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

REPLY TO THE ATTENTION OF:
WW-16J

MAR 28 2019

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDLs) and supporting documentation for the Thief River Watershed to address aquatic life and aquatic recreation use impairments by turbidity/Total Suspended Solids (TSS) in the Thief River (09020304-501) and *E. coli* in the Mud River (09020304-507) in northwestern Minnesota, for a total of two TMDLs in Marshall, Pennington and Beltrami Counties.

The waters classified as Class 2B waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life, and their habitats, and suitable for aquatic recreation of all kinds, including bathing. Class 3C waters shall be such as to permit their use for industrial cooling and materials transport without a high degree of treatment being necessary to avoid severe fouling, corrosion, scaling, or other unsatisfactory conditions.

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 TMDLs. This approval addresses the Thief River for TSS, and Mud River for *E. coli*. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

wq-iw5-11g

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

Sincerely,

Joan M. Tanaka

Joan M. Tanaka
Acting Director, Water Division

Enclosure

cc: Celine Lyman, MPCA
Denise Oakes , MPCA

TMDL: Thief River, MN
Date: March 2019

DECISION DOCUMENT FOR APPROVAL OF THE THIEF RIVER, 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 (chl-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 Minnesota Pollution Control Agency (MPCA) has developed and submitted a TMDL to address aquatic life and aquatic recreation use impairments by turbidity/Total Suspended Solids (TSS) in the Thief River (09020304-501) and *E. coli* in the Mud River (09020304-507) in northwestern Minnesota, for a total of two TMDLs. The waters in the watershed are highly controlled, as there are more than 30 impoundments and reservoirs. There are streams, channelized streams, and judicial ditches (JDs) (Moose River JD 21, Mud River JD 11, Branch 200 of JD 11, Marshall County Ditch 20, and JD 30) that flow primarily from east to west, until their confluence with the Thief River.

The Thief River begins at the western outlet of Thief Lake, which was formed by the damming of the lake in the 1930s. The Thief River is a tributary of the Red Lake River, flowing generally southward from the Lake and joins the Red Lake River at Thief River Falls. The Red Lake River then continues generally southward then changes to a westward direction, eventually into the Red River of the North Basin, in Marshall, Pennington, and Beltrami Counties. The Red River of the North flows generally northward from Minnesota into Canada and forms part of the western boundary of Minnesota, between Minnesota and North Dakota.

Before the Thief River reaches the town of Thief River Falls and the Red Lake River, it flows southward from Thief Lake, through the Agassiz National Wildlife Refuge (NWR), and continues southward. At the western portion of the NWR is the Agassiz Pool which discharges into the Thief River at an outlet with radial gates (Section 3 of the TMDL) which are opened for discharge to occur. The gates are opened when the pool becomes too shallow due to sediment deposits from the tributaries, and when the pool needs to maintain a target water level.

North of the NWR - E. coli impairs the Aquatic Recreation Use in the Mud River (-507) which flows into the east portion of the Agassiz Pool in the NWR, and a TMDL is also completed for this river. The Mud River has low Dissolved Oxygen (DO) believed to be caused by insufficient flow. The low flow or absence of flow in both the Mud and Moose Rivers results in low DO in violation of standards, but not due to the contribution of a pollutant; no DO TMDL is completed. Since the 2014 303(d) list, more recent measurements have resulted in recommendations for the delisting of some segments for low DO, *E. coli* and unionized ammonia so a TMDL will not be completed for these locations, shown in Table 1-1 of the TMDL, incorporated here by reference.

South of the NWR - The JDs and branches of the JDs south of the NWR flow through several pools and impoundments and eventually flow into Thief River where it continues southward. Some of the rivers were dredged many years ago, with maps showing their existence as early as 1912 and 1913, constructed to improve crops by providing better drainage.

Land Use: data for land use in the watershed from 2011 is shown in Table 3-3 of the TMDL. Uses are: 36.35% cultivated crops; 28.36% emergent herbaceous wetlands; 17.06% woody

wetlands; 6.87% pasture/hay; 5.97% deciduous forest; 1.69% open water; and less than 1% each barren land, shrub/scrub, and evergreen forest.

