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

JAN 25 2018

REPLY TO THE ATTENTION OF:
WW-16J

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

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDL) for segments within the Upper Red River Watershed (URRW), including support documentation and follow up information. The URRW is in western Minnesota in parts of Clay, Otter Tail and Wilkin Counties. The URRW TMDLs address impaired aquatic recreation due to bacteria and impaired aquatic life use due to excessive sediment (turbidity/TSS).

EPA has determined that the URRW TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations set forth at 40 C.F.R. Part 130. Therefore, EPA approves Minnesota's two bacteria TMDLs and one sediment (total suspended solids) TMDL. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

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

Sincerely,

Christopher Korleski
Director, Water Division

Enclosure

cc: Celine Lyman, MPCA

wq-iw5-09g

TMDL: Upper Red River of the North Watershed bacteria & TSS TMDLs, Clay, Otter Tail and Wilkin Counties, Minnesota
Date: January 25, 2018

DECISION DOCUMENT
FOR THE UPPER RED RIVER OF THE NORTH WATERSHED TMDLS, CLAY, OTTER TAIL & WILKIN COUNTIES, 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 Upper Red River of the North Watershed (URRNW) (HUC-8 #09020104) is in western Minnesota and includes areas which span the Minnesota-North Dakota border. The portion of the URRNW on the Minnesota side of the state border drains approximately 499 square miles (319,360 acres) in portions of Clay, Otter Tail and Wilkin Counties. The headwaters of the Red River (i.e., the Upper Red River of the North) is formed by the confluence of the Bois de Sioux and Otter Tail rivers and flows northward to the United States and Canadian border. Once in the province of Manitoba, Canada, the Red River empties into Lake Winnipeg. The main tributaries to the upper reaches of Red River are Wolverton Creek and Whiskey Creek. Impaired segments within these tributaries are the focus of this TMDL effort.

The URRNW TMDLs address two impaired segments due to excessive bacteria and one impaired segment due to excessive sediment inputs (Table 1 of this Decision Document). The URRNW spans two ecoregions, the Lake Agassiz Plain (LAP) (also referred to as the Northern Glaciated Plain (NGP)) and the North Central Hardwood Forest (NCHF) ecoregion. A majority of the URRNW is within the LAP and a small portion of the watershed is in the NCHF ecoregion.

Table 1: Upper Red River of the North Watershed impaired waters addressed by this TMDL

Water body name	Assessment Unit ID	Affected Use	Pollutant or stressor	TMDL
Wolverton Creek	09020104-512	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Whiskey Creek	09020104-520	Aquatic Recreation	Bacteria (*E. coli*)	*E. coli* TMDL
Whiskey Creek	09020104-520	Aquatic Life (Turbidity)	Sediment/TSS	TSS TMDL

Land Use:

The land use within the URRNW is primarily agricultural (approximately 85%, Table 2 of this Decision Document) and according to MPCA is expected to remain agricultural for the foreseeable future.

Table 2: Subwatershed Land Cover (National Land Cover Dataset (NLCD) 2011) for the Upper Red River of the North Watershed

Water body Name / Segment	Open Water	Urban	Barren	Forest / Shrub	Pasture / Hay / Grassland	Cropland	Wetland
Wolverton Creek (09020104-512) Subwatershed	1.1%	8.7%	0.3%	0.6%	2.0%	84.0%	3.2%
Whiskey Creek (09020104-520) Subwatershed	0.3%	4.5%	0.0%	1.2%	0.6%	92.9%	0.4%
Upper Red River of the North Watershed	**0.3%**	**5.2%**	**0.9%**	**0.1%**	**3.4%**	**85.9%**	**4.3%**

Problem Identification:
Bacteria TMDLs: Bacteria impaired segments identified in Table 1 of this Decision Document were included on the draft 2014 Minnesota 303(d) list due to excessive bacteria. Water quality monitoring within the URRNW indicated that these segments were not attaining their designated aquatic recreation uses due to exceedances of bacteria criteria. Bacteria exceedances can negatively impact recreational uses (i.e., swimming, wading, boating, fishing) 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.

