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

REPLY TO ATTENTION OF
WW-16J

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

Subject: Approval of the Snake-Middle River Watershed TMDL

Dear Mr. Skuta:

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

EPA has determined that these TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, EPA hereby approves Minnesota's 8 TMDLs for the Snake-Middle River Watershed. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's effort in submitting these TMDLs, and look forward to future submissions by the State of Minnesota. If you have any questions, please contact David Werbach of the Watersheds and Wetlands Branch at Werbach.david@epa.gov or 312-886-4242.

Sincerely,

Digitally signed by
Tera L. Fong
Date: 2020.12.21
09:43:30 -06'00'

Tera L. Fong
Division Director, Water Division

Enclosure

cc: Celine Lyman, MPCA

wq-iw5-16g

TMDL: Snake-Middle Rivers Watershed *E. coli* and Total Suspended Solids TMDLs; Marshall, Polk, and Pennington Counties Minnesota
Date: 12/21/2020

DECISION DOCUMENT FOR THE SNAKE-MIDDLE RIVERS WATERSHED *E. COLI* AND TOTAL SUSPENDED SOLIDS TMDLs, MINNESOTA

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

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

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

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

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

(1) the spatial extent of the watershed in which the impaired water body is located;
(2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;
(4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and
(5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment

impairments; chlorophyll a and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comment:

Location Description/Spatial Extent: The Snake-Middle River Watershed (SMRW) is located in northwestern Minnesota and drains an area of 498,609 acres (or approximately 779 square miles). The Snake River and Middle River both originate in western Marshall County. The rivers flow west roughly parallel until the Snake River turns north, where the Middle River joins the Snake River. The Snake River then flows into the Red River (Figure 1-1 of the final TMDL document). Much of the watershed is in Marshall County (92%), with smaller portions located in Polk (6%) and Pennington (2%) Counties. The watershed is in the Southern River Nutrient Region (SRNR) of the state.

The SMRW TMDLs address three (3) segments impaired due to excessive bacteria and five (5) segments impaired due to excessive sediment inputs (i.e., total suspended solid (TSS) TMDLs) (Table 1 of this Decision Document). MPCA noted that the five TSS TMDLs segments were originally listed on the State's Clean Water Act (CWA) 303(d) Impaired Waters list as impaired for turbidity, but that MPCA is addressing those older turbidity listings with TSS TMDLs (Section 2.2 of the final TMDL document). MPCA determined that there are no tribal lands in the SMRW (Section 1.2 of the final TMDL document).

Table 1 Waterbodies Addressed by the SMRW TMDLs

Water body name	Assessment Unit ID	Affected Use	Pollutant or stressor	Designated use
Snake River	09020309-501	Aquatic Life	TSS	2B, 3C
	09020309-502	Aquatic Life	TSS	2B, 3C
	09020309-504	Aquatic Life	TSS	2B, 3C
	09020309-504	Aquatic Recreation	*E*. coli	2B, 3C
	09020309-537	Aquatic Recreation	*E*. coli	2B, 3C
	09020309-543	Aquatic Recreation	*E*. coli	2B, 3C
Middle River	09020309-540	Aquatic Life	TSS	2B, 3C
	09020309-541	Aquatic Life	TSS	2B, 3C

Land Use:

Land use consists primarily of cultivated croplands (78%), wetlands (7%), forested lands (6%), developed lands (5%) and pasture/hay lands (3%) (Section 3.4.2 and Figure 3-5 of the final TMDL document and Table 2 of this Decision Document).

Table 2: Land cover in the impaired watersheds in the SMRW

Water body name	Assessment Unit ID	Drainage area (Sq. Miles)	Developed (%)	Forest (%)	Pasture/Hay (%)	Cultivated Crop (%)	Wetlands (%)	Other (%)
Snake River	09020309-501 (Entire Snake-Middle Rivers Watershed)	770	5	6	3	78	7	1
	09020309-502	420	5	3	2	86	3	1
	09020309-504	214	5	5	3	81	6	0
	09020309-537	330	5	3	2	85	4	1
	09020309-543	80	4	7	5	75	8	1
Middle River	09020309-540	286	5	10	5	64	15	1
	09020309-541	292	5	10	5	64	15	1

Problem Identification:

E. coli TMDLs: Segments impaired by *E. coli* are identified in Table 1 of this Decision Document were included on the final 2018 Minnesota 303(d) list. Water quality monitoring within the SMRW 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 (e.g., swimming, wading, boating, fishing etc.) and public health. At elevated levels, bacteria may cause illness within humans who have contact with or ingest bacteria laden water. Recreation-based contact can lead to ear, nose, and throat infections, and stomach illness.

