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

AUG 12 2013

REPLY TO THE ATTENTION OF:

WW-16J

Rebecca J. Flood, Assistant Commissioner
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Dear Ms. Flood,

The U. S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDL) for Deer Creek including supporting documentation and follow up information. The Deer Creek watershed is a subwatershed in the Nemadji River Basin. Deer Creek is located entirely in Carlton County, Minnesota. The TMDL addresses the aquatic life use impairment resulting from turbidity, using Total Suspend Solids (TSS) as a surrogate.

The TMDL meets 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 one TMDL for TSS for Deer Creek. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's effort in submitting these TMDLs, and look forward to future 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 yours,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Celine Lyman, MPCA
Karen Evans, MPCA
Jeff Risberg, MPCA

wq-iw10-04g

TMDL: Deer Creek Watershed, Minnesota, Turbidity
Effective Date: August 12, 2013

Decision Document for Approval of
Deer Creek Watershed,
Turbidity TMDL Report

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

Comment:
Location/Description/Spatial Extent: Deer Creek watershed is a subwatershed in the Nemadji River Basin. Deer Creek is located entirely in Carlton County, Minnesota and is a perennial tributary to the Nemadji River. Deer Creek watershed has a drainage area of 5,063 acres. The Creek flows south east to the confluence with the Nemadji River. Sediment carried into the Nemadji River from its tributaries is carried downstream to Superior Harbor and eventually out into Lake Superior. MPCA stated that the approximately 14 percent of the silt and clay loading coming from the Nemadji River is trapped in Superior Bay, with approximately 74 percent reaching Lake Superior. from the Nemadji River. A significant amount of sediment reaching Lake Superior from the Nemadji River appears to be coming from Deer Creek based on monitoring conducted by Nemadji River Basin Project (NRBP) staff. Monitoring conducted by Nemadji River Basin Project (NRBP) in 2004 determined that Nemadji River Watershed streams typically had TSS concentrations less than 40 milligram/liter (mg/l), while Deer Creek concentrations exceeded 600 mg/l during base flows.

A majority of the watershed (>90%) is privately owned with the remainder in a state owned wildlife management area. The land use in the watershed is 52.9% forested, 22.3% as wetlands, 13.4% agricultural, 10.0% grassland or scrubland and 1.1% as low intensity development. Table 2.2 of the TMDL submittal identifies further breakdowns of the land usage.

Problem Identification/Pollutant of Concern: This TMDL addresses the aquatic life use impairment due to turbidity as identified in the summary table, Table 2.1 of the TMDL submittal and on Category 5 of the 2012 (most recently approved) Integrated Report. Category 5 is the list of impaired waters still needing a TMDL.

As stated in the TMDL submittal, Deer Creek was placed on the Minnesota 303(d) list due to failure to meet the turbidity standard, monitoring data collected by MPCA and others. Turbidity is an expression of the optical properties in a water sample that cause light to be scattered or absorbed. Turbidity may be caused by matter, such as clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms (Standard Methods 1999). The scattering of light in the water column makes the water appear cloudy and the cloudiness increases with greater suspended loads. Turbidity limits light penetration which further inhibits healthy plant growth on the river bottom. Because turbidity is dimensionless, Total Suspended Solids (TSS) was used as a surrogate to calculate the loading capacity and determine allocations. Section 3.2.2 of the TMDL submittal discusses the conversion from turbidity to TSS.

Source Identification: Section 3.1 of the TMDL submittal discusses the TSS sources. Numerous studies have been done regarding sediment impacts in the Nemadji Basin. These studies are identified in Appendix A of the TMDL report. The primary causes of turbidity are the suspended sediment and organic material components of TSS. A simplified turbidity conceptual model is presented in Figure 3.1 of the TMDL report. The figure illustrates both "external" and "internal" sources. The sources of TSS to the watershed are livestock in riparian zones, watershed wide land use changes, sediment volcanoes, failing red clay dam structures, cultivated cropland, roadways/culvert crossings, and permitted point sources (construction and industrial stormwater). Further description of these sources are below:

Nonpoint Sources

Livestock in Riparian Zone
MPCA has indicated that a recent study of Deer Creek concluded that grazing in the riparian areas significantly reduced stream bank stability. Cattle reduce riparian vegetation which result in bank erosion. Livestock grazing also results in excess turbidity via soil runoff directly from devegetated areas, resuspension of sediments by walking in the stream, and by destabilizing the banks leading to increased bank erosion or slumping.