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

Total suspended solids (TSS) is a measurement of the sediment and organic material that inhibits natural light from penetrating the surface water column. Excessive sediment and organic material within the water column can negatively impact fish and macroinvertebrates within the ecosystem. Excess sediment and organic material may create turbid conditions within the water column and may increase the costs of treating surface waters used for drinking water or other industrial purposes (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 (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 (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 impacts 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 URRNW 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:
The water bodies addressed by the URRNW TMDLs were given a priority ranking for TMDL development due to: the impairment impacts on public health and aquatic life, the public value of the impaired water resource, the likelihood of completing the TMDL in an expedient manner, the inclusion of a strong base of existing data, the restorability of the water body, the technical capability and the willingness of local partners to assist with the TMDL, and the appropriate sequencing of TMDLs within a watershed or basin. Water quality degradation has led to efforts to improve the overall water quality within the URRNW, and to the development of TMDLs for these water bodies. Additionally, MPCA explained that its TMDL development priorities were prioritized to align with its Statewide watershed monitoring approach and its 10-year Watershed Restoration and Protection Strategies (WRAPS) schedule.

Pollutants of Concern:
The pollutants of concern are bacteria and sediment (TSS).

Source Identification (point and nonpoint sources):

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

<u>URRNW bacteria TMDLs:</u>
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 two wastewater treatment facilities (WWTF) in the URRNW 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 loading in the Upper Red River of the North Watershed

Facility Name	Permit #	Impaired Reach	WLA
Bacteria (*E. coli*) Load (billions of bacteria/day)			
Comstock WWTF	MNG580131	09020104-512	0.93
Rothsay WWTF	MNG580064	09020104-520	2.33

Municipal Separate Storm Sewer System (MS4) communities: MPCA determined that there are no MS4 communities which discharge to impaired bacteria segments addressed in this TMDL report.

Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs): MPCA determined that the URRNW does not have CSOs nor SSOs which contribute pathogens to the bacteria impaired segments addressed in this TMDL report.

Concentrated Animal Feedlot Operations (CAFOs): MPCA determined that there are no CAFO facilities which discharge to impaired bacteria segments addressed in this TMDL report.

URRNW TSS TMDLs:
NPDES permitted facilities: NPDES permitted facilities may contribute sediment loads to surface waters through wastewater discharges. Permitted facilities must discharge wastewater according to their NPDES permit. MPCA determined that there is one WWTF (Rothsay WWTF, MNG580064) which contributes sediment from treated wastewater releases. MPCA assigned the Rothsay WWTF a portion of the sediment WLA.

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 URRNW must comply with the requirements of the MPCA's NPDES Stormwater Program. The NPDES program requires construction and industrial sites to create a Stormwater Pollution Prevention Plan (SWPPP) that summarizes how stormwater will be minimized from the site.

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

URRNW bacteria TMDLs:
Stormwater from agricultural land use practices and feedlots near surface waters: Animal feedlots in close proximity to surface waters can be a source of bacteria to water bodies in the URRNW (Table 3-9 of the final TMDL document includes livestock population estimates in the Wolverton Creek subwatershed and the Whiskey Creek subwatershed). These areas may contribute bacteria via the mobilization and transportation of pollutant laden waters from feeding, holding and manure storage sites. Runoff from agricultural lands may contain significant amounts of bacteria which may lead to impairments in the URRNW. Feedlots generate manure which may be spread onto fields. Runoff from fields with spread manure can be exacerbated by tile drainage lines, which channelize the stormwater flows and reduce the time available for bacteria to die-off.

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

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

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

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

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

URRNW TSS TMDLs:

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

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

Wetland Sources: Sediment may be added to surface waters by stormwater flows through wetland areas in the URRNW. Storm events may mobilize particulates through the transport of suspended solids and other organic debris.

Forest Sources: Sediment may be added to surface waters via runoff from forested areas within the watershed. Runoff from forested areas may include debris from decomposing vegetation and organic soil particles.

Atmospheric deposition: Sediment may be added via particulate deposition. Particles from the atmosphere may fall onto lake surfaces or other surfaces within the URRNW.

Future Growth:

Significant development is not expected in the URRNW. The land use within the watershed is primarily agricultural with small towns scattered throughout the URRNW. MPCA expects that land use in the URRNW will remain unchanged for the foreseeable future. The WLA and load allocations (LA) for the URRNW TMDLs were calculated for all current and future sources. Any expansion of point or nonpoint sources will need to comply with the respective WLA and LA values calculated in the URRNW TMDLs.