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

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

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

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

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

Source Identification (point and nonpoint sources):
Bacteria:
Point Source Identification:
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 three wastewater treatment facilities (WWTFs) in the SMRW which contribute bacteria from treated wastewater releases (Table 3 of this Decision Document). MPCA assigned each of these facilities a portion of the bacteria wasteload allocation (WLA).

Table 3: NPDES facilities which contribute bacteria to impaired segments in the SMRW

Waterbody name	Impaired Reach	Facility	Permit	Maximum Daily Effluent Volume (mgd)	Permitted Concentration (org/100 mL)	*E. coli* WLA (org/day)	Impaired Reach Point-Source WLA (org/day)
Snake River	09020309-504	Viking WWTF	MNG585370	0.244	126	1.17 E+09	1.17 E+09
Snake River	09020309-537	Warren WWTF	MNG585073	4.790	126	2.28 E+10	2.59 E+10
		Alvarado WWTF	MNG585171	0.648	126	3.09 E+09	

Concentrated Animal Feedlot Operations (CAFOs): MPCA stated that there was one CAFO that could impact Segments 504 and 537 (Section 3.7.1.1 and Figure A-4 in Appendix A 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).

Municipal Separate Storm Sewer System (MS4) communities: Stormwater from MS4s can transport bacteria to surface water bodies during or shortly after storm events. MPCA stated that there are no MS4 located in the SMRW. (Section 3.7.1.1 of the final TMDL document). MPCA also noted that there are no Combined Sewer Overflows (CSOs) nor Sanitary Sewer Overflow (SSOs) in the watershed.

<u>Non-Point Source Identification:</u> MPCA indicated the potential nonpoint sources of bacteria for the SMRW TMDLs are:

Animal Feeding Operations: Manure from livestock can contribute bacteria loads directly into the streams or by runoff from cropland or pastures where manure and bacteria can be washed off during precipitation events, snowmelt, or irrigation. This can be from either pasture lands or where manure is used as fertilizer on croplands.

Wildlife: Wildlife can also directly contribute bacteria loads similar to livestock while wading or swimming in the stream, and indirectly contribute on lands that produce stormwater runoff during precipitation events. Bacteria loads from wildlife are generally considered natural background. Some best management practices (BMPs) that reduce loads from livestock and other sources can also reduce loads from wildlife.

Septic systems: Human bacteria sources in urban settings can include cross connections between sanitary sewers and storm drain systems, leaks or overflows from sanitary sewer systems, and wet-weather discharges from centralized wastewater collection and treatment facilities. Outside of city domestic wastewater coverage areas, septic systems can be a potential human source of bacteria loads. Pet waste is another potential source of bacteria from nonregulated communities in a watershed.

TSS

Point Source Identification:

NPDES permitted facilities: MPCA determined that there are seven WWTFs in the SMRW which contribute TSS from treated wastewater releases. MPCA assigned each of these facilities a portion of the TSS WLA (Table 4 of this Decision Document and Tables 4-5 of the final TMDL document).

Table 4: NPDES facilities which contribute TSS to impaired segments in the SMRW

Waterbody name	Impaired Reach	Facility	Permit	Effluent Design-Flow (mgd)	Permitted Concentration (mg/L)	TSS WLA (tons/day)	Impaired Reach Point-Source WLA (tons/day)
Snake River	09020309-502	Warren WWTF	MNG585073	4.790	45	0.8988	1.021
		Alvarado WWTF	MNG585171	0.6484	45	0.1217	
Snake River	09020309-504	Viking WWTF	MNG585370	0.2444	45	0.0459	0.0459
Middle River	09020309-540 & 09020309-541	Argyle WWTF	MNG585140	0.7381	45	0.1385	2.083
		Newfolden WWTF	MNG585145	0.3259	45	0.0611	
		Middle River WWTF	MNG585163	0.2444	45	0.0459	
		Hawkes Co Inc	MN0062715	14.69	30	1.838	

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 SMRW 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.

Municipal Separate Storm Sewer System (MS4) communities: As stated above MPCA stated that there are no MS4s located in the SMRW (Section 3.7.1.1 of the final TMDL document).