Problem Identification for TSS: The Town of Thief River Falls, at the southern end of the Thief River, gets its drinking water from the River, and at times in the past, the water has been undrinkable and had a strong chlorine taste. There is a strong correlation between flow and turbidity, with turbidity occurring after spikes in flow due to controlled drawdown of the Agassiz NWR. Further, the TSS levels are much higher south of the NWR. The turbidity is due to both the flushing of sediment in the Agassiz NWR and the flashy flows from drawdown that cause higher erosion in channels. Historically, the water release objective is to attain a target level at the NWR as soon as possible, further exacerbating flow problems, and the gates for release are located at the channel bottom, and highly erodible soils lead to high TSS levels in the river as water levels recede in the Agassiz Pool. In Section 3.6.1.2 of the TMDL, MPCA states: "The amount of sediment leaving this impoundment is greater than typical impoundments due to a radial gate outlet, increased frequency of full drawdowns, remnants of JD11 that concentrate flow, and purposeful flushing of sediment."

Problem Identification for *E. coli*: Overall Mud River monitoring shows that it meets water quality standards when assessed as a combined unit, but there are two site-specific locations within a mile of each other at the city of Grygla, upstream of the Wastewater Treatment Plant, with E. coli exceedences (Section 3.6.2 of the TMDL).

Pollutants of Concern: The pollutant of concern is turbidity, with an allocation calculated for TSS; the other pollutant is bacteria, with an allocation calculated for *E. coli.*

Source Identification for TSS: The source of sediment is from the release of water and sediment from the Agassiz Pool, and the accompanying sediment scour from the bottom of the outlet and portions of the river affected by high flow velocities that occur with discharge from the Pool, including channel scour and bank erosion.

Section 3.6 of the TMDL states that impoundments and reservoirs, which are intended to address agricultural flooding, have also modified the watershed. The impoundments are opened and closed at control structures at pool outlets. Within the impoundments, sediment infilling has led to a loss of depth in the Agassiz Pool, with sediments coming in from upstream erosion of agricultural lands. To keep the Agassiz Pool functioning as a refuge and reduce the sediment accumulation, the NWR has incrementally excavated the Pool to promote scouring and flushing, but those sediments then flow downstream to the town of Thief River Falls. In 2012, the NWR released water (pool drawdown) with a very strong correlation to water improvement after the drawdown was completed. However, after the flushing and peak of the releases, there was a strong correlation to increases in turbidity (in 2013 and 2015), indicating sediment deposition along the Thief River (Section 3.6.1 of the TMDL).

Source Identification for *E. coli*: Cattle, birds and human waste are the sources of E. coli bacteria in the Mud River (Section 3.6.2 of the TMDL). Microbial source tracking was used to determine that the human waste source is more significant than animal waste, indicating suspected septic failure.

Priority Ranking: MPCA prioritizes its projects based on the impact that the impairments have on the public and aquatic life, the public value of the water resource, likelihood a TMDL can be completed, data availability, local capacity to assist with the TMDL, and MPCA's statewide rotating basin schedule (Section 1.3 of the TMDL). The Thief River TMDL was targeted to start and end in 2011 and 2016, respectively.

Future Growth: Section 5.1 states that there are no current or expected MS4s in the watershed. Section 5.2 of the TMDL states that there are no new or expected wastewater dischargers expected within the direct drainage of the Thief River watershed.

The EPA finds that the TMDL document submitted by the 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 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 Uses – MPCA states in Section 2 of the TMDL that waters in the Thief River watershed are designated as Class 2B and Class 3C. Class 2B surface waters "shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water aquatic biota and their habitats." "These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable." (Minn. R. 7050.0222, subp. 4).

MPCA also states: "The quality of class 3C waters of the state shall be such as to permit their use for industrial cooling and materials transport without a high degree of treatment being necessary to avoid severe fouling, corrosion, scaling, or other unsatisfactory conditions." (Minn. R. 7050.0223, subp. 4).