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

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

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

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

Comment:

Designated Uses:

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

Minnesota Rule Chapter 7050 designates uses for waters of the state. The segments addressed by the URRNW TMDLs are designated as Class 2 waters for aquatic recreation use (fishing, swimming, boating, etc.) and aquatic life 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."*

Standards:

<u>Narrative Criteria:</u> Minnesota Rule 7050.0150 (3) set forth narrative criteria for Class 2 waters of the State:

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

<u>Numeric criteria:</u>

<u>Bacteria TMDLs:</u> The bacteria water quality standards which apply to URRNW TMDLs are:

Table 4: Bacteria Water Quality Standards Applicable to the URRNW 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

<u>Bacteria TMDL Targets:</u> The bacteria TMDL targets employed for the URRNW bacteria TMDLs are the *E. coli* standards as stated in Table 4 of this Decision Document. The focus of bacteria TMDLs is on the 126 organisms (orgs) per 100 mL (126 orgs/100 mL) portion of the standard (Table 4 of this Decision Document). MPCA believes that using the 126 orgs/100 mL portion of the standard for TMDL calculations will result in the greatest bacteria reductions within the URRNW and will result in the attainment of the 1,260 orgs/100 mL portion of the standard. While the bacteria TMDLs will focus on the geometric mean portion of the water quality standard, attainment of both parts of the water quality standard is required.

<u>TSS TMDLs:</u> EPA approved MPCA's regionally-based TSS criteria for rivers and streams in 2015 which replaced Minnesota's statewide turbidity criterion (measured in Nephelometric Turbidity Units (NTU)). The TSS criteria provide water clarity targets for measuring suspended particles in rivers and streams.

<u>TSS TMDL Targets:</u> MPCA employed the regional TSS criterion for the South River Nutrient Region (SRNR) of **<u>65 mg/L</u>**.

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:
URRNW bacteria TMDLs:
MPCA used the geometric mean portion (**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 portion 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 URRNW 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 URRNW. Neither Wolverton Creek, nor Whiskey Creek has continuous flow records so MPCA used nearby USGS gages to estimate flows in both creeks. MPCA assumed that topography, land use, general hydrologic flow patterns and precipitation were roughly equivalent between the USGS surrogate subwatersheds and the subwatersheds for Wolverton Creek and Whisky Creek. MPCA also employed the drainage area ratio method to further refine flow estimates in the Wolverton Creek and Whiskey Creek subwatersheds. Flows from the USGS gage on the South Branch of the Buffalo River (USGS #05061500) were used to develop estimated flows in the Wolverton Creek subwatershed. Flows from the USGS gage on the Wild Rice River (USGS #05053000) were used to develop estimated flows in the Whiskey Creek subwatershed. (Section 4.1.1 of the final TMDL document). 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.

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 URRNW 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 URRNW 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.

MPCA queried water quality data collected in the URRNW between 2002-2012 (Appendix A of the final TMDL document). 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 2: Wolverton Creek (09020106-512) bacterial LDC of Appendix A of the final TMDL document). Individual LDCs are found in Appendix A 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 flow conditions (exceeded 40–60% of the time), low flow conditions (exceeded 60–90% of the time), and very low flow conditions (exceeded 90–100% of the time). LDC plots can be organized to display individual sampling loads with the calculated LDC. Watershed managers can interpret LDC graphs with individual sampling points plotted alongside the LDC to understand the relationship between flow conditions and water quality exceedances within the watershed. Individual sampling loads which plot above the LDC represent violations of the WQS and the allowable load under those flow conditions at those locations. The difference between individual sampling loads plotting above the LDC and the LDC, measured at the same flow, is the amount of reduction necessary to meet WQS.

The strengths of using the LDC method are that critical conditions and seasonal variation are considered in the creation of the FDC by plotting hydrologic conditions over the flows measured during the recreation season. Additionally, the LDC methodology is relatively easy to use and cost-effective. The weaknesses of the LDC method are that nonpoint source allocations cannot be assigned to specific sources, and specific source reductions are not quantified. Overall, MPCA believes and EPA concurs that the strengths outweigh the weaknesses for the LDC method.

