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

REPLY TO ATTENTION OF

WW-16J

November 18, 2020

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 completed its review of the final Total Maximum Daily Loads (TMDL) for segments within the Duluth Urban Area Stream (DUAS) study area, including supporting documentation. The DUAS TMDLs address stream impairments in St. Louis and Carlton Counties in northeastern Minnesota including portions of the St. Louis River watershed, the Lake Superior South watershed, and developed areas near Duluth. The DUAS TMDLs address impaired aquatic recreation use due to excessive bacteria and impaired aquatic life use due to excessive bacteria and sediment.

The DUAS 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 seven (7) bacteria TMDLs and four (4) sediment TMDLs. EPA describes Minnesota's compliance with the statutory and regulatory requirements in the enclosed decision document.

EPA acknowledges Minnesota's efforts in submitting these TMDLs and we look forward to future TMDL submissions by the State of Minnesota. If you have any questions, please contact Ms. Christine Urban, at 312-886-3493 or urban.christine@epa.gov.

Sincerely,

Digitally signed by Tera L. Fong
Date: 2020.11.18 16:30:23 -06'00'

Tera L. Fong
Division Director, Water Division

wq-iw10-11g

TMDL: Duluth Urban Area Streams TMDL, Minnesota
Date: November 18, 2020

DECISION DOCUMENT FOR THE APPROVAL OF THE DULUTH URBAN AREA, MINNESOTA TMDL

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

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

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

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

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

(1) the spatial extent of the watershed in which the impaired waterbody is located;

(2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;
(4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and
(5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyll-a and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comment:
Location Description/Spatial Extent: The Duluth Urban Area TMDLs were submitted by the Minnesota Pollution Control Agency (MPCA) and address 11 stream reaches in the Duluth Urban Area. The streams addressed in the TMDL are located in St. Louis and Carlton Counties on the eastern border of Minnesota, at the northwestern border of Wisconsin, and Lake Superior where the three intersect (Figure 1 of the TMDL).

The watersheds in the TMDL drain to Lake Superior and the St. Louis River Estuary. The TMDL does not include a continuous portion of the Lake Superior Shoreline. The TMDL project includes a portion of the St. Louis River watershed (HUC 04010201) and the Lake Superior South watershed (HUC 04010102) and covers approximately 141 square miles. The project begins with Mission Creek in the southwest and ends with the Lester River in the northeast (Figure 2 of the TMDL). The waterbodies addressed by the Duluth Urban Area TMDLs are listed in Table 3 of the TMDL (Table 1 of this Decision Document) include; Keene Creek, Kingsbury Creek, Miller Creek, Sargent Creek, Stewart Creek, Merritt (Unnamed) Creek, Tischer Creek, Chester Creek, Amity Creek, Amity East Branch Creek, and the Lester River.

There are portions of the watershed with pathogen, aquatic consumption, and temperature impairments addressed in other TMDLs. The Miller Creek Water Temperature TMDL was completed and approved in January 2018. Other reports addressing the St. Louis River and Lake Superior also support the work completed for this TMDL. MPCA plans to complete Miller Creek TMDLs for additional pollutants in the second cycle of the Duluth Urban Watershed Restoration and Protection Strategy (WRAPS).

Land Use: Table 6 in Section 3.2 of the TMDL shows that the land uses are listed with an individual percentage for each subwatershed. Deciduous forest predominates, ranging from 19 - 74%, conifer forest 2 – 20%, forested and shrub wetlands 4 – 20%, and remaining mixed forest, managed/natural grass, emergent wetlands, and lakes/ponds/rivers are 0 – 6% of the land use. Generally, the total natural land cover in each subwatershed is over 50% with a few exceptions.

Table 1: Waterbodies addressed by the Duluth Urban Area TMDLs

Reach Name	AUID (04010x xx-xxx)	Location/Reach Description	Affected Designated Use Class	Pollutant or Stressor	TMDL Pollutant(s) Addressed in this Study
Keene Creek	201-627	Headwaters to St Louis River	Aquatic Recreation	*Escherichia coli*	*Escherichia coli*
Kingsbury Creek	201-626	Mogie Lake to St Louis River	Aquatic Life	Aquatic macroinvertebrate bioassessments	Total suspended solids
				Fishes bioassessments	
Miller Creek	201-512	Headwaters to St Louis River	Aquatic Life and Aquatic Recreation	Aquatic macroinvertebrate bioassessments [a]	*Escherichia coli*
				Chloride [a]	
				Lack of cold water assemblage [a]	
				Temperature [b]	
				Escherichia coli	
Sargent Creek	201-848	Headwaters to St Louis River	Aquatic Recreation	*Escherichia coli*	*Escherichia coli*
Stewart Creek	201-884	T49 R15W S21, west line to St Louis River	Aquatic Recreation	*Escherichia coli*	*Escherichia coli*
Unnamed creek (Merritt Creek)	201-987	Unnamed creek to St Louis River	Aquatic Recreation	*Escherichia coli*	*Escherichia coli*
Tischer Creek	102-544	Unnamed creek to Lake Superior	Aquatic Recreation	*Escherichia coli*	*Escherichia coli*
Chester Creek	102-545	East Br Chester Creek to Lake Superior	Aquatic Recreation	*Escherichia coli*	*Escherichia coli*
Amity Creek	102-511	Unnamed creek to Lester River	Aquatic Life	Turbidity	Total suspended solids
Amity Creek, East Branch	102-540	Unnamed creek to Amity Creek	Aquatic Life	Turbidity	Total suspended solids
Lester River	102-549	T52 R14W S23, north line to Lake Superior	Aquatic Life	Turbidity	Total suspended solids

a. TMDLs will be completed as part of a later cycle of work, by approximately 2025.

b. TMDL has been approved (MPCA 2017b).

Pollutant of Concern: The pollutants of concern for the Duluth Urban TMDL are *E. coli* and total suspended solids (TSS), addressing the impairments caused by bacteria and turbidity, respectively, as found on the 2018 Clean Water Act, Section 303(d) list of impaired water bodies. This submittal calculates for four TSS TMDLs to address turbidity impairments and seven *E. coli* TMDLs to address bacteria impairments. The turbidity standard used in previous Clean Water Act, Section 303(d) lists was replaced by TSS standards in 2015 (Minn. R. 7050.0222). Existing turbidity impairments will remain designated as turbidity impairments, but the TMDLs developed for them will be based on the TSS standards.

Problem Identification: Section 3.3 of the TMDL identifies the flow conditions under which exceedances of *E.coli* and TSS standards occur, using Hydrological Simulation Program FORTRAN (HSPF) to simulate flow where gages do not exist. The rates of exceedance of the TSS criteria in Figure 28 and Figure 29 of the TMDL are based on simulated average daily TSS concentration in the reach for each day during the standard window (April through September) between 1995 and 2016. The TSS standard allows for exceedances of the in-stream concentration (i.e., 10 mg/L) 10% of the time. By using the daily model outputs, the State can better evaluate the percent of time when the stream is exceeding the standard and identify reaches of concern that may not have water quality data.

MPCA noted that typically, TMDLs evaluate the exceedances only on days when a grab sample was collected. TSS monitoring data collected between the months of April through September from 2003 to 2016 were tabulated by flow percentile using simulated daily flow from the HSPF model. A greater number of samples were collected during higher flows (Figure 30). Since exceedances tend to be associated with higher flows, the TSS criterion exceedance rate calculated from monitoring data is biased high relative to the true exceedance rate. As a result, model predictions of TSS exceedance rates are lower than indicated from sampling data.

The TMDL states that development is prevalent in the Duluth Urban Area and natural land covers including forest and wetland form the majority of each of the impaired watersheds (51% to 89%). These natural areas are typically in the headwater areas where slopes are low and are shown to contribute negligibly to impairments (Executive Summary of the TMDL). The watershed transitions to steep slopes and bedrock-controlled channels closer to Lake Superior. Streams in the southern part of the urban area (west in local parlance) meander through a large clay plain before discharging into the St. Louis River. The MPCA noted that there is natural imperviousness due to the bedrock, in addition to, as MPCA states: “the high level of connected imperviousness relative to other North Shore watersheds.” These conditions add to higher runoff volumes and peak flows, resulting in greater erosion and bank instability. There is watershed runoff from both point and nonpoint sources, industrial wastewater, erosion, failing septics, and other untreated wastewater, wildlife, and pets. Section 3.4. of the TMDL describes potential source contributions to impairments as described below.

Sediment Source Identification

Point Sources: Section 3.4.1 of the TMDL describes potential point source contributions to the impaired segments of the Duluth Urban Area TMDL. Four streams are impaired by sediments: MPCA identified, Municipal Separate Storm Sewers (MS4), industrial wastewater and construction stormwater as the only point sources contributing to the impairments. MPCA stated that there are no Confined Animal Feeding Operations (CAFOs) in the watershed or municipal wastewater sources. Stormwater runoff from regulated MS4s was estimated with permitted watershed areas.

Municipal Separate Storm Sewer Systems (MS4s):
There are nine regulated MS4s in the Duluth Urban Area. The listed below applies to both *E. coli* and TSS TMDLs. Lake Superior College is not listed by MPCA as being a regulated MS4 for TSS. See Appendix C of the TMDL for detailed maps of MS4 areas.

- Duluth City (MS400086)
- Hermantown City (MS400093)
- Proctor City (MS400114)
- Rice Lake City (MS400151)
- Midway Township (MS400146)
- Lake Superior College - Duluth (MS400225) (*E. coli* only)
- University of Minnesota - Duluth (MS400214)
- St. Louis County (MS400158)
- Minnesota Department of Transportation (MnDOT) Outstate District (MS400180) - Outstate District (roads)

Industrial Wastewater:
There is one industrial stormwater site permitted through an individual industrial stormwater permit in TSS impaired watersheds: Wisconsin Central Ltd (MN0000361), who is permitted to discharge industrial stormwater in the Kingsbury Creek Watershed. Upon examination of permitted facility discharge monitoring reports (DMR) from 2012 through 2016, MPCA observed nineteen exceedances of the TSS permit limit of 30 mg/L. Observed values for TSS at monitored outfalls ranged from 0.5 mg/L to 136 mg/L, with an average value of 15 mg/L.

