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

JUN 28 2013

REPLY TO THE ATTENTION OF:

WW-16J

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

Dear Ms. Flood:

The United States Environmental Protection Agency (U.S. EPA) has reviewed the final Total Maximum Daily Load (TMDL) from the Minnesota Pollution Control Agency (MPCA) for Bluff Creek (AUID 07020012-710), in Minnesota. The TMDL is for turbidity and fish biota, using total suspended solids (TSS) as a surrogate pollutant, and addresses two impairments in Bluff Creek.

Based on this review, U.S. EPA has determined that Minnesota's TMDL for turbidity and fish biota meets the requirements of Section 303(d) of the Clean Water Act and U.S. EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, U.S. EPA hereby approves one TMDL for two impairments for the Bluff Creek (AUID 07020012-710) in Minnesota. The statutory and regulatory requirements, and U.S. EPA's review of Minnesotas' compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's effort in submitting this TMDL 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: Jeff Risberg, MPCA (same address)
Barb Peichel, MPCA (same address)

JUN 2 8 2013

TMDL: Bluff Creek, Minnesota

Decision Document for Approval of
Bluff Creek Watershed 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; chlorophyll *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comment:
Location/Description: Bluff Creek is a small tributary of the Lower Minnesota River, located near Chanhassen, Minnesota in Carver County. The headwaters of the stream are located near Trunk Highway 41, and the creek flows south into Rice Lake and eventually into the Lower Minnesota River. The impaired segment addressed by this TMDL is the portion of Bluff Creek upstream of Rice Lake (Figure 2.2 of the TMDL). The catchment area at the confluence of Bluff Creek with Rice Lake is 5.8 square miles, while the total length of the main stem is 6.8 miles. The creek is moderately to fully entrenched for most of its course.

The lower reach of the creek has steep valley walls, is highly sinuous, and lined with trees. About 85 percent of the catchment is covered by high-relief, hummocky glacial deposits of loamy till, with some localized organic deposits of muck.

Land Use Distribution: The watershed land uses comprise a mix of agricultural, developed area and undeveloped forested upland and meadow areas. Developed areas encompass nearly 50% of the watershed, with low intensity development representing the largest portion (21%), along with medium intensity (13%) and developed open space (12%). Agricultural land covers nearly 30% of the watershed, consisting of pasture/hay (17%) and cultivated crops (13%). Undeveloped land covers the remaining 20% of the watershed, with deciduous forest (14%) covering the majority of this land use.

Problem Identification/Pollutant of Concern: Bluff Creek is listed by the Minnesota Pollution Control Agency (MPCA) as impaired for aquatic life use due to excess turbidity levels and low fish biota scores. The Bluff Creek TMDL Biological Stressor Identification Report ("Stressor Report") identified sediment, metals, habitat fragmentation, and flow (high) as stressors to fish biota (http://www.pca.state.mn.us/index.php/view-document.html?gid=13751) (Section 4.2 and Appendix D of the TMDL).

In 2002, Bluff Creek was listed on the Minnesota 303(d) list of impaired waters for elevated turbidity levels measured at the monitoring station located on the main stem of the creek downstream of Old Highway 212. In 2004, Bluff Creek was also listed as impaired due to low fish Index of Biological Integrity (IBI) scores. Both impairments are addressed in the Bluff Creek report (Table 1 below). Although the TMDL Report discusses all of the stressors, the TMDL equation is only written for total suspended solids (TSS) which represents a surrogate for both turbidity and fish biota.

Table 1: Bluff Creek watershed 303(d) impairments addressed in the TMDL report

Reach	Description	Year listed	Assessment Unit ID	Affected Use	Pollutant or Impairment
Bluff Creek	Headwaters to Rice Lake (27-0132-00)	2004	07020012-710	Aquatic life	Fish bioassessments
Bluff Creek	Headwaters to Rice Lake (27-0132-00)	2002	07020012-710	Aquatic life	Turbidity

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 suspended matter, such as clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms. The scattering of light in the water column makes the water appear cloudy and the cloudiness increases with greater suspended loads. Excess turbidity can degrade aesthetic qualities of water bodies, increase the cost of treatment for drinking or food processing uses and can harm aquatic life. Greater thermal impacts may result from increased sediment deposition in the stream. Turbidity limits light penetration which further inhibits healthy plant growth on the river bottom.