There have been proposals to change the classification of the Thief River to Class 1 in the next Minnesota standards review, designating the river as a drinking water source. Further, the Thief River is a tributary to the Red Lake River, which is currently a drinking water source for the city of Thief River, East Grand Forks, and Grand Forks (Section 1.2 in the TMDL).

Criteria for TSS – Section 2.2 of the TMDL states that Minnesota has a new TSS standard used in the development of this TMDL, replacing the past turbidity measure in Nephelometric Turbidity Units with a value of **TSS 30 mg/l, applicable April through September**. The impairment determination used the past NTU measurement of 25 NTU, which correlates with the TSS value of 25 mg/l. Though the Thief River is located in the South River Nutrient Region in Minnesota, it is assigned to the Central River Nutrient Region for the purposes of TSS criteria (Figure 2-1 of the TMDL). Impairment is determined if more than 10% of the measurements exceed the standard, and there are at least three exceedances. In the Thief River, 28% of the measurements exceeded the standard in the most recent 10 years at 25mg/l, and 19% exceeded the standard 30 mg/l TSS.

Criteria for *E. coli* – Section 2.4 of the TMDL has a standard that *E. coli* shall not exceed **126 organisms per 100 milliliters as a geometric mean** of not less than five samples in any calendar month, **nor shall more than ten percent of all samples** taken during any calendar month individually **exceed 1,260 organisms per 100 milliliters**. The standard applies **between April 1 and October 31**.

The EPA finds that the TMDL document submitted by the 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 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:

The loading capacities for TSS and *E. coli* for the Thief River and Mud River are shown below, from Section 4.1.7 and 4.2.7 in the TMDL, respectively.

Table 4-2. Thief River (09020304-501) TSS TMDL summary table for site S002-079.

EQuIS Site ID: S002-079 USGS Site ID: 05076000 Total Suspended Solids Standard: 30 mg/l Drainage Area (square miles): 985 % MS4: 0.00% Total WWTF Design Flow (mgd): 0.00	Loading Capacity and Load Allocations for Total Suspended Solids in the Thief River at Marshall County Road 77 (AUID 09020304-501, Station S002-079)				
	Duration Curve Zone				
	Very High	High	Mid	Low	Very Low (No Flow)
TMDL Component	Values Expressed as Tons per Day of Sediment				
TOTAL DAILY LOADING CAPACITY*	93.04	12.22	1.05	0.07	0.00
Wasteload Allocation**					
Permitted Wastewater Treatment Facilities	0	0	0	0	0
NPDES Permitted MS4 Communities	0	0	0	0	0
NPDES Permitted Livestock Facilities	0	0	0	0	0
Construction and Industrial Stormwater	0.01	0.00	0.00	0.00	0.00
Reserve Capacity	0.00	0.00	0.00	0.00	0.00
Daily Load Allocation	83.73	11.00	0.94	0.06	0.00
Daily Margin of Safety	9.30	1.22	0.11	0.01	0.00
	Values Expressed as Percentages of the Total Loading Capacity				
TOTAL MONTHLY LOADING CAPACITY	93.04	12.22	1.05	0.07	0.00
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0%	0%	0%	0%	0%
NPDES Permitted MS4 Communities	0%	0%	0%	0%	0%
NPDES Permitted Livestock Facilities	0%	0%	0%	0%	0%
Construction and Industrial Stormwater	0.008%	0.008%	0.008%	0.008%	0.008%
Reserve Capacity	0%	0%	0%	0%	0%
Load Allocation	89.992%	89.992%	89.992%	89.992%	89.992%
Margin of Safety	10%	10%	10%	10%	10%
MEDIAN FLOW*	1150.00	151.00	13.00	0.50	0.00
FLOW DURATION INTERVAL OF MEDIAN FLOW	5%	25%	50%	71.60%	91.60%

*The flow record from USGS Gauge 05076000 was used to develop flow zones and loading capacities.
**Wasteload Allocations are rounded to the nearest 2 digits (1/100th of a ton)

Table 4-4. Mud River (09020304-507) *E. coli* TMDL summary table for site S002-977.