Construction Stormwater:
Construction stormwater is regulated under general permit issued by MPCA. The State estimated the area in each watershed regulated at any one time as 0.01% of the watershed (Section 3.4.1 of the TMDL).

Nonpoint Sources: Section 3.4.2 of the TMDL describes both watershed runoff sources and near-channel sources as the primary contributors of sediment to Lake Superior and the St. Louis River. MPCA noted that higher loading rates were found for unregulated developed land and agricultural production areas. MPCA estimates that developed land use and roads contribute more than half of the sediment load to surface waters in the subwatersheds addressed in this study. MPCA also explained that urban loading rates are typically higher due to the effects of flow concentration from impervious surfaces, higher runoff volumes, erosion hotspots in ditches and ephemeral headwater channels receiving flow from storm drains.

MPCA identified several nonpoint sources of sediment in the TMDL watersheds. This included runoff from forests or grasslands/pastures, near-channel erosion, and runoff from unregulated developed land (Table 30 of the TMDL).

Unregulated Developed Land: Not all of the TMDL subwatersheds are addressed under MS4 permits. Portions of the TMDL subwatersheds are urbanized, but not enough to be regulated under an MS4 permit. Runoff from these areas can contain significant amounts of sediment, especially under high-flow events. Runoff from impermeable surfaces (e.g., parking lots) can contain significant amounts of sediment and other pollutants.

Near Channel Erosion: In addition to the stormwater runoff containing sediment, the physical action of high flows can erode bluffs and streambanks. At higher precipitation rates, streamflows increase significantly, and can erode large amounts of sediment into the waterbody. Table 30 of the TMDL indicates that as much as 65% of the sediment load can be attributed to near-channel erosion.

Grassland/Pasture and Forest: While often not a significant source, MPCA did note that one subwatershed in particular, the East Branch Amity Creek subwatershed, contained forest and pasture areas which were likely a source of sediment. MPCA suspects this is due to eroded portions of the upland watershed, and poorly maintained grazing areas (Section 3.4.2 of the TMDL).

Additionally, MPCA utilized the Bank Assessment for Nonpoint Source Consequences of Sediment (BANCS) modeling effort to further refine local sources of sediment. The results from the BANCS modeling will be used to target implementation actions and activities to address sediment sources in the watersheds. Further details can be found in Section 3.4.2 of the TMDL and Section 3 of this Decision Document.

Bacteria Source Identification

Point Sources: Seven creeks have aquatic life recreation use impaired by excessive bacteria. Section 3.5 of the TMDL summarizes *E. coli* pollutant sources in the impaired watersheds. Potential sources were identified through MPCA permit information and monitoring records, county and municipal records, watershed and stream-specific studies and data, and field data. A weight of evidence approach was used to determine the primary sources of *E. coli* (Section 3.5 of the TMDL). Similar to the TSS TMDLs, MPCA asserts that there is significant potential for *E. coli* MS4 point source contributions (see Section 1 above) because stormwater runoff from MS4 areas is considered to be the primary mechanism by which contaminants are transported to waterbodies. The MS4 permittees are noted in the above section (TSS Sources – MS4) and in Section 3.4.2 of the TMDL. MPCA determined that there are no other permitted point sources for bacteria in the study area. MPCA does not consider construction and industrial stormwater to be a source of *E. coli* (Section 3.5.2 of the TMDL).

MPCA did review the results of a Bacterial Source Tracking study in two of the TMDL watersheds located near beaches on Lake Superior (Section 3.5.1 of the TMDL). Results indicate that much of the bacteria measured (i.e., *E. coli*) had human DNA markers, although the presence of ruminants (i.e., deer) and gull markers were also noted.

Nonpoint sources: In Section 3.5.3 of the TMDL, MPCA describes how *E. coli* nonpoint sources can add bacteria loads from wildlife, pets, and other animals, to stormwater runoff from unregulated areas outside of MS4s. Similar to the TSS loading discussion above, precipitation events can wash material from the land surface into the waterbodies. Properly installed and maintained septic systems typically do not contribute significant amounts of pollutants, however, improperly installed or failing systems can contribute significant loads of bacteria to a waterbody (Section 3.5.3 of the TMDL). MPCA identified potential areas where failing septic systems could be an issue (Tables 31 and 32 of the TMDL).

Priority Ranking: Section 1.3 of the TMDL states that the TMDLs are prioritized using the watershed approach and the state's 10-year cycle for completing a WRAPS. MPCA developed the priority framework for TMDL development to meet the EPA's national measure WQ-27 under EPA's Long-Term Vision for assessment, restoration, and protection, and developed a corresponding state plan for a priority framework. MPCA identified efforts to be completed by 2022. This TMDL was prioritized and developed to meet commitments in this process.

Future growth: Section 5.1 of the TMDL submittal indicates that future growth or changes in the watershed will be considered. Potential MS4 modifications from load allocation (LA) to wasteload allocation (WLA) may occur, or changing an MS4 WLA to another WLA jurisdiction. Further, the U.S. Census Bureau Urban Area may change to newly regulated areas, which would change the MS4 areal extent, especially for state highways that may have originally been outside of regulated areas. Section 5.2 of the TMDL describes the process for revising a TMDL as new or expanding wastewater discharges occur, to ensure that they are consistent with applicable water quality standards (WQS).

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this first element.

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

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

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

Comment:
Designated Use: Section 2.1 of the TMDL states that the designated uses for the TMDL waterbodies are for aquatic life and recreation. Use classifications are defined in Minn. R. 7050.0140, and water use classifications for individual water bodies are provided in Minn. R. 7050.0470, 7050.0425, and 7050.0430. All the impaired streams in this report are classified as Class 2A and 2B. Class 2 waters are protected for aquatic life and recreation. Class 2A waters are protected for the propagation and maintenance of a healthy community of cold water sport or commercial fish and associated aquatic life and their habitats. Class 2B waters are protected for the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life and their habitats. Both Class 2A and 2B waters are also protected for aquatic recreation activities such as bathing and swimming.

The applicable numeric criteria for these TMDLs are found in Section 2.2 of the TMDL.

TSS – Section 2.2 of the TMDL states that the TSS criteria for Class 2A waters for protection of aquatic life use is **< 10 mg/L**, and applies April 1 through September 30 . The criteria is not to be exceeded no more than 10% of the time.

Bacteria - Section 2.2 of the TMDL states that the bacteria criteria for Class 2A and 2B waters for protection of the recreational use is **not to exceed 126 organisms per 100 milliliters (colony**

forming units (cfu)/100mL) as a geometric mean of not less than five samples representative of conditions within any given calendar month, **nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 cfu/100 mL**. The standard applies only between April 1 and October 31.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this second element.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

The TMDL submittal should contain documentation supporting the TMDL analysis, including the basis for any assumptions; a discussion of strengths and weaknesses in the analytical process; and results from any water quality modeling. EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation. TMDLs must take into account *critical conditions* for stream 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:
TMDL = Loading Capacity (LC) = WLA + LA + MOS
MPCA used the load duration curve (LDC) method to develop the Duluth Urban Area bacteria and sediment TMDLs. The approach involves calculating the allowable loadings over the range of flow conditions expected to occur in the impaired streams. Section 4 in the TMDL details the steps taken to generate these LDC. A load duration curve is similar to a water quality duration curve except that loads rather than concentrations are plotted on the vertical axis. The LDC method uses a long-term daily flow volume record plotted against frequency at which the

pollutant loads occur at each given flow volume. The full spectrum of allowable loading capacities is represented by the resulting curve.

In addition to linking the total maximum daily load of a pollutant that a waterbody can assimilate without exceeding water quality standards, the LDCs are also used to identify the flow conditions under which exceedances occur. Understanding the flow conditions where impaired water quality conditions are typically observed can aid watershed managers in targeting implementation efforts to minimize source inputs to those impaired segments and contributing watersheds.

In the TMDLs, only five points on the entire loading capacity curve are depicted—the midpoints of the designated flow zones (e.g., for the high flow zone [0 to 10-percentile], the TMDL was calculated at the 5th percentile). Table 35 in the TMDL gives the relationship between five hydrologic zones and contributing source areas. However, the entire curve represents the TMDL and is what is ultimately approved by the EPA. Discussions of load duration curves are presented in *An Approach for Using Load Duration Curves in the Development of TMDLs* (EPA 2007).

Section 4.1.2 of the TMDL report contains TMDL Summaries for the Duluth Urban TSS TMDLs and Section 4.2.2 of the TMDL report contains the TMDL Summaries for the *E. coli* TMDLs (Appendix 1 of this Decision Document). Load duration curves were developed using the full range of hydrological conditions at each monitoring site to ensure all flow conditions were considered, including critical conditions. The curves can be found in Figures 69-79 in Sections 4.1.2 and 4.2.2 of the TMDL and in Appendix 2 of this Decision Document.

TSS Tables 37, 39, 41, and 43 in Appendix 2 of this Decision Document, show the results of calculating the loading capacity for the TSS TMDLs. *E. coli* Tables 45 – 50 of this Decision Document, show the results of calculating the loading capacity for the *E. coli* TMDLs. There is a wide range of reductions needed due to the methodology of calculating loading and reduction in five different flow regimes. In general, the greatest TSS reductions are needed in very high to mid-range flow conditions, whereas the *E. coli* reductions are needed across all flow conditions, which suggests that *E. coli* contributions occur during wet and dry conditions.

Methodology for TSS in streams: Several methods are discussed that are used to develop the TMDL Loading Capacity and load reduction estimates. In order to establish a more detailed analysis, stream-specific assessments were conducted for TSS-impaired streams, as explained below. The results of this work were incorporated into the HSPF models.

As noted in Section 1 of this Decision Document, MPCA utilized the BANCS model to further refine the sediment impacts in two of the TMDL streams. The BANCS model used by MPCA combines Bank Erosion Hazard Index (BEHI) and Near Bank Stress (NBS) measurements to estimate an erosion rate. Measurements made at an individual bank scale are extrapolated to a reach scale. As explained by MPCA, the BEHIs were determined by using detailed stream bank monitoring data and measurements of plant root depth and density, bank height, and bank angle. NBS is determined by the dominant channel flow relative to the bank, depositional properties and other channel location of dominant channel flow relative to the bank or depositional properties and other channel characteristics. BEHI and NBS relationship curves are then developed for the BANCS model and then used to predict a bank recession rate. Length and height of the bank are multiplied by the predicted annual recession rate to estimate a mean annual sediment loading rate (for both bedload and suspended sediment) for each bank. They are then used to estimate current and predict bank recession rates (Section 3.4.1 of the TMDL).