There are no confined animal feeding operations in the watershed.

Watershed wide land use changes
Significant land use changes have taken place in the Nemadji basin in the past two centuries. These changes include timber harvesting in the 1800s, forest fires and the conversion of wooded conifer forest land to hay and pasture during the early 1900s. Broad land use changes within the larger watershed have altered stream flows causing the channel to down cut. The change in the channel slope throughout the basin results in downstream movement of soil and associated channel incision or widening. MPCA has determined that studies indicated that between 2008 and 2010 a portion of Deer Creek was logged. Silviculture activities also contribute to changes in hydrology which increase sediment loading in the Deer Creek watershed. MPCA determined that these changes in land use have increased sedimentation rates in Lake Superior.

Sediment Volcanoes - Bank Slumping
"Sediment volcano" is a term used by MPCA to describe ground water discharging in the creek bed, increasing erosion and sediment transport. Approximately 10 sediment volcanoes have been observed between 2006 and 2008 discharging approximately 100 gallons per minute of groundwater to the creek.

Failing Red Clay Dam Structures
MPCA identified four sediment retention structures constructed in the Deer Creek Watershed. The design life of these structures was 10-25 years depending on the specific project, however, the design life has now been exceeded. MPCA indicated that three of the four structures in the Deer Creek watershed were assessed and were found to contain failed metal pipes and, in one case, a breached structure.

Cultivated Cropland
Cultivated cropland can contribute to excess turbidity via sheet/rill erosion of soil; destabilization of banks (if inadequate buffers) leading to increased bank erosion; and drainage alterations on cropped land leading to increased flows causing bank/bed erosion. MPCA determined that based on the land use data from 2006, areas covered with cultivated crops represent only 2% of the watershed (Table 2.2 of the TMDL submittal). MPCA stated the dominant agricultural classification is pasture/hay management representing 11.4% of the watershed.

Roadways/Culvert Crossings
MPCA used the 30 m National Land Cover Dataset (NLCD) impervious surface dataset and determined a total impervious area of 7.25 acres, representing only 0.1% of the total Deer Creek Watershed. Culvert crossings can increase erosion through slope changes and increased water velocities. Impervious surfaces are mostly identified as the county and state roads that cross within the watershed boundaries.

Point Sources

There are no direct NPDES permit discharges to in the Deer Creek Watershed. MPCA did give allocations for potential future industrial and construction stormwater dischargers. Table 5 below identifies the loadings given to the combined stormwater discharge. There are no permitted MS4 communities or confined animal feeding operations in the watershed.

Priority Ranking: Minnesota does not include separate priority rankings for its waters in the TMDL. MPCA prioritizes its waters during the development of the impaired waters list. Development of the TMDL for this segment was scheduled to begin in 2004 with a final TMDL to be submitted in 2013. This information is from the approved 2012 impaired waters list, which is the most recent approved list.

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

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

The TMDL submittal must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the 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 Use of Waterbody: Deer Creek is listed in Minnesota Rules Ch. 7050.0470 classification as a 1B, 2A, 3B waterbody. Of the water classifications identified for Deer Creek, Class 2A waters is the only classification that identifies a standard for turbidity. Class 2A refers to those State waters identified to support cold water aquatic life use and recreation use. Aquatic life and recreation includes all waters of the state that support or may support fish, other aquatic life, bathing, boating, or other recreational purposes and for which quality control is or may be necessary to protect aquatic or terrestrial life or their habitats or the public health, safety, or welfare.

Water Quality Standard: MN Rules ch. 7050.0222 describes the designated beneficial use for Class 2A waters as follows:

The quality of Class 2A surface waters shall be such as to permit the propagation and maintenance of a healthy community of cold water sport or commercial fish and associated aquatic life, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface waters is also protected as a source of drinking water.

Minn Rules ch. 7050.0222 subpart 1, turbidity water quality standard for Class 2A waters, is 10 Nephelometric Turbidity Units (NTUs).