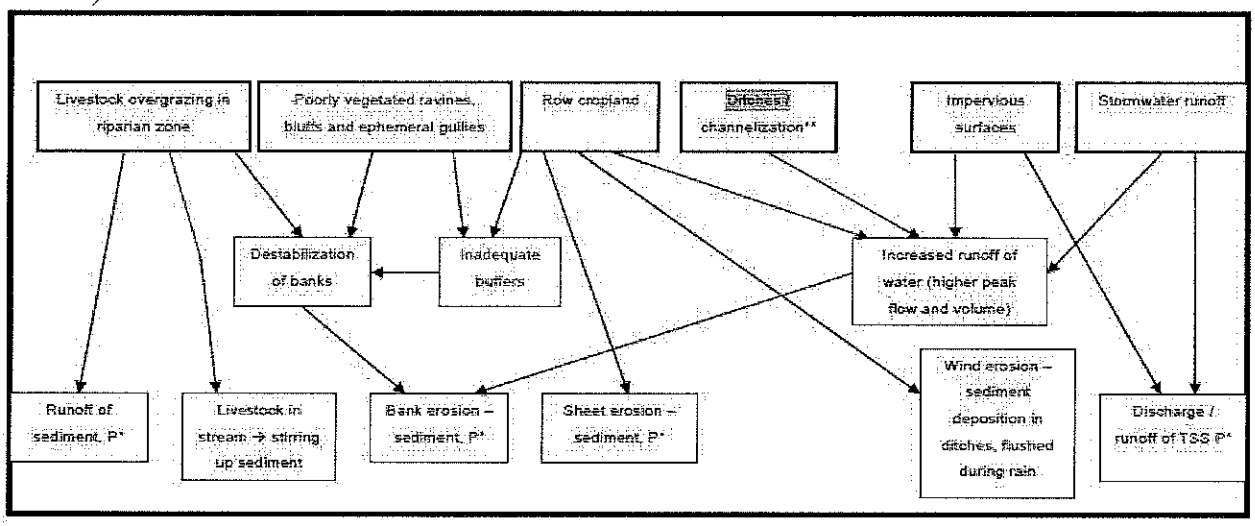
The Stressor Report (Section 4.2.2) states that excessive amounts of fine sediment in stream environments can degrade aquatic communities. Sediment can reduce spawning and rearing areas for certain fish species. Excess suspended sediment can clog the gills of fish, stress certain sensitive species by 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. TSS measures the sediment and organic material that inhibit the natural light coming into the system that negatively impacts the biota.

MPCA believes that controlling the TSS loads will also result in controls of the high flow and potential metals stressors. The Stressor Report noted that the fish community is impacted by high stream flows, either directly by flushing fish downstream, or indirectly by eroding the channel and streambanks and thereby adding to the sediment load. The Stressor Report also noted that while the sampling procedures were questionable for the metals data, overall the trend was for metals values to increase during or just after high flow events, suggesting the metals are washed into the creek (Section 4.2.4 of the Stressor Report). Habitat fragmentation is discussed further in Section 11 of this Decision Document.

Source Identification:

Section 3.2 of the TMDL Report identifies potential sources of TSS. The TMDL Report provides a simplified turbidity conceptual model in Figure 2 (below) showing potential sources and pathways for sediment.

Table 2: Simplified Turbidity Conceptual Model for Bluff Creek (from Figure 3.5 of the TMDL)



Poorly Vegetated Ravines, Streambanks, Bluffs and Gullies

A total of 22 erosion sites in the lower portion of the watershed were documented, in addition to observed streambank erosion. These included contributing ravine erosion, mass slope failures, and erosion associated with storm sewer inlets. All of the inventoried erosion sites are downstream of the Pioneer Trail road crossing and upstream of the Metropolitan Council Environmental Services (MCES) Watershed Outlet Monitoring Program (WOMP) station. Ravine erosion, for the most part, is occurring independently of Bluff Creek, and is due to overland runoff and/or groundwater seepage. Some of the sites appear to be influenced by irrigation practices and runoff from the Bluff Creek golf course.

Erosion inventories of the stream channel, and visits to all of the contributing ravines (and valley walls) of the Bluff Creek lower valley were performed in 1997 and 2007. Significant bank erosion, large slope failures, and lack of stabilizing effect of vegetation under dense forest canopy in riparian areas of the lower valley all contribute to sediment-containing runoff from these sources.