1996-2016 HSPF flow rates from reaches 237 and 241 were used to develop flow regimes & loading capacities Drainage Area (square miles): 133.81 *E. coli* Standard: 126 MPN/100ml %MS4 Urban: 0.00 Total WWTF Design Flow (mgd): 0.00	AUID 09020304-507 Mud River at CSAH 54 (S002-977) Loading Capacity and Load Allocations for *E. coli* Duration Curve Zone				
	Very High	High	Mid-Range	Low	Very Low
Values expressed as billions of organisms per day					
TOTAL DAILY LOADING CAPACITY	**803.93**	**362.21**	**84.25**	**13.83**	**0.93**
Median Flow	260.79	117.50	27.33	4.49	0.30
Median Flow Exceedance	5%	25%	50%	75%	95%
Wasteload Allocations					
NPDES Permitted WWTF	--	--	--	--	--
NPDES Permitted MS4 Communities	--	--	--	--	--
NPDES Permitted Livestock Facilities	--	--	--	--	--
Reserve Capacity	--	--	--	--	--
Daily Load Allocation	**723.54**	**325.99**	**75.82**	**12.45**	**0.84**
Daily Margin of Safety	80.39	36.22	8.43	1.38	0.09
Values expressed as percentages of the total daily loading capacity					
Wasteload Allocations					
NPDES Permitted WWTF	--	--	--	--	--
NPDES Permitted MS4 Communities	--	--	--	--	--
NPDES Permitted Livestock Facilities	--	--	--	--	--
Reserve Capacity	--	--	--	--	--
Load Allocation	90%	90%	90%	90%	90%
Margin of Safety	10%	10%	10%	10%	10%

Methodology:

The Load Duration Curve (LDC) methodology was used to determine the TMDL for the Thief River for both TSS and *E. coli*. The curves were developed using the full range of hydrological conditions at each monitoring site to ensure all flow conditions were considered, including critical conditions. 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.

The curve was divided into five flow duration intervals (no flow, low, mid-range, moist, and high flow conditions). High flow exceedences more often occur from precipitation-related sources and under spring conditions (run-off from upland pastures, cropland with surface manure application) on the left portion of the plot, and non-precipitation related events at the right portion of the plot show the values do not exceed the standard curve. The TMDL for each flow regime was established by using the midpoint flow condition multiplied by the concentration target. The values in Figure 4-1 show the median TSS values of each flow regime, with a mid-range value at 1.05 tons/day, corresponding to the TMDL Table 4-2 above. The *E. coli* TMDL determination was approached in the same manner, but with different units of measure.

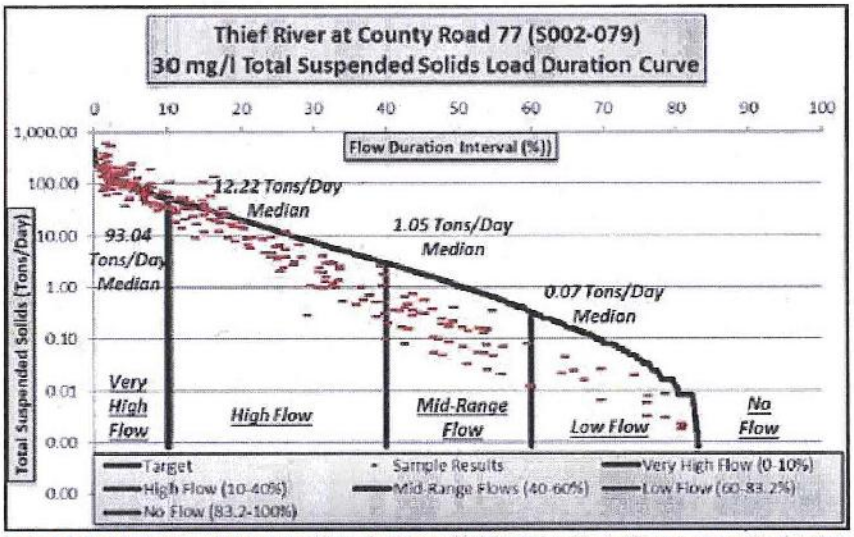

Figure 4-1. Thief River at County Road 77 (S002-079, USGS gauge 05076000) Total Suspended Solids Load Duration Curve (30 mg/l Standard)