Section 4.1.1 in the TMDL provides details on the approach for determining the loading capacity and loading reductions for TSS. The loading capacity was calculated as flow multiplied by the TSS criteria (10 mg/L) and represents the TSS load in the stream when the stream is at the TSS criteria. The simulated flow data (HSPF) used to calculate the loading capacity needed to meet the TMDL are from 1995 through 2016.

This method includes ranking daily flow values from highest to lowest, computing the percentage of days in the period of record with flows that exceed each daily value, and then plotting daily flow versus the exceedance percentage (or flow duration interval). The resultant load curves show flow values and the frequency that the standard is exceeded. Both flood conditions and low flow are represented, as well as conditions in the middle range.

Each plot was divided into five flow duration intervals related to various flow conditions: very high 0-10%; high 10-40%; mid-range 40-60%; low 60-90%, and; very low 90-100%.

High flow exceedances more often occur from precipitation-related sources and run-off on the left portion of the plot, and non-precipitation related events such as failing septics or low flow conditions on the right portion of the plot. The curve is the target load or the TMDL. The TMDL for each flow regime was established by using the midpoint flow condition multiplied by the concentration target. The individual creeks have reductions in various flow regimes, not only during mid-range to very high flow as in this example. The hollow points indicate samples taken outside of the time range of the April through September.

Methodology for E. coli in streams: HSPF was calibrated and validated for *E. coli* using the same timeframes and flow data as the TSS approach above. MPCA also noted there is a lack of data during parts of 2012 due to flooding, which changed the geomorphology of many streams in the area.

Section 4.2.1 of the TMDL states that the same LDC methodology was used in calculations of the *E. coli* TMDLs as well as the TSS TMDLs. The sampling timeframe from April through October represents the recreational season, as well some measurements taken outside of that timeframe. MPCA notes, and EPA concurs, that while the TMDL will focus on the geometric mean portion of the water quality standard, both parts of the water quality standards must be met. Data were simulated from 1995 through 2015, and monitored from 2007 through 2016.

Critical Conditions: Sections 4.1.1 and 4.2.1 of the TMDL document for TSS and *E. coli*, respectively, state that the critical conditions in the impaired waterbodies are considered in the development of the TMDL. MPCA employed simulated HSPF flow data from 1995 to 2015, and actual water quality monitoring data collected from 2007 to 2016 to develop the bacteria TMDL loading capacities and reduction estimates. All seasons, critical conditions, and flow regimes are inherently included within the development of the LDC methodology because the data are collected under all conditions.

EPA finds MPCA's approach for calculating the loading capacity to be reasonable and consistent with EPA guidance. EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this third element.

4. Load Allocations (LAs)

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:
The Load Allocations are presented in Section 4 of the TMDL. TMDL summary tables from Section 4 of the TMDL are available in Appendix 2 of this Decision Document containing the LA components of the TMDL for each impaired waterbody segment in this TMDL study area. The existing loadings for the streams are predominantly nonpoint source watershed runoff. The Load Allocation is calculated by subtracting the sum of the individual WLAs added to the MOS from the loading capacity.

TSS Load Allocation
The LA represents the portion of the loading capacity that is allocated to unregulated pollutant loads (e.g., non-MS4 watershed runoff, near-channel erosion). The LA includes nonpoint pollution sources that are not subject to permit requirements and also includes natural background sources of sediment. Natural background is defined in both Minnesota rule and statute Minn. R. 7050.0150, subp. 4 (see page 101 of the TMDL).

MPCA split the LA into near-channel sources and unregulated watershed runoff. The near-channel LA is calculated based on the percent of the load attributed to near-channel sources in the TMDL scenario as provided in Figure 68 of the TMDL as follows:

Near-channel LA = (Loading capacity – MOS – industrial and construction stormwater WLA) x percent of load attributed to near-channel sources under the TMDL scenario

The unregulated watershed runoff LA was calculated as follows:

Unregulated watershed runoff LA = (Loading capacity – MOS – industrial and construction stormwater WLA – near-channel LA) x percent non-MS4 watershed area

MPCA included a percent reduction that identify non-MS4 developed and undeveloped area stormwaters reduction needs (for example, Table 44 of the TMDL). MPCA found no available evidence to suggest that natural background sources are a major driver of the waterbody impairments and/or affect their ability to meet state water quality standards. For all impairments addressed in this study, natural background sources are implicitly included in the LA portion of the TMDL. TMDL reductions focus on the major anthropogenic sources identified in the source assessment.

***E. coli* Load Allocation**
The *E. coli* LA represents the portion of the loading capacity that is allocated to pollutant loads that are not regulated through an NPDES/SDS permit, and is calculated by MPCA as the loading capacity minus the sum of the WLAs and the MOS. The LA covers watershed runoff that is generated in areas that are not regulated through an NPDES/SDS permit, along with other nonpoint sources such as septic systems. The LA also includes natural background sources of *E. coli* as described in Section 4.1.1 of the TMDL. MPCA explained that natural background sources of *E. coli* would include wildlife and MPCA determined that quantifying these sources was not possible, and therefore did not assign any portion of the LA to wildlife/natural background. The LA for each impaired segment of the Duluth Urban TMDL study area is found in Appendix 2 in this Decision Document

EPA finds MPCA's approach for calculating the LA to be reasonable and consistent with EPA guidance. EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this fourth element.

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 permitees 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:
The WLAs for both TSS and *E. coli* in the waterbodies are calculated for construction and industrial stormwater and MS4s, but WLAs are primarily allocated to MS4s. The MS4 portion of the TMDL is much less than the load allocation from nonpoint sources. There are no other point sources in these waterbodies and MPCA states that no wastewater facilities discharge to the Duluth Urban Area impaired waterbodies, and therefore, there are no calculated WLAs for wastewater. Some of the MS4 boundaries and allocations are located in more than one watershed.

Total Suspended Solids

Municipal Separate Storm Sewer Systems (MS4s): There are eight regulated MS4s which contribute to TSS impaired watersheds (Table 36 and Appendix C of the TMDL). The regulated areas of the permitted cities and townships within each impaired water were approximated using the developed land cover classes within the jurisdictional boundaries of the city or township (see Figure 3 and Table 6 in the TMDL for developed land cover classes; Appendix C of the TMDL includes maps of each MS4 area). The MS4 permits for the regulated road authorities apply to roads within the U.S. Census Bureau Urban Area. The regulated roads and rights-of-way for St. Louis County were approximated by the county road lengths (county and county state aid highways in MnDOT's STREETS_LOAD shapefile) in the 2010 Urban Area multiplied by an average right-of-way width. The regulated roads and rights-of-way within MnDOT's jurisdiction were provided by MnDOT. The University of Minnesota-Duluth (UMD) regulated area was obtained from their Storm Water Pollution Prevention Program documentation. The MS4 WLAs were calculated as follows:

MS4 watershed runoff WLA = *(Loading capacity – MOS – industrial and construction stormwater WLA – near-channel* LA*) x percent MS4 watershed area*

The MS4 wasteload allocation in each impaired watershed is presented in the TMDL Summary Tables in Appendix 2 of this TMDL Decision Document.

Construction and Industrial Stormwater: Construction stormwater and industrial stormwater are NPDES/SDS regulated sources of TSS in the Duluth Urban Area Subwatershed (Construction Stormwater General Permit MNR100001 and Industrial Stormwater General Permit MNR050000). Categorical WLAs for construction and industrial stormwater regulated through the general permits are provided for each TSS TMDL. The average annual (2010 through 2015) percent area of St. Louis County that is regulated through the construction stormwater permit is 0.01% (Section 3.4.1 of the TMDL)).

The construction stormwater WLA was calculated as the loading capacity (or TMDL) minus the MOS multiplied by the percent area:

Construction stormwater WLA = *(TMDL – MOS) x 0.01%*

To account for existing and any potential future industrial activities in the TSS impaired subwatersheds, MPCA set the industrial stormwater WLA equal to the construction stormwater WLA. Industrial stormwater sites are permitted via a general permit.

Wisconsin Central Ltd. (MN0000361) is an industrial stormwater facility with an individual permit located along Kingsbury Creek. The facility has an existing TSS permit limit of 30 mg/L and discharges to Kingsbury Creek (Section 3.4). The regulated area of Wisconsin Central Ltd. (229 acres) was approximated using the developed land cover classes within the facility boundary; this is the same approach as was used to approximate the MS4 regulated areas. The WLA for Wisconsin Central Ltd. was calculated as follows:

Wisconsin Central Ltd. watershed runoff WLA = (Loading capacity – MOS – industrial and construction stormwater WLA – near-channel LA) x percent watershed area

E. coli

The TMDL summary for E. Coli TMDLs can be found in Section 4.2.1 of the TMDL.

Loading Capacity - The loading capacity for *E. coli* is based on the monthly geometric mean standard (126 org/100 mL). MPCA assumed that practices that are implemented to meet the geometric mean standard will also address the individual sample standard (1,260 org/100 mL). The loading capacity is calculated as flow multiplied by the *E. coli* standard (126 org/100 mL). The loading capacities and allocations are rounded to two significant digits, except in the case of values greater than 100, which are rounded to the nearest whole number.

Wasteload Allocation - There are no permitted point sources in the *E. coli* impaired watersheds that require an *E. coli* WLA except for nine regulated MS4s (See Table 45 in Appendix 2 in the Decision Document).

The regulated area within the watershed of each impaired water was approximated using developed landcover classes in the jurisdictional boundary of the city or township (Figure 3 and Table 6 of the TMDL). The MS4 WLAs were calculated as the percent coverage of the regulated MS4 multiplied by the loading capacity minus the MOS. The MS4 regulated area within each impairment watershed is presented in Appendix C of the TMDL.

Permitted construction and industrial stormwater sources are not expected to be sources of *E. coli* and are not provided WLAs. There are no permitted CAFOs in the watershed.

EPA finds MPCA's approach for calculating the WLA to be reasonable and consistent with EPA guidance. EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this fifth element.