Livestock in Riparian Zone

Overgrazing in riparian pastures can contribute to excess turbidity via soil runoff directly from unvegetated areas adjacent to riparian areas. Livestock with unrestricted access to streams can contribute sediment to the waterbodies, either through resuspension of in-stream sediments or destabilizing stream banks leading to increased bank erosion or slumping. MPCA noted that this may have been a more significant source in the past.

Row Cropland

Land use data from 2006 indicates less than 30% of the watershed is agricultural. Cultivated crops occupy less than 15% of the watershed with corn and soybeans grown on much of the harvested cropland in the county. Row cropland can contribute to excess turbidity via sheet/rill

erosion of soil either overland or via surface tile intakes, or by wind-eroded soil settling in ditches that are then flushed into Bluff Creek during rain events.

Ditches/Channelization

MPCA considers ditches and/or straightened portions of the stream to be important factors to consider when evaluating excess stream turbidity and flow rates. Straightened watercourses shorten channels, separate waters from their floodplain, and make gradients steeper causing higher velocities and higher peak flows. Increased energy of the stream is confined to the channel. In an effort to return to equilibrium, straightened channels are unstable and revert to more stable meandering condition. The net result is increased potential for bank erosion. Temporary release of sediments also occurs during ditch and pond cleaning/dredging.

Permitted Point Sources

The only point sources in this watershed are municipal, construction, and industrial stormwater sources. No industrial or wastewater treatment plants discharge into Bluff Creek, therefore these categories were not considered in the analysis. Impervious surfaces (roads, parking lots, roofs, etc.) can contribute to excess turbidity directly via sediment delivery. Impervious surface area has increased in the watershed during the last few decades and is expected to continue increasing in the future as agricultural and low-density developments are converted to higher density urban and suburban land uses. Increased runoff volume caused by impervious surface exacerbates the problem of increased bank/bed erosion. All of the impervious surfaces in the Bluff Creek watershed are subject to NPDES permit requirements and are addressed by Municipal Separate Storm Sewer System (MS4) permits. There are four Permitted MS4 entities in the Watershed. Two are for roadways (Minnesota Department of Transportation (MnDOT) and Carver County), while the other two are for the Cities of Chaska and Chanhannsen (Figure 3.7 of the TMDL).

The MPCA also issues construction permits for any construction activities disturbing: one acre or more of soil; less than one acre of soil if that activity is part of a "larger common plan of development or sale" that is greater than one acre; or less than one acre of soil, but the MPCA determines that the activity poses a risk to water resources. The source appears to be a minor turbidity source in the Bluff Creek watershed. The MPCA also considers industrial stormwater sources as a minor source of sediment, and for the purpose of the TMDL, are combined with construction stormwater into a WLA.

Future Growth:

MPCA did not determine a separate allocation for future growth. To account for future growth, MPCA overestimated the land area addressed through construction or industrial stormwater permits (Section 3.3.4 of the TMDL). MPCA also noted that there may be conversion of agricultural lands to urban lands over time, and explained how the load allocation for agricultural lands will be converted to wasteload allocation for urbanized lands (via stormwater permits) (Section 3.7 of the TMDL).

Priority Ranking:

Minnesota does not include separate priority rankings for its waters in the TMDL, but prioritizes waters based on its five-year rotating watershed assessment approach during the listing cycle. The MPCA projected schedule for Total Maximum Daily Load (TMDL) report completion, as

indicated on Minnesota's 303(d) impaired waters list, implicitly reflects Minnesota's priority ranking of these TMDLs. The Bluff Creek Watershed TMDL study was scheduled to begin in 2008 and be complete in 2011. Ranking criteria for scheduling TMDL projects include, but are not limited to: impairment impacts on public health and aquatic life; public value of the impaired water resource; likelihood of completing the TMDL in an expedient manner, including a strong base of existing data and restorability of the water body; technical capability and willingness locally to assist with each TMDL; and appropriate sequencing of TMDLs within a watershed or basin.

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: Bluff Creek is not listed in the Minn. Rules Ch. 7050.0470 classification therefore it follows the Minn. Rules Ch. 7050.0430 Unlisted Waters as a classification 2B, 3C, 4A, 5, 6 water. Class 2B refers to those State waters identified to support aquatic life (warm and cool water fisheries and associated biota) and recreation (all water recreation activities including bathing). This class of surface waters is also protected as a source of drinking water.