Future Growth:

MPCA anticipates that there will only be a slight demographic growth in the watershed. This may result in a slight shift in land use from agricultural lands to developed land. Based on this information MPCA indicated that there was no planned increase in the capacity of wastewater facilities and future MS4 development is not planned in the SMRW.

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 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 SMRW TMDLs are designated as Class 2 waters for aquatic recreation use (fishing, swimming, boating, etc.) and aquatic life use (TSS). For this TMDL, the Class 2 use is the most protective. Class 3 waters are protected for industrial use; none of the segments are impaired for the Class 3 use. The Class 2 designated use is described in Minnesota Rule 7050.0140 (3):

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

Water use classifications for individual water bodies are provided in Minnesota Rules 7050.0470, 7050.0425, and 7050.0430. This TMDL report addresses the water bodies that do not meet the standards for Class 2 waters. The impaired streams in this report are classified as impaired Class 2B waters (Table 1-1 of the final TMDL document). Class 2B waters are protected for aquatic life and recreation, and the streams in this project are characterized as general warm water habitat waters.

Bacteria TMDL Targets: The bacteria TMDL targets employed for the SMRW bacteria TMDLs are the *E. coli* standards as stated in Table 5 of this Decision Document. The focus of this TMDL is on the 126 organisms (orgs) per 100 mL (126 orgs/100 mL) geometric mean portion of the standard. MPCA determined that using the 126 orgs/100 mL portion of the standard for TMDL calculations will result in the greatest bacteria reductions within the SMRW and will result in the attainment of the 1,260 orgs/100 mL portion of the standard. MPCA stated that 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 (Section 4.2.1 of the final TMDL document).

Table 5: Bacteria Water Quality Standards Applicable to the SMRW 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

TSS TMDL Targets: Five reaches in the Snake-Middle Rivers Watershed were originally impaired for turbidity. The turbidity standard was replaced by a TSS standard in January 2015. Water quality standards for Class 2B streams can be found in Minn. R. 7050.0222 subp. 4. The SMRW is in the Southern River Nutrient Region of the state, and the TSS standard the SRNR is **65 mg/L** TSS, which cannot be exceeded more than 10% of the time. The TSS standard applies from April through September.

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

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

Comment:

Functionally a TMDL is represented by the equation:

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

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

SMRW 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 SMRW 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 SMRW (see Figures 4-1, 4-2, and 4-3 in the final TMDL document). The SMRW FDCs were developed using flow data generated from Hydrologic Simulation Program-Fortran (HSPF) modeling efforts at the outlet/pour point of each impaired reach (Section 4.2.1 of the final TMDL document). MPCA focused on daily HSPF modeled flows from approximately 2006 to 2015 and bacteria (*E. coli*) water quality data from the same time period (Section 3.5.2 of the final TMDL document). HSPF hydrologic models were developed to simulate flow characteristics within the SMRW 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.

HSPF is a comprehensive modeling package used to simulate watershed hydrology and water quality on a basin scale. The package includes both an Agricultural Runoff Model and a more general nonpoint source model. HSPF parametrizes numerous hydrologic and hydrodynamic processes to determine flow rate, sediment, and nutrient loads. HSPF uses continuous meteorological records to create hydrographs and to estimate time series pollution concentrations.[1,2] The output of the HSPF process is a model of multiple hydrologic response units (HRUs), or subwatersheds of the overall SMRW. The flow from these HRUs were calibrated to different gage sites with up to ten years of data (2006 through 2015).

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 SMRW 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 SMRW 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 SMRW 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 4-1 of the final TMDL document). Individual LDCs are found in Section 4.2.5 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.

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[1] HSPF User's Manual - https://water.usgs.gov/software/HSPF/code/doc/hspfhelp.zip

[2] EPA TMDL Models Webpage - https://www.epa.gov/exposure-assessment-models/tmdl-models-and-tools

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 SMRW were calculated and those results are found in Tables 6-8 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).

Tables 6-8 of this Decision Document report five points (the midpoints of the designated flow regime) on the loading capacity curve. However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve. The LDC method can be used to display collected bacteria monitoring data and allows for the estimation of load reductions necessary for attainment of the bacteria water quality standard. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for the segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Tables 6-8 at the end of this Decision Document identify 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.