Weaknesses of the TMDL analysis are that nonpoint source load allocations were not assigned to specific sources within the watershed. However, EPA believes the weaknesses are outweighed by the strengths of the TMDL approach, and that the approach is appropriate based upon the information available. If TSS and *E. coli* levels do not meet WQS in response to implementation efforts, the TMDL strategy may be amended as new information on the watershed is developed, to better account for sources contributing to the impairment and determining where reductions in the Thief River watershed are most appropriate.

The *SWAT model* was used to determine sediment and nutrient yields and the results of various Best Management Practices (BMPs) incorporated into the model for TSS. Section 3.6.1.2 of the TMDL identified areas of the watershed that could yield the most sediments and nutrients, as well as the effectiveness of BMPs. The results included streams erosion amounts, locations, and deposition. Erosion is from streambanks, sheet and rill, wind, ditch banks and gullies.

The *Hydrologic Simulation Program FORTRAN (HSPF)* was used to estimate loading and considers impervious and pervious land cover, including streams and impoundments, instream hydraulics and water quality processes, and results in highlighting where most work needs to be done to reduce sediment yields.

Microbial source tracking (MST) was used to determine the source of *E. coli*, and cattle, birds and humans were found to be sources. Samples were analyzed in the lab and showed higher concentrations in Grygla at Highway 54, upstream of the WWTP. The impoundment on Moose River is not believed to be a likely source.

Typically loading capacities are expressed as a mass per time (e.g. pounds per day). However, for bacteria loading capacity calculations, mass is not always an appropriate measure because bacteria are 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 Thief River bacteria TMDL, MPCA used Minnesota's water quality standards for *E. coli* (126 cfu/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 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.

MPCA developed the *E. coli* TMDL at the sample point of S002-977. Typically, MPCA would develop a TMDL at the downstream end of the impaired segment. However, for Segment 507, the *E. coli* exceedences were limited to sample points upstream of the Town of Grygla (Section 3.6.2.2 of the TMDL). Therefore, MPCA determined the TMDL at the downstream-most impaired site on the Mud River.

Critical Conditions: MPCA determined, as discussed in Section 3.6.3.2 of the TMDL, that the warmer summer conditions from June through September are taken into account. Greater peak flow events and large storms occur in this timeframe. The TMDL allocations were developed based on the standards and summer critical conditions. However, numerous discussions in the TMDL Section 3 state that the release of waters from the Agassiz NWR is a critical condition that occurs when controls are used to decrease the level of the waters and send them downstream via opening the gates in the southern portion of the NWR. The velocity and flashiness of the flow and volume of sediment are critical man-made conditions that add to the downstream decreased water quality, from both the original sediment release and the scouring of the channels.

The same late summer months apply as a critical condition for *E. coli,* as that is when the highest geomeans occur in July and August. Monitoring also occurred most frequently in this timeframe because of the potential for occurrence of blue-green algae. Though highest concentrations have occurred at high flows, the greatest frequency of exceedance is at mid-range and low flows.

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

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 shown above in Table 4-2 and 4-4 in the daily load allocation rows. The LA is calculated by subtracting the WLA (scant amount) and MOS from the TMDL for the Thief River; there is no WLA in the Mud River.

The EPA finds that the TMDL document submitted by the 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:
There are no permitted facilities in the watershed, as shown in the TMDL tables above. There is a small value give for a potential general permit for construction and industrial stormwater WLA under high flow conditions for TSS (Table 4-2). The Grygla WWTP discharges downstream of the impaired portion of Segment 507. MPCA determined that a WLA was not applicable to this facility.