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

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

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

Table 5: Bacteria (*E. coli*) TMDLs for the Upper Red River of North Watershed

Allocation	**Source**	**Very High**	**High**	**Mid**	**Low**	**Very Low**
		E. coli (billions of bacteria/day)				
TMDL for Wolverton Creek (09020104-512)						
Existing Load		9118.27	3056.77	735.69	160.28	10.91
Wasteload Allocation	WLA: Comstock WWTF (MNG580131)	0.93	0.93	0.93	0.93	0.93
Load Allocation	Watershed load	6823.93	1905.04	404.12	93.40	4.06
Margin Of Safety (10%)		758.32	211.77	45.01	10.48	0.55
Loading Capacity (TMDL)		**7583.18**	**2117.74**	**450.06**	**104.81**	**5.54**
Estimated Load Reduction (*E. coli* load)		1535.09	939.03	285.63	55.47	5.37
Estimated Load Reduction (%)		17%	31%	39%	35%	49%

TMDL for Whiskey Creek (09020104-520)						
Existing Load		6250.73	58.50	233.06	76.13	30.60
Wasteload Allocation	WLA: Rothsay WWTF (MNG580064)	2.33	2.33	2.33	2.33	2.33
Load Allocation	Watershed load	1999.35	510.92	182.16	72.58	10.99
Margin Of Safety (10%)		222.41	57.03	20.50	8.32	1.48
Loading Capacity (TMDL)		**2224.09**	**570.28**	**204.99**	**83.23**	**14.80**
Estimated Load Reduction (*E. coli* load)		4026.64	0.00	28.07	0.00	15.80
Estimated Load Reduction (%)		64%	0%	12%	0%	52%

Table 5 of this Decision Document presents MPCA's loading reduction estimates for each of the bacteria TMDLs in the URRNW. These loading reductions were calculated from field sampling data collected in the URRNW. MPCA explained that its load reduction estimates are likely more conservative since they are based on a limited water quality data set.

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 URRNW bacteria TMDLs. The methods used for determining the TMDL are consistent with U.S. EPA technical memos.[1]

URRNW TSS TMDLs: MPCA developed a LDC to calculate a sediment TMDL for the Whiskey Creek (09010204-520) segment. The same LDC development strategies which were employed for the sediment TMDLs were used to develop the bacteria TMDLs (e.g., the incorporation of drainage area ratio method and surrogate flow information from Wild River USGS gage to develop FDCs, water quality monitoring information collected within the URRNW informing the LDC, etc.) The FDC were transformed into LDC by multiplying individual flow values by the SRNR TSS WQS (65 mg/L) and then multiplying that value by a conversion factor.

MPCA calculated the TSS TMDL in Table 6. The load allocation was calculated after the determination of the WLA, and the MOS. Load allocations (ex. stormwater runoff from agricultural land use practices) was not split among individual nonpoint contributors. Instead, load allocations were combined together into one value to cover all nonpoint source contributions. Table 6 of this Decision Document reports five points (the midpoints of the designated flow regime) on the loading capacity curve. However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire loading capacity curve.

The LDC method can be used to display collected sediment monitoring data and allows for the estimation of load reductions necessary for attainment of the SRNR TSS water quality standard. Using this method, daily loads were developed based upon the flow in the water body. Loading capacities were determined for each segment for multiple flow regimes. This allows the TMDL to be represented by an allowable daily load across all flow conditions. Table 6 of this Decision Document identifies the loading capacity for each segment at each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

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

Table 6: Total Suspended Solids (TSS) TMDLs for the Upper Red River of North Watershed

Allocation	Source	Very High	High	Mid	Low	Very Low
		TSS (tons/day)				
TMDL for Whiskey Creek (09020104-520)						
Existing Load		171.40	48.90	14.10	3.40	--
Wasteload Allocation	WLA: Rothsay WWTF (MNG580064)	0.090	0.090	0.090	0.090	0.090
	Construction Stormwater (MNR100001) & Industrial Stormwater (MNR50000)	0.120	0.030	0.010	0.004	0.001
	WLA Totals	0.21	0.12	0.10	0.094	0.091
Load Allocation	Watershed load	116.38	31.12	11.73	4.32	0.60
Margin Of Safety (10%)		12.95	3.47	1.31	0.49	0.08
Loading Capacity (TMDL)		**129.54**	**34.71**	**13.14**	**4.90**	**0.77**
Estimated Load Reduction (TSS load)		41.86	14.19	0.96	0.00	--
Estimated Load Reduction (%)		24%	29%	7%	0%	--

Table 6 of this Decision Document presents MPCA's loading reduction estimate for Whiskey Creek (09010204-520) segment. The loading reduction estimate for Whiskey Creek was calculated from field sampling data collected in this segment. MPCA explained that its load reduction estimates are likely more conservative since they are based on a limited water quality data set.