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 SMRW bacteria TMDLs. The methods used for determining the TMDL are consistent with U.S. EPA technical memos.[3]

SMRW TSS TMDL: MPCA developed LDCs to calculate the TSS TMDLs for streams in the SMRW. The same LDC development strategies were employed for the TSS and bacteria TMDLs (e.g., the incorporation of HSPF model simulated flows to develop FDCs, water quality monitoring information collected within the SMRW informing the LDC, etc.). The FDC were transformed into LDC by multiplying individual flow values by the TSS target (65 mg/L) and then multiplying that value by a conversion factor.

TSS TMDLs were calculated (Tables 9-12 of this Decision Document). The load allocation was calculated after the determination of the WLA, and the MOS. Load allocations (e.g., stormwater runoff from agricultural land use practices) was not split among individual nonpoint contributors. Instead, load allocations were combined into one value to cover all nonpoint source contributions. Tables 9-12 of this Decision Document report five points (i.e., 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. It should be noted that for several TMDLs the State also included information on boundary conditions for the reach. This is included in the Tables

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

9-12 of this Decision Document for information purposes. The TMDL is bolded in the tables at the end of this document.

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 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. Tables 9-12 of this Decision Document identify 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.

It should be noted that MPCA determined that for the segments in the Middle River one TMDL was calculated to address both segments (540 and 541). Segment 541 is immediately downstream of Segment 540. Segment 541 ends at the Snake River. MPCA discussed the rational for combing the two segments into one TMDL in Section 4.3.5 of the final TMDL document. The drainage area of the upstream segment 540 is considerably larger than the area for the downstream segment 541 and the percent of sediment from bed/bank increases from 64.6% in Segment 540 to 71% in Segment 541. This section of the Middle River has extremely flashy flows, and the flows from the entire area drain to Segment 540 likely drive the large bed/bank contributions that occur in Segment 541. The BMPs that would be used to help decrease the flashiness of the stream throughout the entire area would likely have a greater impact on sediment loads to Segment 541.

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

<u>Critical condition:</u> The critical condition for the TSS TMDLs is the higher flow conditions, generally during spring runoff or storm events (Section 5.2 of the final TMDL document). MPCA accounted for the critical conditions by focusing implementation actions towards the higher flow conditions, to reduce loads during these time periods (Sections 7 and 9 of the final TMDL document). For the bacteria TMDLs, MPCA determined that the critical condition for loading was during the spring and early summer months, and the critical condition for water quality impacts was during the later summer months, when flows were lower and stream temperatures higher (Section 5.1 of the final TMDL document). As with the TSS TMDLs, MPCA accounted for the critical conditions by focusing implementation actions towards the higher flow conditions, to reduce loads during these time periods and thereby reduce concentrations in the later months (Sections 8 and 10 of the final TMDL document).

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 SMRW TMDLs can be attributed to different nonpoint sources.

SMRW bacteria TMDLs: The calculated LA values for the bacteria TMDLs are applicable across all flow conditions in the SMRW (Tables 6-8 of this Decision Document). MPCA identified several nonpoint sources which contribute bacteria loads to the surface waters of the SMRW, including; stormwater from agricultural and feedlot areas, failing septic systems, wildlife (e.g., waterfowl and large game species). MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations but aggregated the nonpoint sources into one 'watershed load' LA calculation. More detail discussion can be found in Section 3.7.1.2 of the final TMDL document.

SMRW TSS TMDL: The calculated LA values for the TSS TMDL are applicable across all flow conditions. MPCA identified several nonpoint sources which contribute sediment loads to the SMRW (Tables 9-12 of this Decision Document). Load allocations were recognized as originating from many diverse nonpoint sources including; stormwater contributions from agricultural lands and feedlots, and streambank erosion. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations but aggregated the nonpoint sources into one 'watershed load' LA calculation. More detail can be found in Section 3.7.2.2 of the final TMDL document.

EPA finds MPCA's approach for calculating the LA for bacteria, and TSS to be reasonable. 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:

SMRW bacteria TMDLs: MPCA identified NPDES permitted facilities (Table 3 of this Decision Document) within the SMRW and assigned those facilities a portion of the WLA. WLAs for each of these individual facilities were calculated based on the facility's maximum daily volume (in millions of gallons per day) and the *E. coli* WQS (126 orgs /100 mL) (Section 4.2.2 of the final TMDL). MPCA explained that the WLA for each individual WWTP was calculated based on the *E. coli* WQS but WWTF permits are regulated for the fecal coliform WQS (200 orgs /100 mL) and that if a facility is meeting its fecal coliform limits, which are set in the facility's discharge permit, MPCA assumes the facility is also meeting the calculated *E. coli* WLA from the SMRW 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.