The EPA finds that the TMDL document submitted by the 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:
Section 4.1.4 of the TMDL submittal states that MPCA allocated 10% of the loading capacity as an explicit MOS for the TMDLs. The MPCA expects this will account for uncertainty in calculations made for the TMDL. These uncertainties for both TSS and *E. coli* include the daily flow record, water quality data, variability in concentrations in any flow regime, and lack of homogeneity throughout the water column. EPA also notes there has been extensive field work completed in this watershed using kayaks and canoes to explore the eroding streambanks and perform geomorphic assessment (Section 3.6.1.2 of the TMDL), which adds confidence to the process via detailed streambank characterization.

The EPA finds that the TMDL document submitted by the MPCA satisfies 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:
MPCA considered seasonal variation by evaluating the TSS and loading on a monthly basis (Section 4.1.5) to get an idea of the variation in monthly maximum TSS concentrations. Greatest concentrations are in April, May and August. Exceedences occur during the 20% highest flows at the downstream portion of the reach of the Thief River. Variations in increased loading in spring months of April and May are primarily due to spring melt and storm runoff, and discharge from the Agassiz Pool in May and again in August. Needed reductions are greatest in the very high and high flow regimes.

Section 4.2.5 of the TMDL states that the variation in *E. coli* is considered and most exceedences occur in late summer through a range of flows for the Mud River. The results from the long-term site is similar to the reach as a whole. A July concentration is of concern but does not exceed the standard; no July exceedance of the geomean 126/100ml has been recorded since 2011. However, late summer concentrations around Grygla are a concern and exceeded standards in July and August. Highest concentrations are at high flows but also occur at mid-range and low flows. All of these details are considered in the TMDL development process.

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

8. Reasonable Assurances

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:
Section 6 of the TMDL states that there are Thief River Watershed Restoration and Protection Strategy (WRAPS) processes providing a strong foundation for future projects to support Federal, State and local groups. These groups include the Marshall County Soil and Water Conservation District (SWCD), the Pennington County SWCD, the Beltrami County SWCD, the RLWD, the Natural Resources Conservation Service (NRCS), the US Fish and Wildlife Service (USFWS), the Minnesota Department of Natural Resources (DNR), the MPCA, and the Minnesota Board of Water and Soil Resources (the Board). The Board incorporates information from the WRAPS into the One Watershed One Plan (1W1P) for local watershed planning.

The geomorphologic assessment was completed by the Erickson Group Project and the Halvorson Streambank Stabilization Project, so there is involvement with others outside of the agency to assist with future implementation efforts. MPCA describes several planning and prioritizing tools to assist in reducing pollutant loading throughout the watershed: the International Water Institute Water Quality Decision Support Tool; Hydrologic Simulation Program Fortran (HSPF) modeling; GIS layer development with LiDAR derived topographic data to show greatest risks of erosion in the landscape; and, collaboration of several entities to develop the Prioritize, Target and Measure Application (PTMAPP) tool designed for targeting nonpoint sources.

Clean Water Legacy Act (CWLA) - The 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 provided 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). 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. The WRAPS for the Big Fork River is a work in progress and its status may be accessed at https://www.pca.state.mn.us/water/watersheds/big-fork-river#restoration. As stated previously, WRAPS are already in progress.

Minnesota voters approved the CWLA amendment in 2008, which increased the state sales and use tax rate by three-eighths of 1% on all taxable sales, starting July 1, 2009, and continuing through 2034. Approximately one third of the funds have been 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). Funding for implementation is also available through other nonpoint source programs and the 319 funding mechanism.

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

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:
MPCA in Section 7 of the TMDL states that it and other agencies have a strong history of monitoring, and in the future, MPCA plans to monitor and track the effectiveness of the TMDL.

Most of the sites will be monitored for DO, temperature, turbidity, specific conductivity, pH, as well as the stage of the rivers; TP, orthophosphorus, TSS, Total Dissolved Solids, TKN, ammonia nitrogen, nitrate + nitrites, and *E. coli* will also be measured in four rounds of sampling, and biochemical oxygen demand (from past measurements) and carbon oxygen demand will be measured to assist with low DO analysis.