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

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

4. Load Allocations (LA)

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

Comment:

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

URRNW bacteria TMDLs: The calculated LA values for the bacteria TMDLs are applicable across all flow conditions in the URRNW (Table 5 of this Decision Document). MPCA identified several nonpoint sources which contribute bacteria loads to the surface waters of the URRNW, including; non-regulated urban stormwater runoff, stormwater from agricultural and feedlot areas, failing septic systems, and wildlife (deer, geese, ducks, raccoons, turkeys and other animals). MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations, but aggregated the nonpoint sources into a categorical LA value.

URRNW TSS TMDLs: The calculated LA values for the TSS TMDLs are applicable across all flow conditions (Table 6 of this Decision Document). MPCA identified several nonpoint sources which contribute sediment loads to the surface waters in the URRNW. Load allocations were recognized as originating from many diverse nonpoint sources including; stormwater contributions from agricultural lands, stream channelization and streambank erosion, wetland and forest sources, and atmospheric deposition. MPCA did not determine individual load allocation values for each of these potential nonpoint source considerations, but aggregated the nonpoint sources into one LA value.

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

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

5. Wasteload Allocations (WLAs)

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

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

<u>Comment:</u>

<u>URRNW bacteria TMDLs:</u> MPCA identified two NPDES permitted facilities within the URRNW which MPCA determined contribute bacteria to the Wolverton Creek (09020104-512) and the Whiskey Creek (09020104-520) bacteria impaired segments. MPCA assigned each of these facilities a WLA (Table 5 of this Decision Document). The WLAs for each of these facilities were calculated based on the facility's maximum permitted discharge flow and the *E. coli* WQS (126 orgs /100 mL). MPCA explained that the WLA for each individual WWTF was calculated based on the *E. coli* WQS but WWTF permits are regulated for the fecal coliform effluent limits (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 URRNW 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.

<u>URRNW TSS TMDLs:</u> MPCA identified one NPDES permitted facility within the URRNW which MPCA determined contributes sediment to the Whiskey Creek (09020104-520) TSS impaired segment. MPCA assigned that facility, the Rothsay WWTP (MNG580064), a WLA (Table 6 of this Decision Document). The WLA was calculated based on the maximum permitted discharge flow and a TSS permitted concentration (see Table 4-9 of the final TMDL document for individual facility permitted TSS concentrations).

MPCA calculated a construction and industrial stormwater WLA based on 0.1% of the load allocation. MPCA explained that the TSS TMDL assumed that 0.1% of the URRNW's land area was under construction at any given time and therefore, would contribute construction and/or industrial stormwater runoff to the Whiskey Creek TSS TMDL. MPCA supports this assumption based on its review of historic construction and industrial permits and historic land use in the URRNW (Section 4.2.3 of the final TMDL document).

MPCA explained that BMPs and other stormwater control measures should be implemented at active construction sites to limit the discharge of pollutants of concern. BMPs and other stormwater control measures which should be implemented at construction sites are defined in the State's NPDES/SDS General Stormwater Permit for Construction Activity (MNR100001). In the final TMDL document MPCA explained that if a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit (MNR100001) and properly selects, installs and maintains all BMPs required under MNR1000001 and applicable local construction stormwater ordinances, including those related to impaired waters discharges and any applicable additional requirements found in Appendix A of the Construction General Permit, the stormwater discharges would be expected to be consistent with the WLA in the Whiskey Creek TSS TMDL.

The NPDES program requires construction sites and facilities subject to industrial stormwater requirements to create SWPPPs which summarize how stormwater pollutant discharges will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit (MNR100001) and applicable local construction stormwater ordinances, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan complies with the applicable requirements in the State permits and local ordinances. As noted above, MPCA has explained that meeting the terms of the applicable permits will be consistent with the

WLAs set in the URRNW TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified.

EPA finds the MPCA's approach for calculating the WLA for the Whiskey Creek 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 (Sections 4.1.4 and 4.2.4 of the final TMDL document).

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

- Uncertainty in the water quality data used to develop TMDL loads;
- Environmental variability in pollutant loading;
- Variability in water quality data (i.e., collected water quality monitoring data, field sampling error, etc.); and
- Calibration and validation processes of LDC modeling efforts, uncertainty in modeling outputs, and conservative assumptions made during the modeling efforts.