The SMRW has no MS4s in the watershed therefore, the WLA = 0.

MPCA noted the presence of one CAFO in the SMRW in Section 3.7.1.1 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) by MPCA for the SMRW bacteria TMDLs. CAFOs are generally defined as having over 1,000 animal units confined for more than 45 days in a year. Under MPCA NPDES permit requirements, discharges of pollutants from CAFOs are not allowed except under extreme circumstances (24-hour storm duration exceeding the 25-year recurrence interval), and therefore no allocations were developed for the manure-handling facilities. If there is a discharge, MPCA noted that it must be consistent with the applicable permit. Runoff from the spreading of manure in agronomic rates is not regulated as a point source discharge and is therefore considered in the nonpoint source load.

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

SMRW TSS TMDL: MPCA identified seven NPDES permitted facilities, (Table 4-5 of the final TMDL and Table 4 of this Decision Document) which contribute sediment to four of the impaired segments and assigned these facilities a portion of the WLA (Tables 4 and 9-12 of this Decision Document). The WLA was calculated based on the TSS effluent limit and the average daily flow rate (Section 4.3.2 of the final TMDL document).

MPCA calculated a portion of the WLA for construction and industrial stormwater for the TSS TMDL. This WLA was represented as a categorical WLA for construction and industrial stormwater. The construction and industrial stormwater allocations for the SMRW TSS TMDL were calculated based on the percent of area with industrial uses was determined by dividing total industrial acres over total watershed acres. Average annual industrial stormwater acres in 2015 ranged from 0.012% of the area to

0.038% of the area for different impairment areas. To ensure coverage, 0.045% of the area in all impairments was assumed to be industrial.

To determine the load allowed from construction and industrial stormwater, the loading capacity in each flow zone (minus the MOS) was multiplied by 0.0007 to represent 0.025% from construction stormwater and 0.045% from industrial permits.

EPA finds the MPCA's approach for calculating the WLA for the SMRW TSS TMDL 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 and TSS TMDLs. All five parameters employed an explicit MOS set at 10% of the loading capacity.

SMRW bacteria and TSS TMDLs: The SMRW 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 6-12 of this Decision Document). MPCA explained that 10% was considered an appropriate MOS for both the bacteria and TSS TMDLs because the LDC approach minimizes the uncertainty associated with developing TMDLs. For the bacteria TMDLs, MPCA also considered the fact that they did not include a rate of decay or die-off rate of pathogen species when calculating the TMDL or creating LDCs. As stated in the 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.

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:

SMRW 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 SMRW 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).

SMRW TSS TMDL: 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 SMRW. Sediment loading in the SMRW 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 streamflow's, 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 SMRW 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, during spring flows and snowmelt 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 SMRW bacteria and TSS TMDLs provide reasonable assurance that actions identified in the implementation section of the final TMDL (i.e., Sections 7 and 9 of the final TMDL document), will be applied to attain the loading capacities and allocations calculated for the impaired reaches within the SMRW. 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 SMRW. Implementation practices will be implemented over the next several years. It is anticipated that staff from the Snake-Middle Rivers Watershed county (primarily Marshall County), Soil and Water Conservation Districts (SWCDs), and the Middle-Snake-Tamarac River Watershed District (MSTRWD) groups, will work together to reduce pollutant inputs to the SMRW. MPCA has authored a Snake-Middle Rivers Watershed Restoration and Protection Strategy Report (approved by MPCA on December 3, 2020) 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.

County SWCDs, have a history of implementation efforts in the SMRW. SWCDs, and the MSTRWD have a long history of completing water quality improvement projects with a well-developed infrastructure in place. Section 9 of the final TMDL document MPCA outlines completed projects that have been effective in reducing pollutants loads to Minnesota waters. Additionally, multiple flood damage reduction projects have been completed throughout the watershed. Selection of sites for new Best Management Practices will be led by local government units (LGUs), including SWCDs, watershed districts, and county planning and zoning offices, with support from state and federal agencies. These BMPs are supported by programs administered primarily by the SWCDs, Board of Water and Soil Resources (BWSR), and the Natural Resource Conservation Service (NRCS).

