45	0.25	0.11
Owatonna MS4 (MS400244)	5.08	1.55	0.81	0.44	0.19
Waseca MS4 (MS400258)	1.5	0.46	0.24	0.13	0.06
Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.33	0.11	0.06	0.03	0.02

	WLA Totals	21.2612	10.7112	8.4812	7.3812	6.6412
Load Allocation	Watershed Load	310.24	94.59	49.27	26.83	11.63
	LA Totals	310.24	94.59	49.27	26.83	11.63
Margin Of Safety (10%)		36.83	11.70	6.42	3.80	2.03
Loading Capacity (TMDL)		**368.33**	**117.00**	**64.17**	**38.01**	**20.30**
TMDL for Wolf Creek (07040002-522)						
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.01	0.00	0.00	0.00	0.00
	WLA Totals	0.01	0.00	0.00	0.00	0.00
Load Allocation	Watershed Load	14.18	4.02	2.02	1.13	0.30
	LA Totals	14.18	4.02	2.02	1.13	0.30
Margin Of Safety (10%)		1.58	0.45	0.22	0.13	0.03
Loading Capacity (TMDL)		**15.77**	**4.47**	**2.24**	**1.26**	**0.33**
TMDL for Prairie Creek (07040002-504)						
Wasteload Allocation	Dennison WWTP (MN0022195)	0.049	0.049	0.049	0.049	0.049
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.03	0.01	0.00	0.00	0.00
	WLA Totals	0.0790	0.0590	0.0490	0.0490	0.0490
Load Allocation	Watershed Load	25.11	6.81	4.17	2.86	1.78
	LA Totals	25.11	6.81	4.17	2.86	1.78
Margin Of Safety (10%)		2.80	0.76	0.47	0.32	0.20
Loading Capacity (TMDL)		**27.99**	**7.63**	**4.69**	**3.23**	**2.03**
TMDL for Unnamed Creek (07040002-512)						
Wasteload Allocation	Dennison WWTP (MN0022195)	0.05	0.05	0.05	0.05	0.05
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.01	0.00	0.00	0.00	0.00
	WLA Totals	0.05	0.05	0.00	0.05	0.05
Load Allocation	Watershed Load	5.26	1.31	0.78	0.53	0.31
	LA Totals	5.26	1.31	0.78	0.53	0.31
Margin Of Safety (10%)		0.59	0.15	0.09	0.06	0.04
Loading Capacity (TMDL)		**5.90**	**1.51**	**0.87**	**0.64**	**0.40**
TMDL for Straight River (07040002-503)						
	Ellendale WWTP (MNG580014)	0.238	0.238	0.238	0.238	0.238
	Geneva WWTP (MN0021008)	0.122	0.122	0.122	0.122	0.122
	Hope - Somerset Township WWTP (MN0068802)	0.001	0.001	0.001	0.001	0.001
	Hope Creamery (MN0001317)	0.0042	0.0042	0.0042	0.0042	0.0042
	Lakeside Foods Inc. - Owatonna Plant (MN0001571)	0.07	0.07	0.07	0.07	0.07
	Mathiowetz Construction (MNG490137)	0.095	0.095	0.095	0.095	0.095
	Spinler Quarry (MNG490081)	0.566	0.566	0.566	0.566	0.566
	MNDOT Straight River Rest Area (MN0049514)	0.017	0.017	0.017	0.017	0.017