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:
Section 4.1.1 of the TMDL states that an explicit 10% MOS was used in the TSS modeling effort. MPCA believes the MOS is appropriate because there were comparable simulated and observed concentration values, but there was some uncertainty due to variability in monitoring data, processes within the modeling efforts, and assumptions made. There were also limitations for estimated TSS data collected outside of the model simulation period, and some flow estimates were used from nearby gages to determine a representative flow in the impaired stream, realizing that temperature and rainfall can vary from where the gage and impaired stream is located.

Section 4.2.1 of the TMDL states that an explicit 10% MOS was used in the *E. coli* modeling effort. There were also limitations for estimated *E. coli* data collected outside of the model simulation period, and some flow estimates were used from nearby gages to determine a representative flow in the impaired stream, realizing that temperature and rainfall can vary from where the gage and impaired stream is located.

MPCA did not use a rate of decay, or die-off rate of pathogen species, in the TMDL calculation. 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 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 cfu/100 mL as a geometric mean. Thus, it is more conservative to apply the State's WQS as the MOS, because this standard must be met at all times under all environmental conditions.

EPA finds MPCA's approach for calculating the MOS to be reasonable and consistent with EPA guidance. EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this sixth element.

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:

Seasonal variation was considered for TSS as described in Section 4.1.1 of the TMDL. MPCA takes this variability into account by setting standards with growing season averages representing critical conditions, especially during snowmelt and runoff. The LDC approach evaluates loads over the entire range of observed flows and by doing so, incorporates seasonal flow variations into the TMDL.

Seasonal variation was considered for *E. coli* as described in Section 4.2.1 of the TMDL. Standards are developed for April through October when the potential for recreation is the greatest, and water is warmer in these months when bacteria is most productive. The LDC approach evaluates loads over the entire range of observed flows.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this seventh element.

8. Reasonable Assurance

When a TMDL is developed for waters impaired by point sources only, the issuance of a National Pollutant Discharge Elimination System (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:
MPCA states in Section 6 of the TMDL that many factors add to the reasonable assurance that the TMDL reductions will occur. There are restoration efforts led by the South St. Louis Soil and Water Conservation District (SWCD), counties, state agencies, local communities and residents, watershed groups such as the Regional Stormwater Protection Team (RSPT), Lake Superior Streams, the Weber Stream Restoration Initiative, the Minnesota Sea Grant, the Natural Resources Research Institute (NRRI) and the University of Minnesota Duluth.

- Duluth Urban WRAPS Advisory Committee formed in 2015 to collaborate and share information, and to evaluate local ordinances regarding green infrastructure development.
- RSPT works on stormwater pollution prevention and coordinating with local MS4s and coordinates special projects such as tree planting and trash collection in the Miller Creek corridor.
- The City of Duluth restores urban waters through improving stream crossings and leaking wastewater infrastructure, as well as monitoring.

MPCA's reasonable assurance also includes a list of potential funding sources: Minnesota's Lake Superior Coastal Program grants; local government cost-share and loan programs; federal grants and technical assistance programs (e.g., National Fish and Wildlife Foundation, U.S. Forest Service); federal Section 319 program for watershed improvements; Great Lakes Restoration Initiative, and; Great Lakes Commission grants.

Current and future restoration projects are listed in detail in Section 6 of the TMDL, including projects in the contributing watersheds of most of the impaired waterbodies. The projects in the Duluth Urban Area are in the planning phases, as well as some that are completed. Projects for future restoration include channel stabilization, provision of trout habitat, stabilization of streams to reduce sediment, removal of damaged dams that impede fish passage, increase resilience to future flooding, demonstration of stormwater BMPs, and stormwater management plan development. Minnesota listed completed runoff reduction projects, erosion control projects, and evergreen planting to reduce runoff and reduce water temperatures in Section 6.

The Clean Water Legacy Act (CWLA) was passed in Minnesota for the purposes of protecting, restoring, and preserving Minnesota water and includes protocols and practices to be followed 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. To attain its 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). https://www.pca.state.mn.us/sites/default/files/wq-ws4-03.docx). 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 action. MPCA has developed guidance on what is required in the WRAPS. Section 6 of the TMDL also states that a WRAPS is currently being developed to outline future implementation and best management practices (BMPs) to achieve TMDL goals. Progress may be tracked at: http://www.lakesuperiorstreams.org/communities/duluthWRAPS/index.html

In 2008, Minnesota voters approved an amendment to the CWLA that added a three-eighths of 1% state sales and use tax rate on all taxable sales, starting July 1, 2009, and continuing through

2034. Approximately one third of the funds are dedicated to a Clean Water Fund to, "protect, enhance, and restore water quality in lakes, rivers, streams, and groundwater, with at least 5% of the fund targeted to protect drinking water sources." (MPCA 2014). The CWLA also provides details on public and stakeholder participation, and how the funding will be used. Funding for implementation is also available through other nonpoint source programs and the 319 funding mechanism.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this eighth element

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:
Section 7 of the TMDL describes both new and increased stream monitoring efforts in the Duluth area to further assess sources and to focus implementation activities. Section 7.1 of the TMDL discusses the need for TSS sampling throughout the impaired watersheds to further assess potential sources. The following stream-specific monitoring recommendation are suggested by MPCA:

- Kingsbury Creek –
    - Increase sampling under mid-range to very low flow conditions. Only one sample was collected under low and very low flows prior to this report.
    - Increase monitoring during the summer. Three samples have been taken in July, August, and September over last 10 years.
- Amity Creek
    - Increase samples under low and very low flow conditions during winter conditions.
    - Currently no sampling under very low flows has been performed.
- Lester River
    - Increase sampling under very low flow conditions, especially during winter conditions.
    - Currently only one sample under very low flows has been collected.

Sampling for TSS is to increase under mid-flow, low, and very low flow conditions, as currently there is very little sampling under these conditions.

Section 7.2 of the TMDL states that *E. coli* samples are needed throughout the impaired watersheds to further assess potential sources and focus implementation activities. Microbial Source Tracking (MST) could be used to further evaluate sources of *E. coli* and target restoration activities. In 2020, the City of Duluth began a monitoring study to assess sources of *E. coli* to Keene Creek and Tischer Creek. MST is a component of this work. Longitudinal, or synoptic, sampling can be done to identify hotspots along an impaired segment where higher concentrations of *E. coli* are found. This information, paired with sanitary sewer surveys and field reconnaissance, can be used to further investigate sources of *E. coli*. Further investigations into leaky wastewater and failing septic systems through inspections and monitoring are also needed. Minnesota provides stream-specific monitoring recommendations as summarized below:

- New monitoring effort at existing stations (currently only physical stream data) to determine source areas upstream and downstream.
- Increase spring monitoring from March through May.
- Miller Creek: New monitoring effort to determine if stormwater from impervious surface discharges contribute to *E. coli* impairment. This would also include increased sampling under very high and very low flow conditions.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this ninth element.

10. Implementation

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

Comment:

Implementation strategies are outlined in Section 8 of the TMDL. The MPCA presented a variety of possible implementation activities which could be undertaken within the watersheds. Most of these actions will address both pollutants.

Urban/residential stormwater reduction strategies: Several of the watersheds have significant amounts of urban/suburban land. MPCA anticipates that controls on stormwater will be needed to attain and maintain WQS. As noted in Section 5 of this Decision Document, the Stormwater Pollution Prevention Programs (SWPPPs) will be reviewed and revised as needed. Disconnecting impervious cover and reducing runoff will be important in reducing both pollutants in the watersheds.

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

Septic System Control: Improvements to existing septic systems, as well as improvements at restroom facilities in parks and beaches will reduce bacteria loads in several of the watersheds. MPCA will be working with local organizations to improve signage and facilities.

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

EPA reviews, but does not approve, implementation plans. EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this tenth element

11. Public Participation

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

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

Comment:
Section 9 of the TMDL states that there was considerable opportunity for public participation throughout the course of development. Section 4 states that the approach to develop allocations was determined through a stakeholder involvement process, focused primarily on the MS4 entities. Meetings were held throughout 2019 to gather input and recommendations from stakeholders (e.g., city and agency partners, organizations and individuals). Several meetings were held on various topics during the development of the TMDL

MPCA first held a public comment period on the TMDL report from March 19 to April 18, 2018 and then extended to April 19 through June 18, 2018. In response to public comments received during this time, the MPCA reevaluated the draft TMDL and made significant updates. The TMDL approach was revised, and further discussions were held with stakeholders.

An opportunity for public comment on the revised draft TMDL report was provided via a public notice in the *State Register* from June 22, 2020 through July 22, 2020. MPCA received 10 comments during this time period and prepared responses to those comments. Staff from several state agencies and Duluth residents provided comments on the revised draft TMDL in the summer of 2020.

Several comments were received in support of the TMDL. These comments focused on additional BMPs that could be implemented in the watersheds, or expressed support for the ongoing activities currently underway.

The Minnesota Department of Transportation noted concerns over impacts the TSS WLAs would have on their stormwater permit. MNDOT noted they have a very small drainage area in several of the TMDLs, and accounting for the load of TSS would be difficult to determine, especially under varying flow regimes. MPCA responded that they have met and will continue to meet with MNDOT to address concerns over the stormwater permit. MPCA explained that they have developed a guidance to assist permittees in understanding and meeting allocations across multiple flow regimes.

The City of Duluth raised concerns over the bacteria TMDLs noting that the sources of bacteria are not well-identified, and that additional monitoring will be needed to better identify sources and target implementation accurately. The City is concerned that resources are limited and implementing costly BMPs across the watershed will not necessarily address the more localized problems. MPCA responded that the Agency is working on developing a watershed action plan involving stakeholder groups to better identify problem locations and appropriate solutions. Identification of additional resources will be an important part of this effort.

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

12. Submittal Letter

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

Comment:
The EPA received the final Duluth Urban Area TMDL document, submittal letter and accompanying documentation on October 21, 2020. In the submittal letter, MPCA states that the submission includes the final TMDLs for TSS in four streams and *E. coli* in seven streams and were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval. The submittal also contained the names of the watersheds as they appear on Wisconsin's 303(d) list, and the causes/pollutants of concern. This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements concerning this twelfth element.