For the eight impairments addressed with seven TMDLs in this report, the vast majority of the pollutant loads are attributed to nonpoint sources. The existing state statutes/rules pertaining to nonpoint sources include:

- Average of a 50-foot buffer (minimum of 30 feet) required for the shore impact zone of streams classified as protected waters (Minn. Stat. § 103F.201) for agricultural land uses [Minnesota State Legislature 2015].
- 16.5-foot minimum width buffer required on public drainage ditches (Minn. Stat. § 103E.021).
- Protecting highly erodible land within the 300-foot shoreland district (Minn. Stat. § 103F.201).
- Excessive soil loss statute (Minn. Stat. § 103F.415).
- Nuisance nonpoint source pollution (Minn. R. 7050.0210, subp. 2).

Monitoring in the watershed will be conducted by volunteers and county/SWCDs. Continued water quality monitoring within the basin is supported by MPCA. MPCA stated that annual reporting by the Snake-Middle Rivers Watershed partners will provide benchmarks for measuring progress of the implemented TMDLs and for adaptive management. Details of the monitoring approach were specified during the Snake-Middle Rivers WRAPS process. Monitoring will also be conducted by state and local groups independent of the WRAPS schedule through the MPCA's Watershed Pollutant Load Monitoring Network and the Minnesota Department of Natural Resources (DNR) Cooperative Stream Gaging program, both of which have provided useful long-term water monitoring data. The next intensive watershed monitoring in the next iteration of the Snake-Middle Rivers WRAPS project is scheduled to start in 2024 with waterbody condition assessments in early 2026.

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, 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 SMRW (Section 8 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 local SWCDs) and volunteers as long as there is sufficient funding to support the efforts of these local entities. At a minimum, the SMRW will be monitored once every 10 years as part of the MPCA's Intensive Watershed Monitoring cycle. The next intensive watershed monitoring in the next iteration of the Snake-Middle Rivers WRAPS project is scheduled to start in 2024 with waterbody condition assessments in early 2026.

Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation efforts utilized in the SMRW. 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 SMRW. 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.

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 TMDL outlined some implementation strategies in Section 9 of the final TMDL. MPCA stated that in implementing the TMDL they would be utilizing an adaptive management approach. Management activities will be changed or refined to more efficiently meet the TMDL goals. Currently MPCA utilizes this process and completes the cycle every ten years.

SMRW bacteria TMDLs:
Section 9.2.1 of the final TMDL document outlines BMPs that are expected to reduce *E. coli* loads to impaired streams, and noted two State documents to assist stakeholders in developing and implementing restoration activities. The WRAP report also covers BMP information.

List of possible types of BMPs for the SMRW:

- Animal Access Control: Off-stream watering and fencing will aid in restricting animal access to stream and sensitive stream bank areas and allow growth of riparian vegetation.
- Buffers and Streambank Stabilization: Riparian vegetation helps to filter pollutants and stabilize banks. The SWCD is identifying the priority for placing perennial vegetation buffers along small streams, headwater areas, and county ditches.
- Manure Management: Proper manure management will assist in reducing the amount of manure-related organic matter that is carried in runoff volumes.
- Pasture Management: Rotational grazing, off-stream watering, and maintenance of riparian vegetation will aid in keeping bacteria from entering stream systems.
- Pet waste management: Ensure that local ordinances are being followed by using public education and enforcement of pet waste regulations.
- County SSTS (Septic System) Compliance and Inspection Programs: Upgrades of noncompliance.
- Public Education, Public Outreach, and Civic Engagement

SMRW TSS TMDL:
Section 9.2.2 of the final TMDL document outlines BMPs that are expected to reduce *E. coli* loads to impaired streams, and noted two State documents to assist stakeholders in developing and implementing restoration activities. The WRAP report also covers BMP information.

- Buffers and Streambank Stabilization: Riparian vegetation helps to filter pollutants and stabilize banks.
- Agricultural BMPs: Cropland BMPs such as conversion to pasture with rotational grazing, conversion to grassland/perennials, the use of no-till cropping systems, the use of cover crops, and many others help to filter out or reduce the sediment that moves into the streams systems. Cropland BMPs help reduce flashiness of the system.
- Public Education: The benefits of the above practices should continue with SMRW partnering counties providing core materials for reinforcing messages aimed at targeted audiences.