Challenges associated with quantifying *E. coli* loads include the dynamics and complexity of bacteria in stream environments. Factors such as die-off and re-growth contribute to general uncertainty that makes quantifying stormwater bacteria loads particularly difficult. The MOS for the URRNW bacteria TMDLs also incorporated certain conservative assumptions in the calculation of the TMDLs. No rate of decay, or die-off rate of pathogen species, was used in the TMDL calculations or in the creation of load duration curves for *E. coli*. Bacteria have a limited capability of surviving outside their hosts, and normally a rate of decay would be incorporated. MPCA determined that it was more conservative to use the WQS (126 orgs/100 mL) and not to apply a rate of decay, which could result in a discharge limit greater than the WQS.

As stated in *EPA's Protocol for Developing Pathogen TMDLs* (EPA 841-R-00-002), many different factors affect the survival of pathogens, including the physical condition of the water. These factors include, but are not limited to sunlight, temperature, salinity, and nutrient deficiencies. These factors vary depending on the environmental condition/circumstances of the water, and therefore it would be difficult to assert that the rate of decay caused by any given combination of these environmental variables was sufficient to meet the WQS of 126 orgs/100 mL. Thus, it is more conservative to apply the State's WQS as the bacteria target value, because this standard must be met at all times under all environmental conditions.

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

7. Seasonal Variation

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

Comment:
URRNW 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 USGS flow data from surrogate gages in nearby watersheds (Section 3 of this Decision Document). 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 URRNW 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).

URRNW TSS TMDLs: The TSS WQS applies from April to September which is also the time period when high concentrations of sediment are expected in the surface waters of the URRNW. Sediment loading to surface waters in the URRNW varies depending on surface water flow, land cover and climate/season. Typically, in the URRNW, sediment is being moved from terrestrial source locations into surface waters during or shortly after wet weather events. Spring is typically associated with large flows from snowmelt, the summer is associated with the growing season as well as periodic storm events and receding streamflows, and the fall brings increasing precipitation and rapidly changing agricultural landscapes.

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

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

8. Reasonable Assurance

When a TMDL is developed for waters impaired by point sources only, the issuance of a NPDES permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R. 122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with, "the assumptions and requirements of any available wasteload allocation" in an approved TMDL.

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

EPA's August 1997 TMDL Guidance also directs Regions to work with States to achieve TMDL load allocations in waters impaired only by nonpoint sources. However, EPA cannot disapprove a TMDL for nonpoint source-only impaired waters, which do not have a demonstration of reasonable assurance that LAs will be achieved, because such a showing is not required by current regulations.

Comment:
The URRNW bacteria and TSS TMDLs provide reasonable assurance that actions identified in the implementation section of the final TMDL (i.e., Sections 6 and 8 of the final TMDL document), will be applied to attain the loading capacities and allocations calculated for the impaired reaches within the URRNW. 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 URRNW. Implementation practices will be implemented over the next several years. The following groups are expected to work closely with one another to ensure that pollutant reduction efforts via BMPs are being implemented within the URRNW: the Buffalo-Red River Watershed District (BRRWD), county Soil and Water Conservation Districts (SWCDs), the Minnesota Department of Natural Resources (DNR), the Minnesota Department of Agriculture (MDA), the Minnesota Department of Health (MDH) and the Minnesota Board of Water and Soil Resources (BWSR).

The BRRWD is a stakeholder group which is actively engaged in water quality improvement activities in the URRNW (http://www.brrwd.org/). The BRRWD's comprehensive goals are to reduce flooding events and improve water quality in the Buffalo and Red River watersheds. To attain its goals, the BRRWD aims to increase engagement of local watershed residents for protecting waters in the URRNW and the BRRWD also acts to facilitate progress between the local community and state agencies/organizations whom are acting in the URRNW on various implementation efforts.

The BRRWD has been actively promoting flood damage reduction activities in the URRNW via projects which aim to promote retention of agricultural stormwater and by other efforts aimed at improving the conveyance of stormwater in channels and ditches during high precipitation events. BRRWD explains in the 2016 Annual Report[2] that locally funded stream restoration projects typically employ both goals, storing excess stormwater and restoring capacity to stream environments which have been filled with sediment. Sustainable landscape practices (e.g., incorporation of cover crops) and the installation of practices which promote greater retention of agricultural stormwater via water/sediment control basins, grassed waterways, etc. have been employed via efforts coordinated by the BRRWD. Interested local partners can apply for grant assistance through the BRRWD and work with the BRRWD to implement sediment BMP controls, expanding riparian buffers and improving channel stability.