Water Quality Standard (WQS): Minn. Rules Ch. 7050.0222 subp. 5 lists applicable water quality standards for Class 2 waters. The WQS for Class 2B waters for turbidity is 25 Nephelometric Turbidity Units (NTUs).

Target: Turbidity is commonly measured in NTU. Turbidity is a dimensionless indicator, so the Bluff Creek TMDL uses TSS as a surrogate pollutant to develop a loading capacity and determine allocations that address the aquatic life use impairment due to turbidity.

In order to establish loads, continuous turbidity probe measurements were used from the WOMP sampling station to translate NTU values to the surrogate measure of TSS. TSS shows a good correlation with turbidity, based on regressions done on the monitoring data. The TMDL uses equations to convert turbidity (NTU) to a TSS concentration (mg/L) (detailed in Equations 3.1 and 3.2) for the WOMP sampling location. Water quality duration curves were then developed for TSS. At the WOMP sampling location a concentration of **120 mg/L TSS** represents the 25 NTU standard.

Future WQS: MPCA is considering revising the turbidity standard of 25 NTU to a new standard where TSS concentrations cannot exceed 30 mg/L more than 10% of the time (Appendix A of the TMDL). MPCA analyzed the effect of the WQS change on the Bluff Creek TMDL. EPA's approval of the Bluff Creek TMDL does not represent an approval of the revised standard for TSS, nor the related allocations in Appendix A of the TMDL. Changes to WQS are reviewed under a separate EPA process. If the WQS is revised, the TMDL will be modified as appropriate.

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:

Summary:

Section 3.4 of the TMDL presents an overview of how the loading capacities for Bluff Creek were calculated to meet the surrogate TSS target of 120 mg/L TSS at the WOMP station.

Method for Deriving TMDL:

The Bluff Creek TMDL uses the Load Duration Curve approach to derive and express the TSS load capacity for Bluff Creek. The TSS load duration curve represents instantaneous loading capacities that vary as a function of flow. This method uses a long-term record of daily flow volumes, so virtually the full spectrum of allowable loading capacities for varying flow regimes is represented by the resulting curve. The entire curve in Figure 3.13 of the TMDL Report (Table 3 below) represents the TMDL: in other words, the loadings that meet the standards at each ranked flow. The loading capacities for Bluff Creek are in Table 4 below. A summary of the process is provide below.

1. Flow data - First, continuous flow data are required. No long-term flow gages are present in the Bluff Creek watershed. To determine stream flows, MPCA used short-term gages in Bluff Creek, which gathered data in 2008-2010.
2. Water Quality data - The LDC determined for Bluff Creek was created by using existing data from the WOMP station.
3. Load Duration Curves - The plots are derived from the flow data and water quality data described above. Existing monitored water pollutant loads, represented by the various points on the plot, are compared to target loads, the water quality standard line (in red). If the existing loads are below (less than) the target line, no reduction needs to occur. Conversely, if the existing loads are above (greater than) the target load, a reduction is necessary to reach the target.
4. Analysis - The final step is to link the geographic locations of load reductions needed to the flow conditions under which the exceedences occur. Specific flow regimes contributing to pollutant loads, represented by the graph, are identified to determine under what flow conditions the pollutant exceedences are occurring. By knowing the flow conditions under which exceedences are occurring, MPCA can focus implementation activities on those sources most likely to contribute loads. MPCA provided an analysis for the LDC to determine under what conditions the exceedences are occurring (Section 3.4 of the TMDL).

MPCA divided flow rates measured at the Bluff Creek WOMP station from 2008 through 2010 into five flow zones: high flows (0-10%), moist conditions (10-40%), mid-range flows (40-60%), dry conditions (60-90%) and low flows (90-100%). The five categories were used to calculate the TSS loading capacities and allocations for each flow zone for the Bluff Creek WOMP station. The total daily loading capacity was calculated using the mid-point flow rate for each of the flow zones and the 120 mg/L TSS concentration (which corresponds to the 25 NTU standard). This analysis results in total daily load capacities of 8.03, 1.41, 0.82, 0.46 and 0.13 tons/day for the high, moist, mid, dry and low flow zones, respectively.