	OMG Midwest Inc./Southern MN Construction (Owatonna Quarry, Steele County) (MNG490131)	0.27	0.27	0.27	0.27	0.27
	Owatonna WWTP (MN0051284)	0.626	0.626	0.626	0.626	0.626
	Sanders North - SD002 (Medford North S&G) (MNG490273)	0.15	0.15	0.15	0.15	0.15
	Viracon (MNG255078)	0.034	0.034	0.034	0.034	0.034
	Wondra Pit (MNG490130)	0.397	0.397	0.397	0.397	0.397
	Owatonna MS4 (MS400244)	4.96	1.4	0.66	0.3	0.09
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.10	0.03	0.02	0.01	0.00
	WLA Totals	7.6502	4.0202	3.2702	2.9002	2.6802
Load Allocation	Watershed Load	94.69	26.71	12.54	5.77	1.62
	LA Totals	94.69	26.71	12.54	5.77	1.62
Margin Of Safety (10%)		11.37	3.42	1.76	0.96	0.48
Loading Capacity (TMDL)		**113.71**	**34.15**	**17.57**	**9.63**	**4.78**
TMDL for Rush Creek (07040002-505)						
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.01	0.00	0.00	0.00	0.00
	WLA Totals	0.01	0.00	0.00	0.00	0.00
Load Allocation	Watershed Load	9.09	2.25	1.10	0.54	0.17
	LA Totals	9.09	2.25	1.10	0.54	0.17
Margin Of Safety (10%)		1.01	0.25	0.12	0.06	0.02
Loading Capacity (TMDL)		**10.11**	**2.50**	**1.22**	**0.60**	**0.19**
TMDL for Straight River (07040002-515)						
	Ellendale WWTP (MNG580014)	0.238	0.238	0.238	0.238	0.238
	Faribault Dairy Co Inc. - Faribault (MNG255092)	0.013	0.013	0.013	0.013	0.013
	Faribault WWTP (MN0030121)	0.876	0.876	0.876	0.876	0.876
	Geneva WWTP (MN0021008)	0.122	0.122	0.122	0.122	0.122
	Hope - Somerset Township WWTP (MN0068802)	0.001	0.001	0.001	0.001	0.001
	Hope Creamery (MN0001317)	0.0042	0.0042	0.0042	0.0042	0.0042
	Lakeside Foods Inc. - Owatonna Plant (MN0001571)	0.07	0.07	0.07	0.07	0.07
	Mathiowetz Construction (MNG490137)	0.095	0.095	0.095	0.095	0.095
	Spinler Quarry (MNG490081)	1.154	1.154	1.154	1.154	1.154
	Medford WWTP (MN0024112)	0.018	0.018	0.018	0.018	0.018
	Meriden Township WWTP (MN0068713)	0.038	0.038	0.038	0.038	0.038
	MNDOT Straight River Rest Area (MN0049514)	0.017	0.017	0.017	0.017	0.017
	OMG Midwest Inc./Southern MN Construction (Owatonna Quarry, Steele County) (MNG490131)	0.27	0.27	0.27	0.27	0.27
	Owatonna WWTP (MN0051284)	0.626	0.626	0.626	0.626	0.626

	Sanders North - SD002 (Medford North S&G) (MNG490273)	0.15	0.15	0.15	0.15	0.15
	Viracon (MNG255078)	0.034	0.034	0.034	0.034	0.034
	Wondra Pit (MNG490130)	0.397	0.397	0.397	0.397	0.397
	Faribault MS4 (MS400233)	2.3	0.66	0.32	0.16	0.06
	Owatonna MS4 (MS400244)	5.65	1.63	0.78	0.38	0.13
	Waseca MS4 (MS400258)	1.97	0.57	0.27	0.13	0.05
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.18	0.06	0.03	0.02	0.01
	WLA Totals	14.2232	7.0432	5.5232	4.8132	4.3732
Load Allocation	Watershed Load	169.36	48.70	23.38	11.48	4.01
	LA Totals	169.36	48.70	23.38	11.48	4.01
Margin Of Safety (10%)		20.40	6.19	3.21	1.81	0.93
Loading Capacity (TMDL)		**203.98**	**61.93**	**32.11**	**18.10**	**9.31**
TMDL for Straight River (07040002-536)						
	Ellendale WWTP (MNG580014)	0.238	0.238	0.238	0.238	0.238
	Geneva WWTP (MN0021008)	0.122	0.122	0.122	0.122	0.122
	Hope - Somerset Township WWTP (MN0068802)	0.001	0.001	0.001	0.001	0.001
	Hope Creamery (MN0001317)	0.0042	0.0042	0.0042	0.0042	0.0042
	Lakeside Foods Inc. - Owatonna Plant (MN0001571)	0.07	0.07	0.07	0.07	0.07
	Mathiowetz Construction (MNG490137)	0.095	0.095	0.095	0.095	0.095
	Spinler Quarry (MNG490081)	1.154	1.154	1.154	1.154	1.154
	Medford WWTP (MN0024112)	0.018	0.018	0.018	0.018	0.018
	Meriden Township WWTP (MN0068713)	0.038	0.038	0.038	0.038	0.038
	MNDOT Straight River Rest Area (MN0049514)	0.017	0.017	0.017	0.017	0.017
	OMG Midwest Inc./Southern MN Construction (Owatonna Quarry, Steele County) (MNG490131)	0.27	0.27	0.27	0.27	0.27
	Owatonna WWTP (MN0051284)	0.626	0.626	0.626	0.626	0.626
	Sanders North - SD002 (Medford North S&G) (MNG490273)	0.15	0.15	0.15	0.15	0.15
	Viracon (MNG255078)	0.034	0.034	0.034	0.034	0.034
	Wondra Pit (MNG490130)	0.397	0.397	0.397	0.397	0.397
	Owatonna MS4 (MS400244)	5.73	1.59	0.74	0.34	0.09
	Waseca MS4 (MS400258)	1.69	0.47	0.22	0.1	0.03
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.16	0.05	0.02	0.01	0.01
	WLA Totals	10.8142	5.3442	4.2142	3.6842	3.3642
Load Allocation	Watershed Load	145.63	40.42	18.77	8.55	2.27
	LA Totals	145.63	40.42	18.77	8.55	2.27
Margin Of Safety (10%)		17.38	5.08	2.55	1.36	0.63
Loading Capacity (TMDL)		**173.82**	**50.84**	**25.53**	**13.59**	**6.26**