Target: The numeric criterion for turbidity, based on a stream classification of a Class 2A, is a standard of 10 NTU. Turbidity, however, is a dimensionless measurement and thus loading capacities cannot be calculated. A TSS surrogate is used to calculate loading capacity and to determine allocations. MPCA analyzed turbidity and corresponding TSS data for Deer Creek to determine the relationship between turbidity and TSS. There was ample data to use the stream specific relationship for this TMDL. Section 3.2 of the TMDL report discusses the calculations used to develop the TSS surrogate target. The TSS surrogate numeric target was determined to be **4 mg/L.**

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

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:
Loading Capacity: As mentioned above, turbidity is a dimensionless unit. TSS was chosen as a surrogate to calculate loading allocations and capacities for turbidity impairments. MPCA determined the loading capacities through the use of the Load Duration Curve (LDC) method (Section 3.4.2 of the TMDL submittal).

Carlton County Soil and Water Conservation District (CCSWCD) staff collected water quality information at five sites within the Deer Creek watershed with continuous flow measurements recorded at two of the five sites. Figure 2.1 of the TMDL report identifies the location of the sites. TSS shows a good correlation with turbidity for Deer Creek, based on regressions done on the monitoring data. Lab turbidity and TSS measurements were recorded from grab samples at the Upper and Lower Deer Creek sites. The measurements were used to develop a NTU to TSS relationship. The Lower Deer Creek site TSS concentration was determined to be the most stringent of the two sites to meet the water quality standard in Deer Creek. Based on this determination, MPCA used this site to set the load allocation in the stream. Further detail including the calculation to convert NTU to TSS is discussed in section 3.2.2 of the TMDL report. Appendix A of the TMDL report is an annotated bibliography of the information used to determine load allocations for the Deer Creek watershed.

The TSS load duration curve represents instantaneous loading capacities that vary as a function of flow. Because this method uses a long-term record of daily flow volumes virtually the full spectrum of allowable loading capacities is represented by the resulting curve.

Load duration analysis method:

- A flow duration curve was developed using the full range of hydrological conditions from data collected between 2008 to 2010 at Highway 23. The resultant curve shows flow values and the frequency that the flow is exceeded. All flow conditions are represented.
- The load duration curve was developed using the flow multiplied by the standard or target concentration (4 mg/l TSS). The curve in figure 3.5 of the TMDL Report represents the loads meeting turbidity standards as translated to TSS, and the points above the curve are pollutant exceedences. Review of the Load Duration Curve indicates that under all conditions the load was exceeded. In addition, the 90th percentile values, and the median values are shown for each flow regime. The curve demonstrates that the 4 mg/l TSS value is exceeded under all weather conditions. The TMDL for each flow regime was established by using the midpoint flow condition multiplied by the concentration target.

In Table 3.1 of the TMDL report only five points on the entire loading capacity curve are depicted (the midpoints of the designated flow zones). However, it should be understood that the components of the TMDL equation could be illustrated for any point on the entire curve. The load duration curve method can be used to display collected TSS monitoring data and allows for estimation of load reductions necessary for attainment of the turbidity water quality standard.

Using this method, daily loads were developed based upon the flow in the waterbody. 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 1 below identifies the loading capacity for the waterbody for each flow regime. Although there are numeric loads for each flow regime, the LDC is what is being approved for this TMDL.

Table 1 Loading Capacity

Flow Zone (percent of flow)	TSS Loading Capacity (lbs/day)
High (0-10%)	429
Moist (10-40%)	73
Mid (40 – 60%)	40
Dry (60 -90%)	40
Low (90 – 100%)	27

Median loads over the three year period were calculated as 13314, 810, 94, 228, and 128 lbs/day for the high, moist, mid, dry and low flow zones, respectively. Using the above medians from the load duration curve for the loading capacity needed to meet standards, it is estimated that a reduction range of 57-96% is needed.

Critical Condition: The highest turbidity levels occur during snowmelt and storm runoff events. The unique geology and resulting soils and hydrology in the Deer Creek watershed make the

whole range of stream flows subject to elevated turbidity levels. The duration curve methodology addresses the critical conditions and seasonal varitation. EPA concurs with the data analysis and LDC approach utilized by MPCA in its calculation of the wasteload allocations, load allocations and the margin of safety for the Deer Creek Watershed TMDL. The method used for determining these TMDLs is consistent with EPA technical memos.[1]

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this third element.