13. Conclusion

After a full and complete review, EPA finds that the TSS and *E. coli* TMDLs for the Duluth Urban Area Streams TMDL satisfies all of the elements of approvable TMDLs. The TMDLs address impaired aquatic recreation use due to excessive bacteria and impaired aquatic life use due to excessive bacteria and sediment and 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 seven (7) bacteria TMDLs and four (4) sediment TMDLs.

EPA's approval of this TMDL does not extend to those waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters

APPENDIX 1
Duluth Urban Area TMDL Load Duration Curves
(TMDL Figures 69-79)

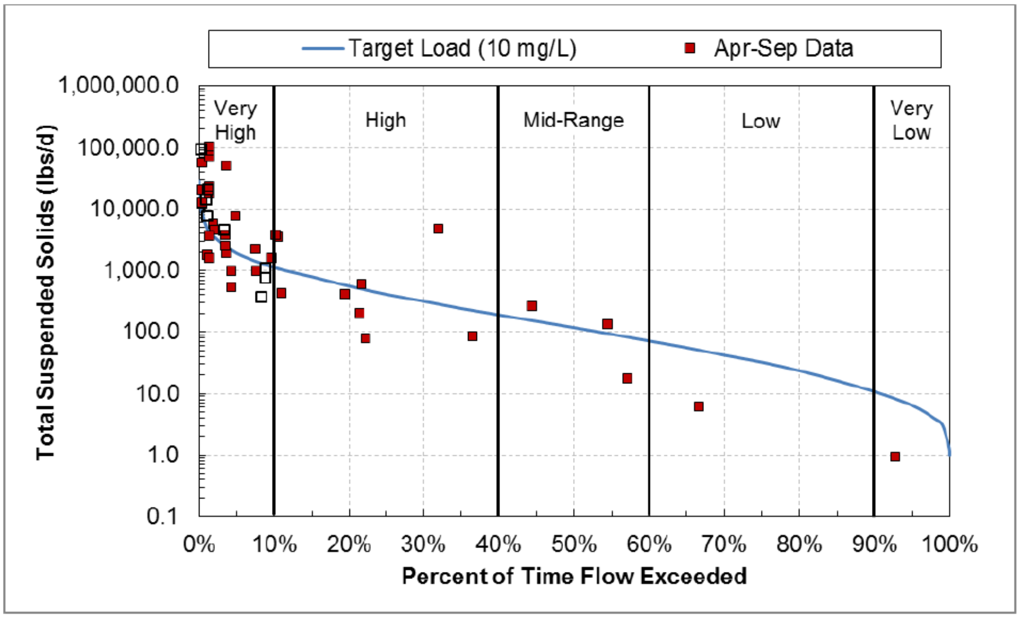

Figure 69. TSS load duration curve, Kingsbury Creek (04010201-626).
Hollow points indicate samples during months when the standard does not apply.

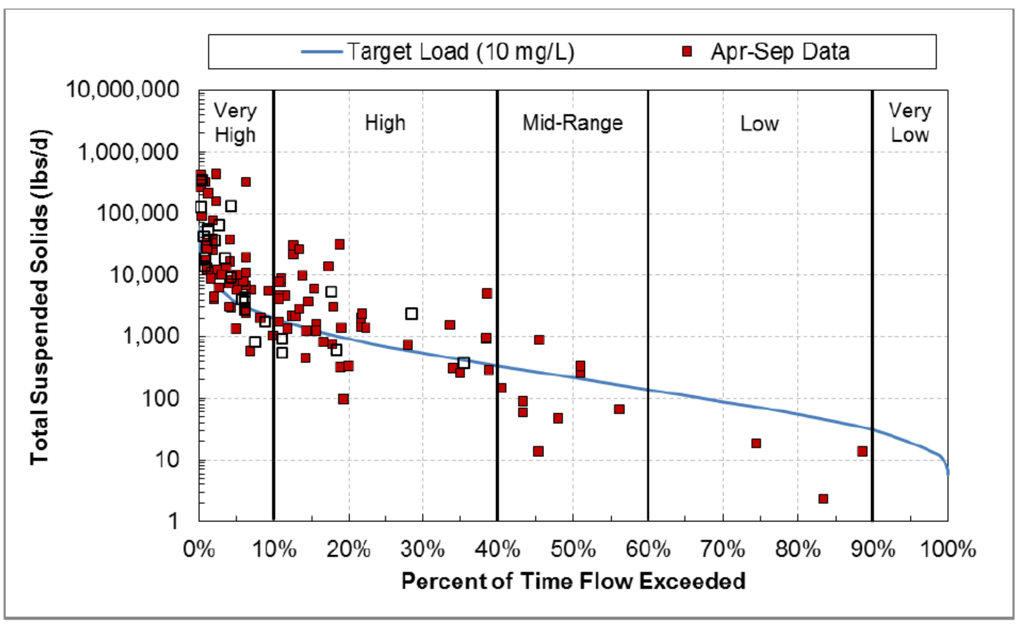

Figure 70. TSS load duration curve, Amity Creek (04010102-511).
Hollow points indicate samples during months when the standard does not apply.

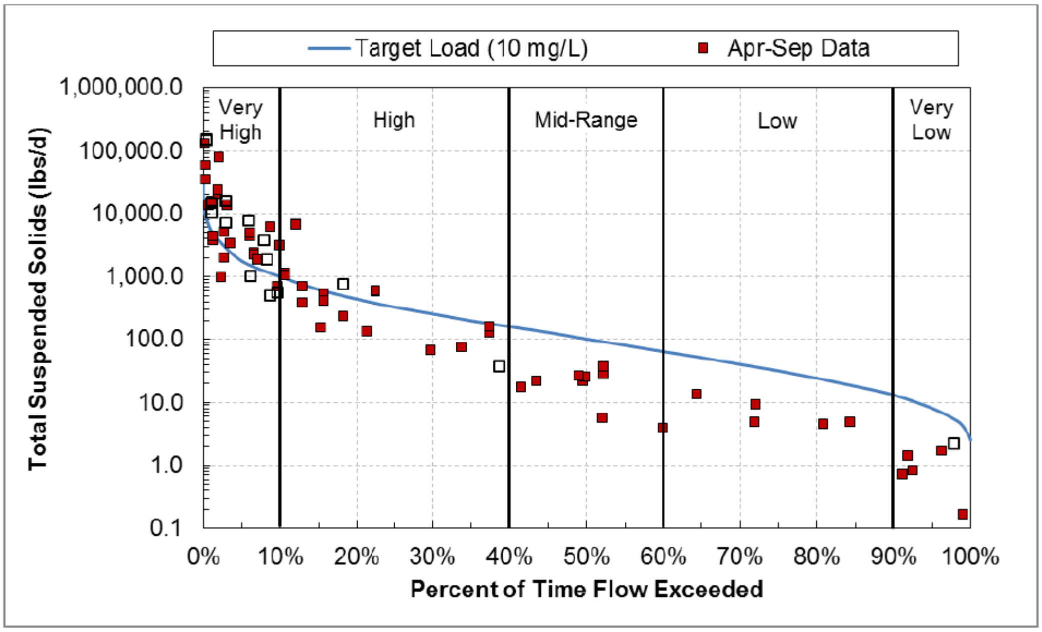

Figure 71. TSS load duration curve, Amity Creek, East Branch (04010102-540).
Hollow points indicate samples during months when the standard does not apply.

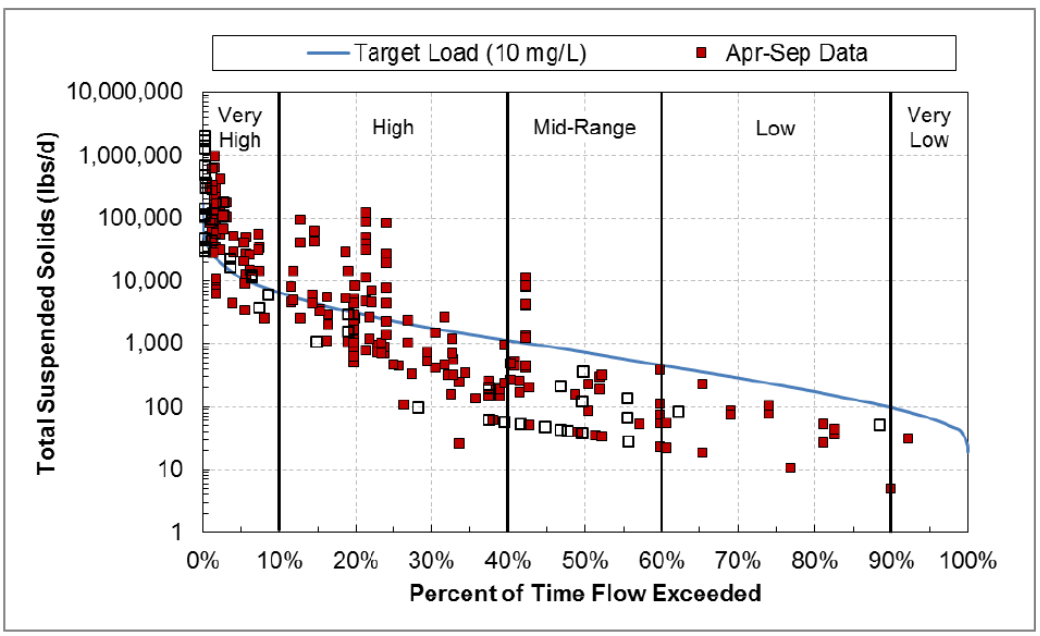

Figure 72. TSS load duration curve, Lester River (04010102-549).
Hollow points indicate samples during months when the standard does not apply.