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

11. Public Participation

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

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

Comment:
The public participation section of the final TMDL document submittal is found in Section 10 of the final TMDL document.

Throughout the development of the SMRW TMDLs the public was given various opportunities to participate in the TMDL process. The MPCA encouraged public participation through public meetings and small group discussions with stakeholders within the watershed.

Meetings were first held in 2017 to begin the TMDL process. A project kick-off meeting was held on April 25, 2017. Additional meetings were held during 2017 to gather public input on the development of the TMDL. Due to the pandemic, no formal public hearing or meeting was held, but MPCA circulated a flyer to all interested parties that contained the web-based presentations regarding the TMDL and WRAPS documents.

The draft TMDL was posted online by the MPCA at (http://www.pca.state.mn.us/water/tmdl). The public comment period began on September 21, 2010 and ended on October 21, 2020. The MPCA received one comment from the EPA, regarding a clarification of the mercury impairments in the watershed. MPCA responded appropriately to the comment.

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:
This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130.

The EPA received the final SMRW TMDL document, submittal letter and accompanying documentation from the MPCA on December 9, 2020. The transmittal letter explicitly stated that the final Snake-Middle Rivers Watershed TMDLs for *E. coli* and TSS were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval. The letter clearly stated that this was a final TMDL submittal under Section 303(d) of CWA. The letter also contained the name of the watershed as it appears on Minnesota's 303(d) list, and the causes/pollutants of concern. This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130.

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

13. Conclusion

After a full and complete review, the EPA finds that the 3 bacteria TMDLs, and the 5 TSS TMDLs addressing 7 segments satisfy all elements for approvable TMDLs. This TMDL approval is for **eight TMDLs**, addressing segments for aquatic recreational and aquatic life use impairments (Table 1 of this Decision Document).

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

Approved TMDLS

Table 6: Snake River AUID 09020309-504 *E. coli* TMDL in (organisms/day)

TMDL Component		Very High	High	Mid	Low	Very Low
Allowable Loading at Pour point		1.44E+12	3.96E+11	1.39E+11	3.57E+10	5.17E+09
Boundary Condition (BC) Allowable Loading (Reach 543)		9.75E+11	2.29E+11	5.94E+10	1.11E+10	1.13E+09
Total Daily Loading Capacity (Adjusted for BC)		4.61E+11	1.67E+11	7.93E+10	2.46E+10	4.04E+09
Margin of Safety		4.61E+10	1.67E+10	7.93E+09	2.46E+09	4.04E+08
Wasteload Allocations	**Viking WWTF**	1.17E+09	1.17E+09	1.17E+09	1.17E+09	1.17E+09
	Industrial and Construction Stormwater	–	–	–	–	–
Load Allocation		4.14E+11	1.49E+11	7.02E+10	2.10E+10	2.47E+09

Bold is TMDL for the segment 09020309-504

Table 7: Snake River AUID 09020309-537 *E. coli* TMDL in (organisms/day)

TMDL Component		Very High	High	Mid	Low	Very Low
Allowable Loading at Pour point		2.28E+12	5.73E+11	1.96E+11	4.89E+10	6.92E+09
Boundary Condition (BC) Allowable Loading (Reach 504)		1.44E+12	3.96E+11	1.39E+11	3.57E+10	5.17E+09
Total Daily Loading Capacity (Adjusted for BC)		8.43E+11	1.78E+11	5.76E+10	1.32E+10	1.74E+09
Margin of Safety		8.43E+10	1.78E+10	5.76E+09	1.32E+09	1.74E+08
Wasteload Allocations	**Warren and Alvarado WWTFs**	2.59E+10	2.59E+10	2.59E+10	*	*
	Industrial and Construction Stormwater	–	–	–	–	–
Load Allocation		7.33E+11	1.34E+11	2.59E+10	1.19E+10	1.57E+09

Bold is TMDL for the segment 09020309-537

Note: The WLA for the permitted wastewater dischargers are based on facility design flow. The WLA exceeded the low-flow regime total daily loading capacity and is denoted in the table by a "*". For this flow regime, the WLA and nonpoint-source LA is determined by the following formula: Allocation = (flow contribution from a given source) × (E. coli concentration limit or standard) × conversion factor.