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity attributed to existing and future non-point 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 non-point sources.

Comments:
Load Allocation: The load allocation is discussed in Sections 3.1, 3.3.3, and 3.4.2 of the TMDL submittal. MPCA determined that nonpoint sources include: land use changes, sediment volcanoes, failing red clay dam structures, cultivated cropland, and roadways/culvert crossings. Descriptions of each loading type are discussed in Section 1 of this document and in Section 3.1 of the TMDL report.

MPCA determined available LAs by calculating the loading capacity and subtracting the wasteload allocations and a 10% margin of safety. The load allocation includes nonpoint pollution sources that are not subject to an NPDES permit as well as "natural background" sources such as wildlife. Table 2 below identifies the load allocation associated with the mid section of each flow regime.

Table 2 Loading Allocation

Flow Zone (percent of flow)	High (0-10%) (lbs TSS/day)	Moist (10-40%) (lbs TSS/day)	Mid (40-60%) (lbs TSS/day)	Dry (60-90%) (lbs TSS/day)	Low (90-100%) (lbs TSS/day)
Load Allocation	385.8	65.8	35.8	35.8	24.4

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this fourth element.

[1] See 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-07-2006, Washington, D.C.

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.

Comments:
The WLA is discussed in Sections 3.1, and 3.3.1 of the TMDL submittal. There are no industrial or municipal wastewater treatment facilities that discharge to Deer Creek. The Deer Creek watershed is not subject to MS4 permits. Consideration was given to construction stormwater and industrial stormwater permits.

Construction Stormwater
For a stormwater discharge from a construction site which requires a NPDES permit, the permittee must obtain coverage under the Construction General Permit and properly select, install and maintain all Best Management Practices (BMPs) required under the permit, or meet local construction stormwater requirements if they are more restrictive than requirements of the State General Permit. This TMDL assumes 0.1% of the land area is designated for construction. MPCA has determined that the total loading from construction stormwater is less than 0.1% of the loading capacity for Deer Creek.

Industrial Stormwater
For industrial stormwater discharges the discharger must obtain coverage under the industrial general stormwater permit issued by the state or a general sand and gravel general permit (MNG49) under the NPDES program and select, install and maintain all BMPs required under the permit. This TMDL assumes that any future land area designated for industrial stormwater is implicitly combined with the land area designated for construction activities. MPCA has determined that the total loading from industrial stormwater is less than 0.1% of the loading capacity for Deer Creek.

Minnesota also requires a reserved capacity (RC) component to the TMDL when there are authorized discharges. No reserved capacity was calculated for the Deer Creek TMDL

Table 3 Waste Load Allocations – Construction and Industrial Stormwater (NPDES)

Flow Zone (percent of flow)	High (0-10%) (lbs TSS/day)	Moist (10-40%) (lbs TSS/day)	Mid (40-60%) (lbs TSS/day)	Dry (60-90%) (lbs TSS/day)	Low (90-100%) (lbs TSS/day)
Waste Load Allocation	0.43	0.07	0.04	0.04	0.03

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this fifth element.

6. Margin of Safety (MOS)

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

Comments:
An explicit 10% of the total loading was applied in the TMDL calculation to express the MOS in this TMDL. The use of the LDC approach minimized variability associated with the development of the TMDL because the calculation of the loading capacity was a function of flow multiplied by the target value. Section 3.3.2 of the TMDL submittal discusses the MOS.

EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this sixth element.

7. Seasonal Variation

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

Comments:
The LDC approach used in developing the TMDL captures the full range of flow condition over all seasons and flow ranges. MPCA flow data from 2008-2010 was compared to data from 1976-2010. Although the flow data from 2008-2010 was lower than the historical data, analysis showed

the more recent MPCA flow data adequately represented the long term flow. Therefore, data from the 2008 -2010 data set was used in the development of the TMDL.

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

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.