Duluth Urban Area TMDL – *E.Coli* Load Duration Curves

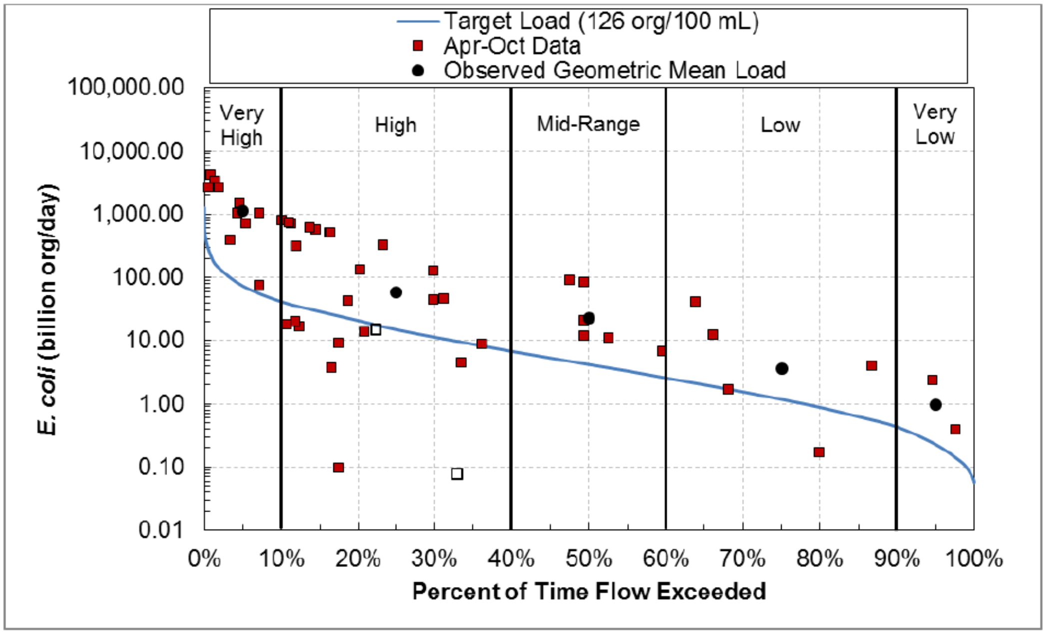

Figure 73. *E. coli* load duration curve, Keene Creek (04010201-627).
Hollow points indicate samples during months when the standard does not apply.

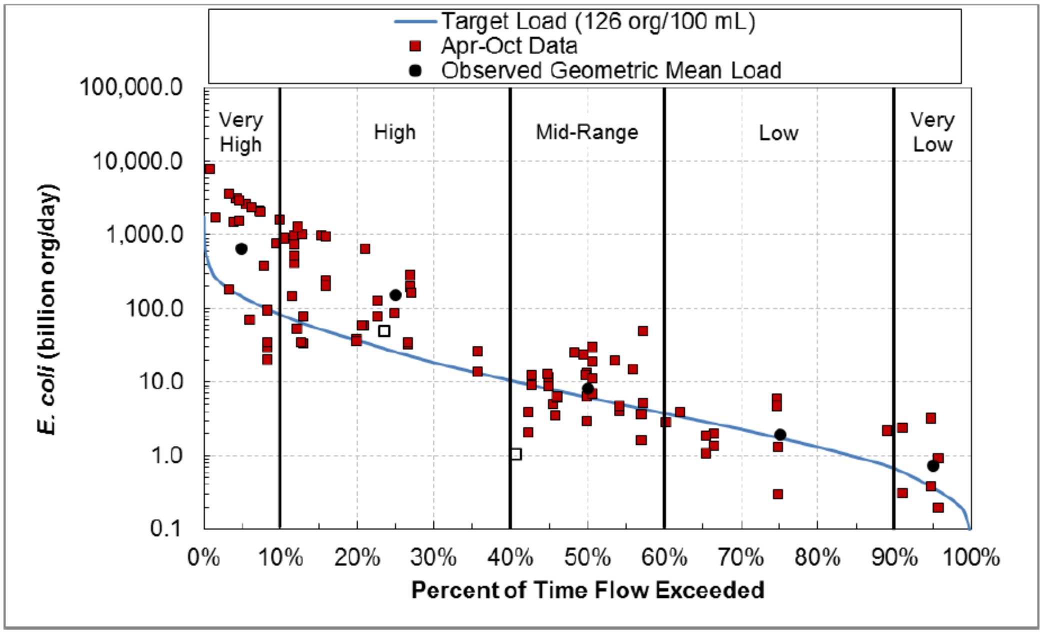

Figure 74. *E. coli* load duration curve, Miller Creek (04010201-512).

Hollow points indicate samples during months when the standard does not apply.

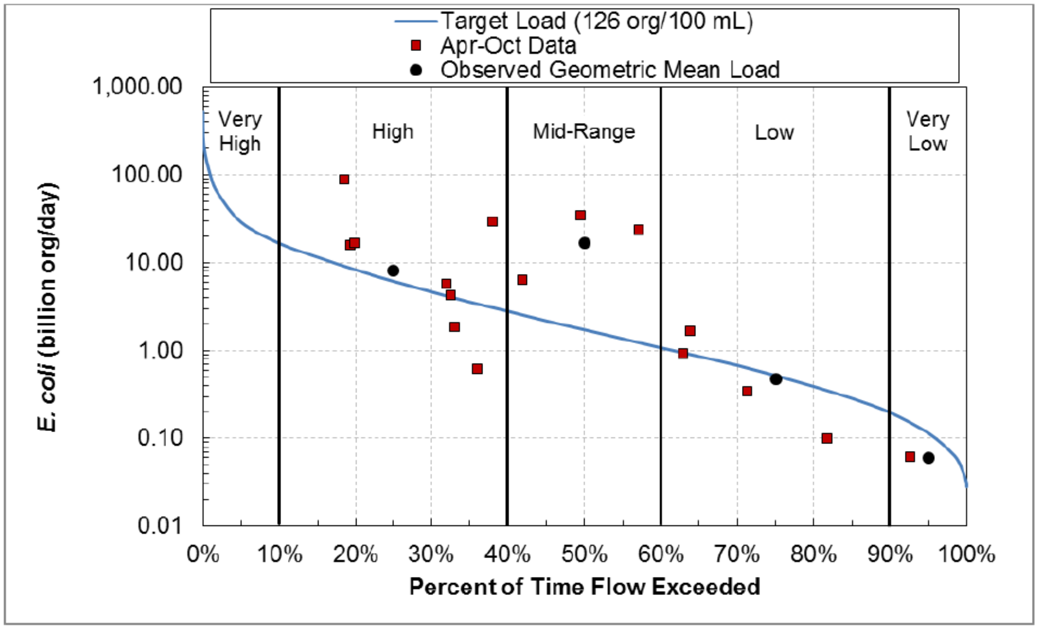

Figure 75. *E. coli* load duration curve, Sargent Creek (04010201-848).

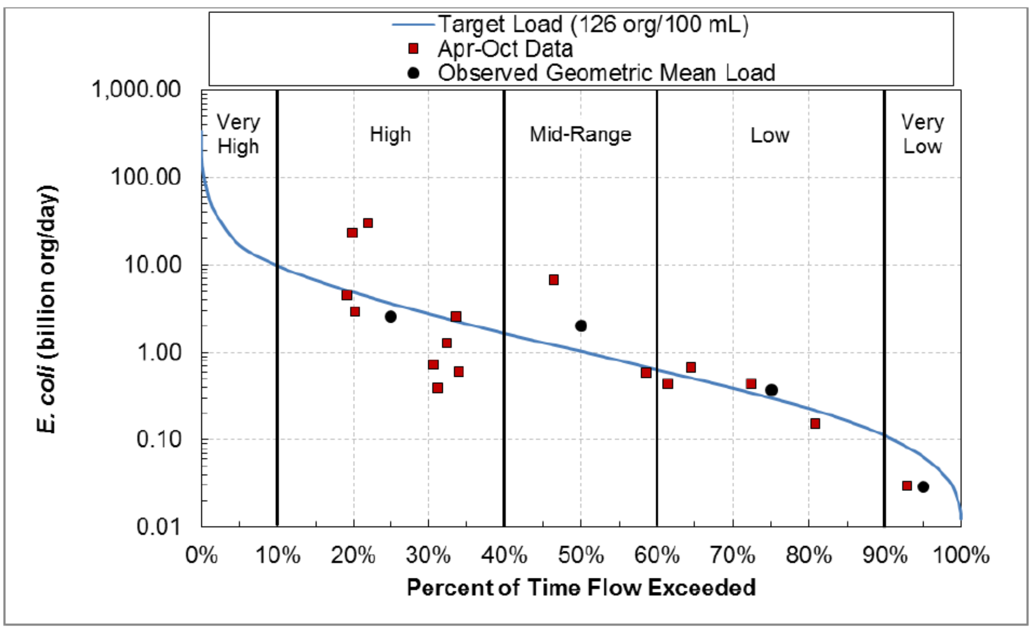

Figure 76. *E. coli* load duration curve, Stewart Creek (04010201-884).

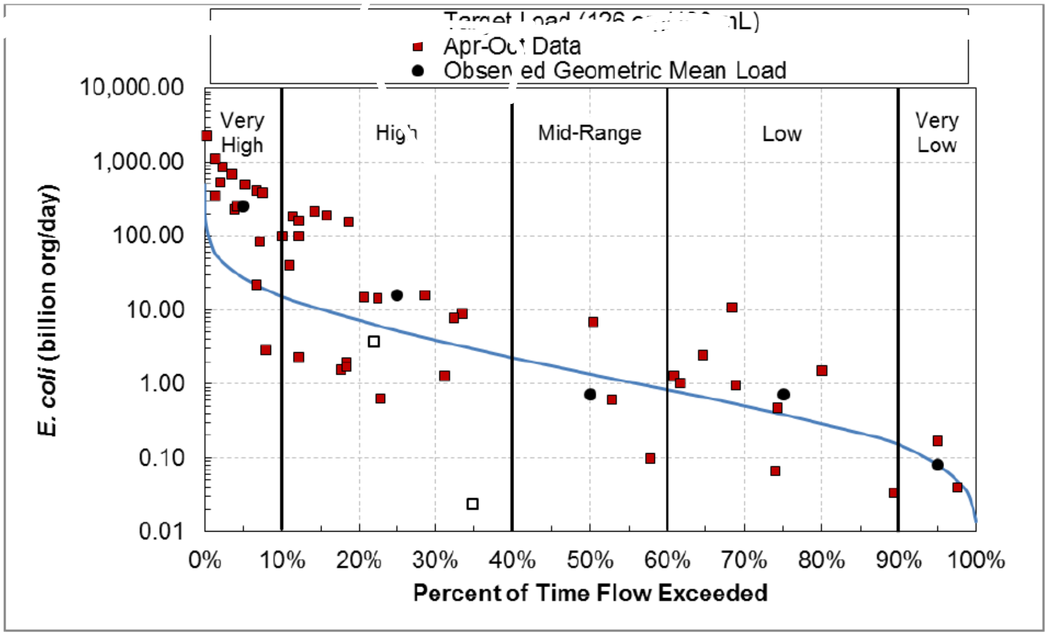

Figure 77. *E. coli* load duration curve, Unnamed Creek (Merritt Creek; 04010201-987).
Hollow points indicate samples during months when the standard does not apply.