The Clay County SWCD has various ongoing programs which target erosion control and water management programs. The Clay County SWCD's effort focus on supporting the installation and upkeep of agricultural BMPs, conservation programming (e.g., conservation tree planting programs), Continuous Conservation Reserve Programming (CCRP) which focuses on improving habitat and water quality via the use of buffer and filter strips and other programming which target erosion control and water management. The SWCD works with local farmers to identify appropriate state cost-sharing programs for BMP installation and maintenance.

The ongoing efforts of the BRRWD and local SWCDs in western Minnesota, demonstrate the commitment of stakeholders to improving water quality and reducing pollutant load to surface waters in the URRNW and other adjacent watersheds of western Minnesota. While measureable progress may be slow to develop, actions from these groups and other stakeholders in the URRNW should ultimately result in improvements to water quality for all of the pollutants addressed in the URRNW TMDLs.

MPCA has authored the Upper Red River of the North WRAPS document (finalized December 2017) which provides information on the development of scientifically-supported restoration and protection strategies for implementation planning and action. The report provides a summary of the stressors causing impairments for the stream segments, including a chart of point sources, and a table outlining the relative magnitude of contributing nonpoint pollutant sources in the URRNW. According to the WRAPS, because much of the nonpoint source strategies outlined rely on voluntary implementation by landowners, land users, and residents of the watershed it is imperative to create social capital (trust, networks, and positive relationships) with those who will be needed to voluntarily implement BMPs. Thus, effective ongoing civic engagement is fully a part of the overall plan for moving forward.

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[2] Buffalo-Red River Watershed District 2016 Annual Report, June 2017, http://www.brrwd.org/pdf/Annual%20Reports/2016_BRRWD_Annual_Report.pdf

MPCA views 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.[3] EPA believes that the detail provided in the WRAPS document is a sound starting point for providing a focused, comprehensive implementation plan on the watershed scale. Subsequent work in the watershed by BWSR to further refine implementation on the local level via its One Watershed, One Plan (1W1P) document should also serve to enhance implementation discussions included in the WRAPS document.

Continued water quality monitoring within the basin is supported by MPCA. Additional water quality monitoring results could provide insight into the success or failure of BMP systems designed to reduce *E. coli*, nutrient and TSS loading into the surface waters of the watershed. Local watershed managers would be able to reflect on the progress of the various pollutant removal strategies and would have the opportunity to change course if observed progress is unsatisfactory.

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

Reasonable assurance that the WLA set forth will be implemented is provided by regulatory actions. According to 40 CFR 122.44(d)(1)(vii)(B), NPDES permit effluent limits must be consistent with assumptions and requirements of all WLAs in an approved TMDL. MPCA's stormwater program and the NPDES permit program are the implementing programs for ensuring WLA are consistent with the TMDL. The NPDES program requires construction and industrial sites to create SWPPPs which summarize how stormwater will be minimized from construction and industrial sites. Under the MPCA's Stormwater General Permit, managers of sites under construction or industrial stormwater permits must review the adequacy of local SWPPPs to ensure that each plan meets WLA set in the URRNW TMDLs. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified. This applies to sites under the MPCA's General Stormwater Permit for Construction Activity (MNR100001) and its NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) or NPDES/SDS General Permit for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production facilities (MNG490000).

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.

[3] Upper Red River of the North WRAPS document (December 2017).

The CWLA also provides details on public and stakeholder participation, and how the funding will be used. In part to attain these goals, the CWLA requires MPCA to develop WRAPS. The WRAPS are required to contain such elements as the identification of impaired waters, watershed modeling outputs, point and nonpoint sources, load reductions, etc. (*Chapter 114D.26*; CWLA). The WRAPS also contain an implementation table of strategies and actions that are capable of achieving the needed load reductions, for both point and nonpoint sources (*Chapter 114D.26*, Subd. 1(8); CWLA). Implementation plans developed for the TMDLs are included in the table, and are considered "priority areas" under the WRAPS process (*Watershed Restoration and Protection Strategy Report Template*, MPCA). This table includes not only needed actions but a timeline for achieving water quality targets, the reductions needed from both point and nonpoint sources, the governmental units responsible, and interim milestones for achieving the actions. MPCA has developed guidance on what is required in the WRAPS (*Watershed Restoration and Protection Strategy Report Template*, MPCA)

The Minnesota Board of Soil and Water Resources administers the Clean Water Fund as well, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (FY 2014 Clean Water Fund Competitive Grants Request for Proposal (*RFP*); *Minnesota Board of Soil and Water Resources*, 2014).