Comments:
The TMDL report identifies nonpoint sources as the major contributor to the TSS loads in Deer Creek. Section 6 of the TMDL report discusses mechanisms that give reasonable assurance that the TMDL will be met. Below is a summary of these assurances.

Reasonable assurance:

- The Nemadji River watershed, which includes the Deer Creek watershed, has a long history of study. Appendix A of the TMDL contains a partial list of studies dating back over 20 years. These studies focus on sediment sources and impacts in the watershed, and illustrate the high level of interest in this watershed. The CSWCD develops annual plans identifying the goals and projects to protect water resources in the county.
- The CSWCD has several projects underway to address sediment in the Nemadji River and Deer Creek. The CSWCD, in conjunction with the State, has been working on a project to identify failing red clay dams in the Deer Creek watershed. The CSWCD has noted that there are three failing structures in the watershed contributing significant amounts of sediment to Deer Creek, Nemadji River, and ultimately to Lake Superior. Future phases of the project will involve restoring these structures.

- Efforts are underway to address the sediment volcanoes in the watershed. These structures form from groundwater discharge at the surface near the creek, transporting soil into the creek. MPCA has performed a groundwater study and model in conjunction with the University of Minnesota- Duluth. Further work is underway to determine potential remediation efforts to address this source.
- The Nemadji River watershed is part of the St. Louis River Area of Concern (AOC) as designated by the EPA. The Nemadji River is a significant source of sediment to Superior Bay, as noted in the Remedial Action Plan for the St. Louis River AOC. Efforts to attain the beneficial uses in the AOC will require sediment reductions in the Nemadji River watershed. These efforts will be implemented as part of the St. Louis River AOC project.
- Clean Water Legacy Act (CWLA): The CWLA is a statute passed in Minnesota in 2006 for the purposes of protecting, restoring, and preserving Minnesota water. The CWLA provides the process to be used in Minnesota to develop TMDL implementation plans, which detail the restoration activities needed to achieve the allocations in the TMDL. The TMDL implementation plans are required by the State to obtain funding from the Clean Water Fund. The Act discusses how MPCA and the involved public agencies and private entities will coordinate efforts regarding land use, land management, and water management. Cooperation is also expected between agencies and other entities regarding planning efforts, and various local authorities and responsibilities. This would also include informal and formal agreements to jointly use technical, educational, and financial resources. MPCA expects the implementation plans to be developed within a year of TMDL approval.

  The CWLA also provides details on public and stakeholder participation, and how the funding will be used. The implementation plans are required to contain ranges of cost estimates for both point and nonpoint source load reductions, as well as monitoring to determine effectiveness. MPCA has developed guidance on what is required in the implementation plans (Implementation Plan Review Combined Checklist and Comment, MPCA), which includes cost estimates, general timelines for implementation, and interim milestones and measures. 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 '11 Clean Water Fund Competitive Grants Policy; Minnesota Board of Soil and Water Resources, 2011).

EPA finds that the TMDL document submitted by MPCA adequately addresses this eighth element.

9. Monitoring Plan to Track TMDL Effectiveness

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

the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

Comments:
Section 4 of the TMDL submittal discusses the monitoring efforts that will continue in the watershed. At a minimum, monitoring will be continued at the Deer Creek downstream site at Highway 23 for assessment/study purposes. This monitoring will occur during the open water season and at a frequency and timing similar to previous turbidity assessment monitoring. Monitoring will primarily be conducted by local staff, citizen volunteers, and MPCA and DNR staff.

Additional monitoring sites may be needed to further investigate the sediment sources from the sediment volcanoes. Stations directly upstream and downstream of the sediment volcanoes can be used to determine how sediment loads at the outflow are impacted by the sediment volcanoes.

The Minnesota MPCA has recently begun implementation of a 10-year rotation for watershed work. MPCA employs an intensive watershed monitoring schedule that provides comprehensive assessments of all of the major watersheds (HUC 8 digit) on a ten-year cycle. This schedule provides intensive monitoring of streams and lakes within each major watershed to identify overall health of the water resources, to identify impaired waters, and to identify those waters in need of additional protection to prevent future impairments.