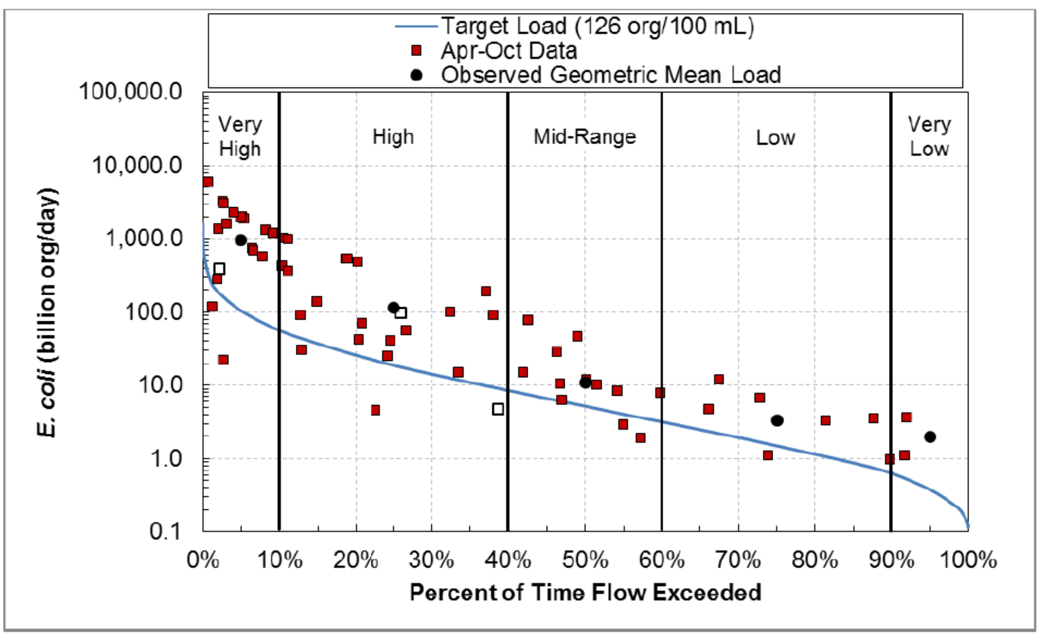

Figure 78. *E. coli* load duration curve, Tischer Creek (04010102-544).
Hollow points indicate samples during months when the standard does not apply.

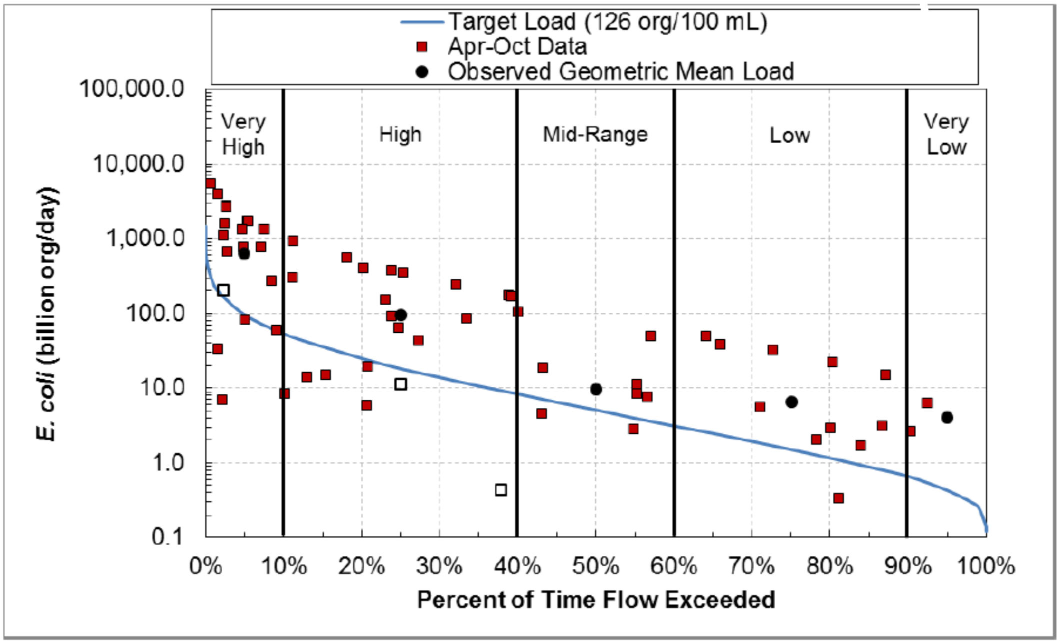

Figure 79. ***E. coli*** **load duration curve, Chester Creek (04010102-545).**

APPENDIX 2
Waterbody Specific TMDL Summary
TSS Tables 37, 39, 41, and 43
Ecoli 45 - 50

(Including Individual Municipal Separate Stormwater Waste Load Allocations)

Table 37. TSS TMDL Summary, Kingsbury Creek (04010201-626)

TMDL Parameter		Flow Regime				
		Very High (21–523 cfs)	High (4–21 cfs)	Mid-Range (1–4 cfs)	Low (0.2–1 cfs)	Very Low (0.02–0.2 cfs)
		TSS Load (lbs/day)				
Wasteload Allocation	Wisconsin Central Ltd (MN0000361) [a]	42	9.1	2.6	0.71	0.14
	Duluth City MS4 (MS400086)	47	10	2.9	0..79	0.16
	Hermantown City MS4 (MS400093)	44	9.5	2.7	0.74	0.15
	Midway Township MS4 (MS400146)	26	5.6	1.6	0.44	0.088
	Proctor City MS4 (MS400114)	108	23	6.6	1.8	0.36
	St. Louis County MS4 (MS400158)	13	2.8	0.81	0.22	0.044
	MnDOT Outstate District MS4 (MS400180)	16	3.3	0.96	0.26	0.052
	Industrial Stormwater (MNR050000) [b]	0.17	0.037	0.011	0.0029	0.00058
	Construction Stormwater (MNR100001) [b]	0.17	0.037	0.011	0.0029	0.00058
Load Allocation	Near-channel	611	132	38	10	2.0
	Non-MS4 watershed runoff	813	175	50	14	2.7
MOS		191	41	12	3.2	0.64
Loading Capacity		**1,912**	**412**	**118**	**32**	**6.4**

a. See Construction and Industrial Stormwater in Section 4.1.1 for details on actions needed to demonstrate consistency with Wisconsin Central Ltd.'s WLA.
b. It is assumed that loads from permitted construction and industrial stormwater sites that operate in compliance with general permits are meeting the WLA

Table 39. TSS TMDL Summary, Amity Creek (04010102-511).

TMDL Parameter		Flow Regime				
		Very High (37–1,128 cfs)	High (6–37 cfs)	Mid-Range (3–6 cfs)	Low (0.6–3 cfs)	Very Low (0.1–0.6 cfs)
		TSS Load (lbs/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	135	26	8.2	2.7	0.71
	Rice Lake City MS4 (MS400151)	124	24	7.5	2.4	0.65
	St. Louis County MS4 (MS400158)	5.6	1.1	0.34	0.11	0.030
	Industrial Stormwater (MNR050000) [a]	0.32	0.062	0.020	0.0064	0.0017
	Construction Stormwater (MNR100001) [a]	0.32	0.062	0.020	0.0064	0.0017
Load Allocation	Near-channel	1,030	197	62	20	5.4
	Non-MS4 watershed runoff	1,955	373	118	38	10
MOS		361	69	22	7.1	1.9
Loading Capacity		**3,611**	**689**	**218**	**71**	**19**

a. It is assumed that loads from permitted construction and industrial stormwater sites that operate in compliance with the permits are meeting the WLA.
-: No data

Table 41. TSS TMDL Summary, Amity Creek, East Branch (04010102-540).

TMDL Parameter		Very High (18–540 cfs)	High (3–18 cfs)	Mid-Range (1–3 cfs)	Low (0.2–1 cfs)	Very Low (0.05–0.2 cfs)
		TSS Load (lbs/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	24	4.6	1.4	0.44	0.11
	Rice Lake City MS4 (MS400151)	90	17	5.2	1.6	0.42
	St. Louis County MS4 (MS400158)	1.9	0.35	0.11	0.034	0.0086
	Industrial Stormwater (MNR050000) [a]	0.16	0.030	0.0092	0.0029	0.00073
	Construction Stormwater (MNR100001) [a]	0.16	0.030	0.0092	0.0029	0.00073
Load Allocation	Near-channel	332	62	19	6.0	1.5
	Non-MS4 watershed runoff	1,133	211	66	21	5.2
MOS		176	33	10	3.2	0.81
Loading Capacity		**1,758**	**328**	**102**	**32**	**8.1**

a. It is assumed that loads from permitted construction and industrial stormwater sites that operate in compliance with the permits are meeting the WLA.

Table 43. TSS TMDL Summary, Lester River (04010102-549).

TMDL Parameter		Very High (122–3,259 cfs)	High (21–122 cfs)	Mid-Range (8–21 cfs)	Low (2–8 cfs)	Very Low (0.4–2 cfs)
		TSS Load (lbs/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	137	28	8.9	2.7	0.80
	Rice Lake City MS4 (MS400151)	150	31	9.8	3.0	0.88
	University of Minnesota, Duluth MS4 (MS400214)	0.029	0.0059	0.0019	0.00057	0.00017
	St. Louis County MS4 (MS400158)	5.3	1.1	0.3	0.11	0.031
	MnDOT Outstate District MS4 (MS400180)	0.13	0.026	0.0083	0.0025	0.00074
	Industrial Stormwater (MNR050000) [a]	1.0	0.21	0.066	0.020	0.0059
	Construction Stormwater (MNR100001) [a]	1.0	0.21	0.066	0.020	0.0059
Load Allocation	Near-channel	3,484	719	228	70	21
	Non-MS4 watershed runoff	6,323	1,305	414	126	37
MOS		1,122	232	74	22	6.6
Loading Capacity		**11,222**	**2,316**	**735**	**224**	**66**

a. It is assumed that loads from permitted construction and industrial stormwater sites that operate in compliance with the permits are meeting the WLA.