The EPA finds that this criterion has been adequately addressed.

9. Monitoring Plan to Track TMDL Effectiveness

EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions and, such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

Comment:

The final TMDL document outlines the water monitoring efforts in the URRNW. 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., members of the BRRWD) as long as there is sufficient funding to support the efforts of these local entities. At a minimum, the URRNW will be monitored once every 10 years as part of the MPCA's Intensive Watershed Monitoring cycle.

Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation efforts utilized in the URRNW. 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 URRNW. Watershed managers will have the opportunity to reflect on the progress or lack of progress, and will have the opportunity to change course if progress is unsatisfactory. Review of BMP efficiency is expected to be completed by the local and county partners.

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

The EPA finds that this criterion has been adequately addressed.

10. Implementation

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

Comment:
The findings from the URRNW TMDLs will be used to inform the selection of implementation activities as part of the Upper Red River of the North WRAPS process. The purpose of the WRAPS report is to support local working groups and jointly develop scientifically-supported restoration and protection strategies to be used for subsequent implementation planning. The TMDL outlined implementation strategies in Section 8 of the final TMDL document. MPCA outlined the importance of prioritizing areas within the URRNW, education and outreach efforts with local partners, and partnering with local stakeholders to improve water quality within the watershed. Reduction goals for the bacteria and TSS TMDLs may be met via components of the following strategies:

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

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

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

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

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

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

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

URRNW TSS TMDLs:

Restoration activities to re-establish the natural flow pattern: Watershed managers should be encouraged to restore the natural hydrologic flow patterns of the stream channel in Whiskey Creek via riparian and floodplain restoration efforts. These efforts would have positive effects on water quality, water storage and improved biological habitats in the URRNW.

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

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

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

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 TMDL submittal is found in Section 9 of the final TMDL document. Throughout the development of the URRNW TMDLs the public was given various opportunities to participate. As part of the strategy to communicate the goals of the TMDL project and to engage with members of the public, MPCA collaborated with local partners via its participation in a technical stakeholder group (TSG) for TMDL and WRAPS development. The TSG included coordination with local SWCD staff, NRCS staff, other state agency staff (e.g., staff from the Minnesota Department of Natural Resources and Board of Soil and Water Resources (BWSR)), county and township officials and local citizens. This group met at various times to discuss strategies for improving water quality in the URRNW.

MPCA posted the draft TMDL online at (https://www.pca.state.mn.us/water/total-maximum-daily-load-tmdl-projects) for a public comment period. The 30-day public comment period was started on July 24, 2017 and ended on August 23, 2017. MPCA received one public comment during the public comment period from the Minnesota Department of Agriculture (MDA).

The MDA provided comments on both the draft TMDL and the draft WRAPS documents. MDA's TMDL comments focused on MPCA updating its implementation discussion (Section 8 of the final TMDL document) and providing additional reference to current state programs and resources available to local stakeholders. These programs and resources would ultimately support implementation activities in the URRNW. Additionally, MDA encouraged MPCA to include references to MDA's *Agricultural Best Management Practices Handbook for Minnesota*, within the final TMDL document. MPCA updated language within the final URRNW TMDL in response to MDA's comments.

EPA believes that MPCA adequately addressed the comments and updated the final TMDL appropriately. MPCA submitted all public comments received during the public notice period and individual responses to those comments in the final TMDL submittal packet received by the EPA on January 4, 2018.

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

12. Submittal Letter

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

Comment:
The EPA received the final URRNW TMDL document, submittal letter and accompanying documentation from MPCA on January 4, 2018. The transmittal letter explicitly stated that the final TMDLs referenced in Table 1 of this Decision Document were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval.

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 Upper Red River of the North Watershed TMDLs by MPCA satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the 2 bacteria TMDLs and 1 TSS TMDL satisfy all elements for approvable TMDLs. This TMDL approval is for **three TMDLs**, addressing water bodies 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.