The impaired reach of Bluff Creek extends downstream of the WOMP station (to Rice Lake). To account for the additional watershed area, MPCA adjusted the load capacities based on the total watershed area at the confluence with Rice Lake in proportion to the watershed area at the WOMP station. Following this adjustment the total daily load capacities for the impaired reach of Bluff Creek were **8.22, 1.44, 0.84, 0.47 and 0.13 tons/day** for the high, moist, mid, dry and low flow zones, respectively (Table 4 below).

Table 3: Load Duration Curve for Bluff Creek (AUID: 07020012-710)

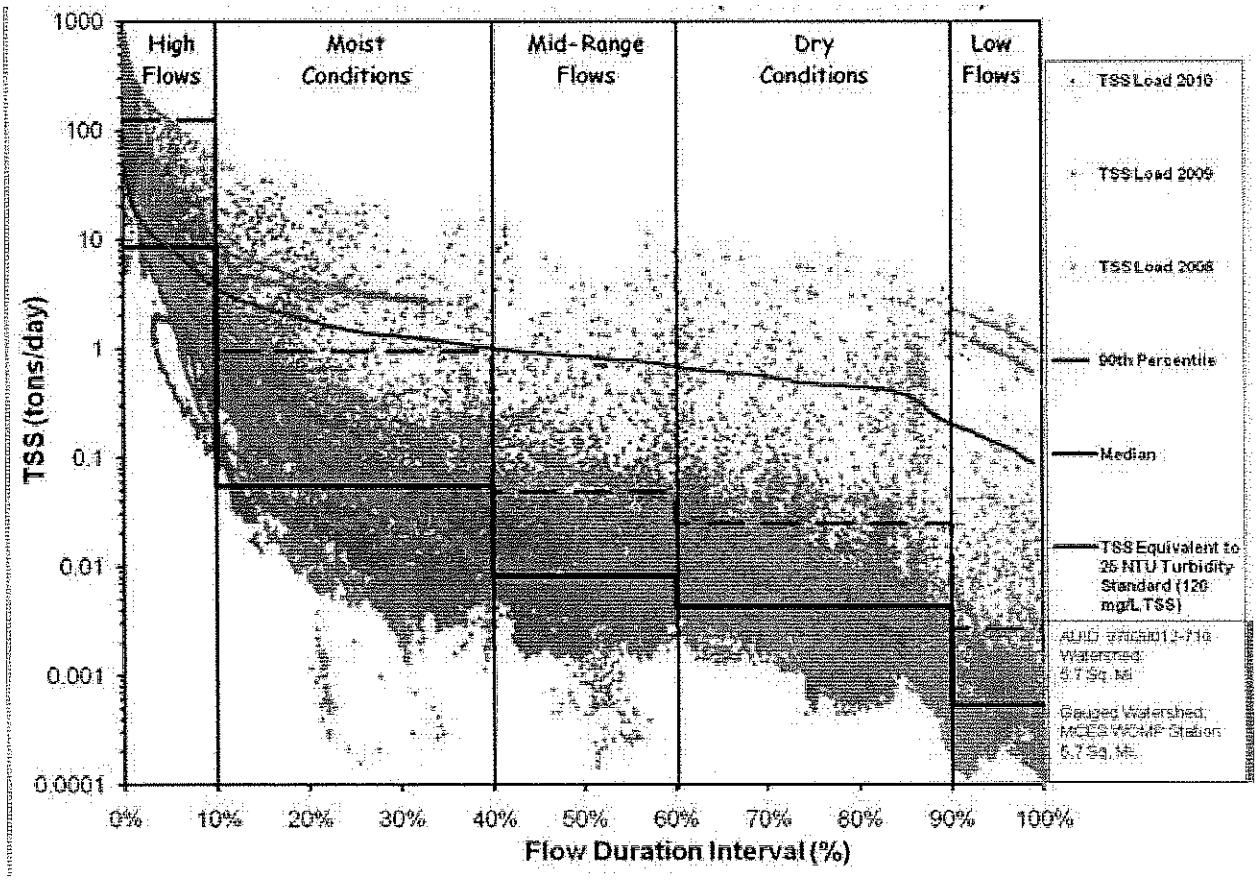


Table 4: TSS Allocations for Bluff Creek (AUID: 07020012-710)