Many groups outside of the MPCA will assist with monitoring. River Watch is a high school monitoring group; the Pennington County SWCD collects samples from a golf course bridge; there is a monitoring co-location with a USGS gauging station. The MPCA's Major Watershed Pollutant Load Monitoring Network and Red Lake Watershed District (RLWD) have completed extensive DO monitoring, and site specific investigation and ditch monitoring has occurred in the past and will continue into the future. There are new flow gauges being installed by the USGS.

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

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:
Section 8 of the TMDL identifies implementation actions that would result in achieving the TMDL reductions. The strategies are predominantly focused on nonpermitted sources since there are no MS4s in the watershed, and one WWTF at Grygla. Construction and industrial stormwater make up only a small part of potential sources. The establishment of buffers, meanders and riparian corridor improvement are considered important viable possibilities for improvement of water quality, especially low DO. There is a project planned to decrease meandering and increase flow through a causeway. The Pennington SWCD wants to halt the project because the gradient of the river will be increased and could lead to more streambank erosion upstream. There is compilation and sharing of photos of erosion problems, especially occurring in spring and early summer before gully erosion is hidden by crops.

The focus of the Pennington County 2010 to 2020 Comprehensive Local Water Management Plan is multifaceted and includes reduction of water and wind erosion, identification of problem reaches to address drainage needs without sacrificing water quality, monitoring compliance with ordinances that protect water resources, education of the public, coordinating with other agencies, addressing listed waters with TMDLs, addressing high sediment volumes, addressing high hydrogen sulfide affecting the reservoirs at Thief River Falls, and educating citizens about source water protection.

Section 3.6.1.2 describes details of the Soil and Water Assessment Tool (SWAT) modeling which was completed by the USDA/NRCS in cooperation with the Marshall-Beltrami Soil and Water Conservation Service (SWCS), Pennington SWCS, and local, state and federal agencies, related to erosion, sedimentation and sediment yield. The model evaluated and identified areas that yield the greatest amounts of sediment and nutrients, as well as the potential effectiveness of BMPs, such as 50-foot buffer installation. Opportunities for grants and cost analysis are also part of the discussion in Section 8.3.

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

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:
Many meetings and events occurred within the watershed to discuss the Thief River TMDL and WRAPS development with the public, the MPCA and other entities. Section 9 relates the history of the meetings since 2011 including buffer strip installation, laboratory presentations, public kickoff meeting, development of various online resources including, Facebook, blog and watershed-specific sites, civic engagement, and participation in a community expo.

The Draft Thief River TMDL was on Public Notice from June 25, 2018 to July 25, 2018. MPCA received one comment via email. The comments were for general clarification by the Minnesota Department of Natural Resources, and MPCA responded adequately.

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

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:
EPA received a submittal letter dated March 18, 2019, signed by Glenn Skuta, MPCA Watershed Division Director, addressed to Joan Tanaka, EPA Region 5, Acting Water Division Director. The submittal letter identified the name and location of the waterbodies for which the TMDLs were developed. The letter stated that the Thief River Watershed TMDLs are being submitted for final approval by USEPA under Section 303(d) of the Clean Water Act.

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

13. Conclusion

After a full and complete review, the EPA finds that the TMDLs for Thief River Watershed for TSS and *E. coli* meet all of the required elements of an approvable TMDL. This decision document addresses Turbidity/TSS in the Thief River (ID# 09020304-501) and bacteria in the Mud River (ID# 09020304-507).

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.

ERRATA SHEET (Revision April 2019)

This errata sheet lists errors and their correction for the Thief River Total Maximum Daily Load Decision Document by EPA Region 5, dated March 2019

Location	Error	Correction
Page 2, fourth paragraph	"North of the NWR"	"East of the NWR"
Page 12, second paragraph of the comments, first sentence	"The geomorphologic assessment was completed by the Erickson Group Project and the Halvorson Streambank Stabilization Project, so there is involvement with others outside of the agency to assist with future implementation efforts."	"The geomorphologic assessment was completed by the Minnesota Department of Natural Resources. Resultant projects fixed problem areas that were identified in the geomorphological assessment."
Page 13, first full paragraph, second to last sentence	"Big Fork River"	"Thief River"