Table 45. Regulated MS4s in *E. coli*-impaired watersheds.

E. coli-impaired Reach Name	Regulated MS4								
	Duluth (MS400086)[a]	Hermantown (MS400093)[a]	Midway Township (MS400146)[a]	Proctor (MS400114)[a]	Rice Lake (MS400151)[a]	Lake Superior College (MS400225)[a]	University of Minnesota, Duluth (MS400214)[a]	St. Louis County (MS400158)	MnDOT Outstate District (MS400180)
Keene Creek	✓	✓						✓	✓
Miller Creek	✓	✓			✓	✓	✓	✓	✓
Sargent Creek	✓		✓						✓
Stewart Creek	✓		✓	✓					✓
Unnamed creek (Merritt Creek)	✓	✓						✓	✓
Tischer Creek	✓				✓		✓	✓	✓
Chester Creek	✓				✓		✓	✓	✓

a. Regulated MS4 area represented by developed lands.

Table 46. *E. coli* TMDL summary, Keene Creek (04010201-627).

TMDL Parameter		Flow Regime				
		Very High (13–412 cfs)	High (2–13 cfs)	Mid-Range (0.8–2 cfs)	Low (0.1–0.8 cfs)	Very Low (0.02–0.1 cfs)
		E. coli Load (billion org/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	9.1	1.9	0.52	0.15	0.029
	Hermantown City MS4 (MS400093)	6.1	1.3	0.35	0.10	0.019
	St. Louis County MS4 (MS400158)	0.76	0.16	0.044	0.013	0.0024
	MnDOT Outstate District MS4 (MS400180)	0.95	0.20	0.055	0.016	0.0030
Load Allocation		49	10	2.8	0.80	0.15
MOS		7.3	1.5	0.42	0.12	0.023
Loading Capacity		**73**	**15**	**4.2**	**1.2**	**0.23**
Maximum monthly geomean (org/100 mL)		961				
Overall estimated percent reduction [a]		87%				

a. Calculated by comparing the highest observed (monitored) monthly geometric mean concentration from the months that the standard applies to the geometric mean standard, as a concentration, (monitored – standard/monitored). See Section 3.3 for more information.

Table 47. *E. coli* TMDL summary, Miller Creek (04010201-512).

TMDL Parameter		Flow Regime				
		Very High (27–574 cfs)	High (3–27 cfs)	Mid-Range (1–3 cfs)	Low (0.2–1 cfs)	Very Low (0.02–0.2 cfs)
		E. coli Load (billion org/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	39	7.3	1.7	0.48	0.10
	Hermantown City MS4 (MS400093)	12	2.2	0.53	0.15	0.031
	Rice Lake City MS4 (MS400151)	1.0	0.18	0.044	0.012	0.0025
	Lake Superior College MS4 (MS400225)	0.55	0.10	0.025	0.0067	0.0014
	University of Minnesota, Duluth MS4 (MS400214)	0.13	0.025	0.0060	0.0016	0.00035
	St. Louis County MS4 (MS400158)	1.6	0.31	0.073	0.020	0.0042
	MnDOT Outstate District MS4 (MS400180)	3.1	0.57	0.14	0.037	0.0079
Load Allocation		69	13	3.1	0.82	0.18
MOS		14	2.6	0.62	0.17	0.036
Loading Capacity		**140**	**26**	**6.2**	**1.7**	**0.36**
Maximum monthly geomean (org/100 mL)		418				
Overall estimated percent reduction [a]		70%				

a. Calculated by comparing the highest observed (monitored) monthly geometric mean concentration from the months that the standard applies to the geometric mean standard, as a concentration, (monitored – standard/monitored). See Section 3.3 for more information.

Table 48. *E. coli* TMDL summary, Sargent Creek (04010201-848).

TMDL Parameter		Very High (5–172 cfs)	High (0.9–5 cfs)	Mid-Range (0.3–0.9 cfs)	Low (0.06–0.3 cfs)	Very Low (0.009–0.06 cfs)
		E. coli Load (billion org/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	1.9	0.40	0.11	0.034	0.0072
	Midway Township MS4 (MS400146)	0.51	0.11	0.030	0.0091	0.0019
	MnDOT Outstate District MS4 (MS400180)	0.11	0.023	0.0064	0.0019	0.00041
Load Allocation		24	5.0	1.4	0.42	0.089
MOS		2.9	0.62	0.17	0.052	0.011
Loading Capacity		29	6.2	1.7	0.52	0.11
Maximum monthly geomean (org/100 mL)		228				
Overall estimated percent reduction [a]		45%				

-: No data

a. Calculated by comparing the highest observed (monitored) monthly geometric mean concentration from the months that the standard applies to the geometric mean standard, as a concentration, (monitored – standard/monitored). See Section 3.3 for more information.

Table 49. *E. coli* TMDL summary, Stewart Creek (04010201-884).

TMDL Parameter		Very High (3–111 cfs)	High (0.5–3 cfs)	Mid-Range (0.2–0.5 cfs)	Low (0.04–0.2 cfs)	Very Low (0.004–0.04 cfs)
		E. coli Load (billion org/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	1.3	0.28	0.078	0.024	0.0050
	Midway Township MS4 (MS400146)	0.22	0.047	0.013	0.0039	0.00084
	Proctor City MS4 (MS400114)	0.068	0.014	0.0040	0.0012	0.00026
	MnDOT Outstate District MS4 (MS400180)	0.18	0.039	0.011	0.0032	0.00069
Load Allocation		14	2.9	0.79	0.24	0.051
MOS		1.7	0.36	0.10	0.030	0.0064
Loading Capacity		**17**	**3.6**	**1.0**	**0.30**	**0.064**
Maximum monthly geomean (org/100 mL)		226				
Overall estimated percent reduction [a]		44%				

-: No data

a. Calculated by comparing the highest observed (monitored) monthly geometric mean concentration from the months that the standard applies to the geometric mean standard, as a concentration, (monitored – standard/monitored). See Section 3.3 for more information.

Table 50. *E. coli* TMDL summary, Unnamed Creek (Merritt Creek; 04010201-987).

TMDL Parameter		Flow Regime				
		Very High (5–161 cfs)	High (0.7–5 cfs)	Mid-Range (0.3–0.7 cfs)	Low (0.05–0.3 cfs)	Very Low (0.004–0.05 cfs)
		E. coli Load (billion org/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	7.1	1.4	0.37	0.10	0.021
	Hermantown City MS4 (MS400093)	0.63	0.12	0.033	0.0091	0.0019
	St. Louis County MS4 (MS400158)	0.48	0.092	0.025	0.0069	0.0014
	MnDOT Outstate District MS4 (MS400180)	0.41	0.080	0.021	0.0060	0.0012
Load Allocation		16	3.0	0.81	0.23	0.047
MOS		2.7	0.52	0.14	0.039	0.0080
Loading Capacity		**27**	**5.2**	**1.4**	**0.39**	**0.080**
Maximum monthly geomean (org/100 mL)		858				
Overall estimated percent reduction [a]		85%				

a. Calculated by comparing the highest observed (monitored) monthly geometric mean concentration from the months that the standard applies to the geometric mean standard, as a concentration, (monitored – standard/monitored). See Section 3.3 for more information.

Table 51. *E. coli* TMDL summary, Tischer Creek (04010102-544).

TMDL Parameter		Flow Regime				
		Very High (18–540 cfs)	High (3–18 cfs)	Mid-Range (1–3 cfs)	Low (0.2–1 cfs)	Very Low (0.04–0.2 cfs)
		E. coli Load (billion org/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	24	4.4	1.2	0.35	0.088
	Rice Lake City MS4 (MS400151)	6.4	1.2	0.32	0.092	0.023
	University of Minnesota, Duluth MS4 (MS400214)	1.4	0.25	0.070	0.020	0.0051
	St. Louis County MS4 (MS400158)	1.4	0.25	0.067	0.019	0.0049
	MnDOT Outstate District MS4 (MS400180)	0.026	0.0047	0.0013	0.00037	0.000093
Load Allocation		61	11	3.0	0.87	0.22
MOS		10	1.9	0.52	0.15	0.038
Loading Capacity		**104**	**19**	**5.2**	**1.5**	**0.38**
Maximum monthly geomean (org/100 mL)		1,193				
Overall estimated percent reduction [a]		89%				

a. Calculated by comparing the highest observed (monitored) monthly geometric mean concentration from the months that the standard applies to the geometric mean standard, as a concentration, (monitored – standard/monitored). See Section 3.3 for more information.

Table 52. *E. coli* TMDL summary, Chester Creek (04010102-545).

TMDL Parameter		Flow Regime				
		Very High (17–474 cfs)	High (3–17 cfs)	Mid-Range (1–3 cfs)	Low (0.2–1 cfs)	Very Low (0.04–0.2 cfs)
		E. coli Load (billion org/day)				
Wasteload Allocation	Duluth City MS4 (MS400086)	24	4.5	1.3	0.38	0.11
	Rice Lake City MS4 (MS400151)	0.24	0.046	0.013	0.0038	0.0011
	University of Minnesota, Duluth MS4 (MS400214)	0.0093	0.0017	0.00049	0.00014	0.000041
	St. Louis County MS4 (MS400158)	0.62	0.12	0.033	0.010	0.0028
	MnDOT Outstate District MS4 (MS400180)	0.030	0.0056	0.0016	0.00047	0.00013
Load Allocation		62	12	3.2	0.96	0.27
MOS		10	1.8	0.51	0.15	0.043
Loading Capacity		**96**	**18**	**5.1**	**1.5**	**0.43**
Maximum monthly geomean (org/100 mL)		1,494				
Overall estimated percent reduction [a]		92%				

a. Calculated by comparing the highest observed (monitored) monthly geometric mean concentration from the months that the standard applies to the geometric mean standard, as a concentration, (monitored – standard/monitored). See Section 3.3 for more information.