Table 9: Chloride TMDL for the Cannon River Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		chloride (tons/day)				
TMDL for Unnamed Ditch (07040002-555)						
Wasteload Allocation	Lonsdale WWTP (MN0031241)	0.66	0.66	0.66	0.66	0.66
	WLA Totals	0.66	0.66	0.66	0.66	0.66
Load Allocation	Watershed load	4.83	1.09	0.53	0.31	0.15
	LA Totals	4.83	1.09	0.53	0.31	0.15
Margin Of Safety (10%)		0.61	0.19	0.13	0.11	0.09
	Loading Capacity (TMDL)	**6.10**	**1.94**	**1.32**	**1.08**	**0.90**

Table 10: Nitrate TMDLs for the Cannon River Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		Nitrate (kg/day)				
TMDL for Little Cannon River (07040002-589)						
Wasteload Allocation	Nerstrand WWTP (MN0065668)	4.00	4.00	4.00	4.00	4.00
	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	2.93	0.78	0.46	0.34	0.24
	WLA Totals	6.93	4.78	4.46	4.34	4.24
Load Allocation	Watershed Load	2925.65	774.07	459.76	340.14	240.42
	LA Totals	2925.65	774.07	459.76	340.14	240.42
Margin Of Safety (10%)		325.84	86.54	51.58	38.28	27.18
	Loading Capacity (TMDL)	**3258.42**	**865.39**	**515.80**	**382.76**	**271.84**
TMDL for Pine Creek (07040002-520)						
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.87	0.25	0.15	0.10	0.06
	WLA Totals	0.87	0.25	0.15	0.10	0.06
Load Allocation	Watershed Load	865.02	249.89	153.74	104.74	59.06
	LA Totals	865.02	249.89	153.74	104.74	59.06
Margin Of Safety (10%)		96.21	27.79	17.10	11.65	6.57
	Loading Capacity (TMDL)	**962.10**	**277.93**	**170.99**	**116.49**	**65.69**
TMDL for Trout Brook (07040002-567)						
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	1.08	0.32	0.21	0.15	0.09
	WLA Totals	1.08	0.32	0.21	0.15	0.09

Load Allocation	Watershed Load	1080.35	317.69	209.43	151.11	93.94
	LA Totals	1080.35	317.69	209.43	151.11	93.94
Margin Of Safety (10%)		120.16	35.33	23.29	16.81	10.45
Loading Capacity (TMDL)		**1201.59**	**353.34**	**232.93**	**168.07**	**104.48**
TMDL for Trout Brook (07040002-573)						
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.5800	0.1700	0.1100	0.0800	0.0500
	WLA Totals	0.5800	0.1700	0.1100	0.0800	0.0500
Load Allocation	Watershed Load	575.59	169.03	110.55	78.85	47.30
	LA Totals	575.59	169.03	110.55	78.85	47.30
Margin Of Safety (10%)		64.02	18.80	12.30	8.77	5.26
Loading Capacity (TMDL)		**640.19**	**188.00**	**122.96**	**87.70**	**52.61**
TMDL for Spring Brook (07040002-557)						
Wasteload Allocation	Construction Stormwater (MNR100001) and Industrial Stormwater (MNR50000)	0.29	0.08	0.04	0.03	0.02
	Northfield MS4 (MS400271)	0.65	0.18	0.10	0.06	0.04
	WLA Totals	0.94	0.26	0.14	0.09	0.06
Load Allocation	Watershed Load	293.22	80.36	44.63	27.56	16.21
	LA Totals	293.22	80.36	44.63	27.56	16.21
Margin Of Safety (10%)		32.69	8.96	4.97	3.07	1.81
Loading Capacity (TMDL)		**326.85**	**89.58**	**49.74**	**30.72**	**18.08**