Table 8: Snake River AUID 09020309-543 *E. coli* TMDL summary in (organisms/day)

TMDL Component		Very High	High	Mid	Low	Very Low
Total Daily Loading Capacity		9.75E+11	2.29E+11	5.94E+10	1.11E+10	1.13E+09
Margin of Safety		9.75E+10	2.29E+10	5.94E+09	1.11E+09	1.13E+08
Wasteload Allocations	**There are no Permitted Dischargers**	–	–	–	–	–
	Industrial and Construction Stormwater	–	–	–	–	–
Load Allocation		8.77E+11	2.06E+11	5.35E+10	9.99E+09	1.02E+09

Table 9: Snake River AUID 09020309-501 TSS TMDL summary in (tons/day)

TMDL Component		Very High	High	Mid	Low	Very Low
Allowable Loading at Pour point		328.7	86.86	29.64	6.400	0.9300
Boundary Condition (BC) Allowable Loading (Reach 502)		176.3	45.60	16.14	3.560	0.4216
BC Allowable Loading (Reach 541)		138.4	35.24	10.42	2.103	0.3054
Total Daily Loading Capacity (Adjusted for BC)		**14.03**	**6.017**	**3.080**	**0.7369**	**0.2013**
Margin of Safety		1.403	0.6017	0.3080	0.0737	0.0201
Wasteload Allocations	**There are no Permitted Dischargers**	–	–	–	–	–
	Industrial and Construction Stormwater	0.0088	0.0038	0.0019	0.0005	0.0001
Load Allocation		12.62	5.411	2.770	0.6627	0.1811

Bold is TMDL for the segment 09020309-501

Table 10: Snake River AUID 502 TSS TMDL summary in (tons/day)

TMDL Component		Very High	High	Mid	Low	Very Low
Allowable Loading at Pour point		176.3	45.60	16.14	3.560	0.4216
Boundary Condition (BC) Allowable Loading (Reach 504)		86.49	25.00	8.935	2.217	0.2613
Total Daily Loading Capacity 502 (Adjusted for BC)		**89.81**	**20.60**	**7.205**	**1.343**	**0.1603**
Margin of Safety		8.981	2.060	0.7205	0.1343	0.0160
Wasteload Allocations	**Warren WWTF and Alvarado WWTF**	1.021	1.021	1.021	1.021	*
	Industrial and Construction Stormwater	0.0566	0.013	0.0045	0.0008	0.0001
Load Allocation		79.75	17.51	5.459	0.1869	0.1442

Bold is TMDL for the segment 09020309-502

Note: The WLA for the permitted wastewater dischargers are based on facility design flow. The WLA exceeded the low-flow regime total daily loading capacity and is denoted in the table by a "*". For this flow regime, the WLA and nonpoint-source LA is determined by the following formula: Allocation = (flow contribution from a given source) × (TSS concentration limit or standard) × conversion factor.

Table 11: Snake River AUID 504 TSS TMDL summary in (tons/day)

TMDL Component		Very High	High	Mid	Low	Very Low
Total Daily Loading Capacity 504		**86.49**	**25.00**	**8.935**	**2.217**	**0.2613**
Margin of Safety		8.649	2.500	0.8935	0.2217	0.0261
Wasteload Allocations	**Viking WWTF**	0.0459	0.0459	0.0459	0.0459	0.0459
	Industrial and Construction Stormwater	0.0545	0.0158	0.0056	0.0014	0.0002
Load Allocation		77.74	22.44	7.990	1.948	0.1891

Table 12: Snake River AUIDs 540 and 541 TSS TMDL summary in (tons/day)

TMDL Component		Very High	High	Mid	Low	Very Low
Total Daily Loading Capacity 504		**138.4**	**35.24**	**10.42**	**2.103**	**0.3054**
Margin of Safety		13.84	3.524	1.042	0.2103	0.0305
Wasteload Allocations	**Argyle, Newfolden, and Middle WWTFs and Hawkes Co. Inc.**	2.083	2.083	2.083	*	*
	Industrial and Construction Stormwater	0.0872	0.0222	0.0066	0.0013	0.0002
Load Allocation		122.4	29.61	7.29	1.891	0.2747

Note: The WLA for the permitted wastewater dischargers are based on facility design flow. The WLA exceeded the low-flow regime total daily loading capacity and is denoted in the table by a "*". For this flow regime, the WLA and nonpoint-source LA is determined by the following formula:
Allocation = (flow contribution from a given source) × (TSS concentration limit or standard) × conversion factor