Once BMPs are completed, the evaluation cycle begins again. The Nemadji watershed began this rotational cycle in 2011. Monitoring at this intensive level is scheduled to occur again in 2021. More specific monitoring plan(s) will be developed as part of implementation efforts. The impaired water body will remain listed until water quality standards are met. Additional monitoring will primarily be conducted by local staff, citizen volunteers, and MPCA and DNR staff.

EPA finds that the TMDL document submitted by MPCA adequately addresses this ninth element.

10. Implementation

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

Comment:
General implementation strategies are discussed in Section 5 of the TMDL submittal. A detailed implementation plan will be developed in 2013. The implementation plan objectives are outlined

in Section 5.1, which includes discussions on hydrology, biology, geomorphology, and water quality.

EPA finds that the TMDL document submitted by MPCA adequately addresses this tenth element.

11. Public Participation

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

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

Comments:
Section 7 of the TMDL submittal discusses public participation. MPCA identified the following opportunities for both public and stakeholder participation in the Deer Creek TMDL process which occurred over the last two years. These opportunities included:

- Updates in the SWCD newsletter distributed to 2600 landowners,
- Distribution of draft reports for review and comment to Stewardship committee members,
- Dialog at meetings of the Nemadji Stewardship Committee and SWCD board, both ongoing venues for public and watershed residents to voice issues or concerns,
- Continued and timely postings to the Nemadji River and Deer Creek web pages hosted by the SWCD, and
- An open house meeting to facilitate public review of the final draft during the public notice period

The TMDL was on public notice in the State Register and the public comment period was open from March 25, 2013 through April 23, 2013. The draft TMDL was available on MPCA's website.

MPCA received comments via email from five entities. Two responders requested extensions to the comment period. Three submitted comments on various aspects of the TMDL report. MPCA staff provided responses for the three commenters. While no extension was provided, requestors were notified via email that remarks are welcome at any time that the implementation plan effort is underway, and that MPCA would welcome their input.

One comment received by MPCA requested more information on reasonable assurance for this TMDL. MPCA responded that more "detailed implementation plans are typically completed within one year of the TMDL approval." MPCA added language to the TMDL report indicating a more detailed implementation plan effort is underway and some description of how the plan will prioritize and target BMPs. This added language should address the concern of the commenter.

EPA finds that the TMDL document submitted by MPCA satisfies all 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 transmittal letter was dated June 14, 2013 from Rebecca J. Flood, Assistant Commissioner, MPCA, to Tinka Hyde, Water Division Director, EPA Region 5. The letter stated that this was a TMDL submittal for final approval of one TMDL for Deer Creek as identified on Category 5 of Minnesota's Integrated Report. This TMDL addresses part of the loading in the Nemadji River Watershed of the Lake Superior Basin.

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

13. Conclusion

After a full and complete review, EPA finds that the TMDL for turbidity for the Deer Creek Wateshed satisfies all of the elements of an approvable TMDL. This approval document is for one water body segment impaired for turbidity using TSS as a surrogate for a total of one TMDL, addressing one impairment, from the final approved 2012 Minnesota 303(d) list and submitted 2012 Minnesota 303(d) list. EPA's approval of this document 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 CWA Section 303(d) for those waters.

Table 4

Reach	Description	HUC (AU)	Pollutant	Surrogate Pollutant	Impairments
Deer Creek	Headwaters to Nemadji River	04010301-531	Turbidity	TSS	Aquatic Life Use

Table 5 Loading Capacities for TSS Deer Creek Watershed

Deer Creek Headwaters to Nemadji River AU ID: 04010301-531	**Flow Zone**				
	High	**Moist**	**Mid-Range**	**Dry**	**Low**
	Values expressed as Lbs TSS/day				
Wasteload Allocation					
Permitted Wastewater Treatment Facilities	0	0	0	0	0
Communities Subject to MS4 NPDES Permit Requirements	0	0	0	0	0
Construction and Industrial Stormwater (NPDES)	0.43	0.07	0.04	0.04	0.03
Wasteload Allocation Total	**0.43**	**0.07**	**0.04**	**0.04**	**0.03**
Load Allocation	**385.8**	**65.8**	**35.8**	**35.8**	**24.4**
MOS	**42.9**	**7.3**	**4.0**	**4.0**	**2.7**
Total Daily Loading Capacity	**429**	**73**	**40**	**40**	**27**