	Flow Zone				
	High (5%)	Moist (25%)	Mid (50%)	Dry (75%)	Low (95%)
	Tons/day				
TOTAL DAILY LOADING CAPACITY	8.22	1.44	0.84	0.47	0.13
Wasteload Allocation					
Communities Subject to MS4 NPDES Requirements					
Mn/DOT MS4 NPDES	0.68	0.12	0.07	0.04	0.01
Carver County MS4 NPDES	0.13	0.02	0.01	0.01	0.002
Chaska MS4 NPDES	0.27	0.05	0.03	0.02	0.004
Chanhassen MS4 NPDES	2.80	0.49	0.29	0.16	0.04
Construction and Industrial Stormwater	0.008	0.002	0.001	<0.001	<0.001
Load Allocation	3.50	0.61	0.36	0.20	0.06
Margin of Safety	0.82	0.14	0.08	0.05	0.01

MPCA determined that the load duration curves show that more exceedences occur under high flows and moist conditions. High flow exceedences more often occur from precipitation-related sources (stormwater, overland run-off) on the left portion of the plot and non-precipitation related (failing septics, wastewater discharge) exceedences more often occur under low flow conditions on the right portion of the plot. The TMDL for each flow regime was established by using the midpoint flow condition multiplied by the concentration target.

The total loading capacity (TMDL) was divided between MOS, WLA, and LA components for each flow condition.

MPCA also utilized data from a short-term sampling site at Pioneer Trail to develop a partial LDC (Section 3.4.4 and Figure 3.15 of the TMDL). This analysis was not used in setting a TMDL, but was compared with the data collected at the WOMP station (see Figure 3.10 of the TMDL) to evaluate the relative importance of the gullies/ravines, bluffs, and streambank erosion sources of turbidity that enter the stream in the lower valley of the watershed between Pioneer Trail and the WOMP monitoring stations. The data comparison indicates that the TSS load measured at the WOMP station was one to two orders of magnitude higher than the load observed at Pioneer Trail during high flow conditions(for 2008).

Critical Condition

Turbidity levels are generally at their highest following significant storm events during the spring and summer months. Although there is variation from year to year, such conditions and variations are fully captured in the duration curve methodology used in this TMDL, as allocations have been developed for five separate segments of the overall flow-duration regime, and data from more than one year was used in development of the TMDL.

EPA finds MPCA's approach for calculating the loading capacity to be reasonable and meets

EPA Guidance. 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:
The load allocations are discussed in Section 3.3.3 of the TMDL submittal and are reflected in Table 4 (above) for the 5 flow categories. MPCA determined available LAs by determining the loading capacity then subtracting the wasteload allocations and a 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 natural sediment erosion. Although several nonpoint source types were identified in the TMDL, MPCA did not divide the LAs into subcategories or land use types. The State's modeling approach and assumptions made in determining load allocations as described in the TMDL Report are consistent with EPA guidance.

EPA finds MPCA's approach for calculating the loading capacity to be reasonable. EPA finds that the TMDL document submitted by MPCA satisfies all requirements of this fourth element.

5. Wasteload Allocations (WLAs)

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

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. These individual WLAs may be adjusted during the NPDES permitting process. If the WLAs are adjusted, the individual effluent limits for each permit issued to a discharger on the impaired water must be consistent with the assumptions and requirements of the adjusted WLAs in the TMDL. If the WLAs are not adjusted, effluent limits contained in the permit must be consistent with the individual WLAs specified in the TMDL. If a draft permit provides for a higher load for a discharger than the corresponding individual WLA in the TMDL, the State/Tribe must demonstrate that the total WLA in the TMDL will be achieved through reductions in the remaining individual WLAs and that localized impairments will not result. All 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 methodology for determining the WLAs is based on the proportional area of each source as determined by land use information, and is described in Section 3.3.4 of the TMDL. These methods resulted in a 48.3% allocation to areas that fall under NPDES MS4 requirements.

The waste loads are summarized by category as follows:

Industrial & Municipal Wastewater Treatment Facilities: Individual WLAs
No industrial or municipal wastewater treatment facilities are actively discharging into Bluff Creek, therefore the wasteload allocation is set to zero for these categories of dischargers.

Municipal Separate Storm Sewer Systems (MS4s): Individual WLAs
The MS4 wasteload allocations were divided between the four entities based on respective drainage areas (Figure 3.7 and Section 3.3.4 of the TMDL). The four permittees are: MnDOT for discharge from state operated road rights-of-way, Carver County for discharge from county operated road rights-of-way, and the municipalities of Chaska and Chanhassen. Individual WLAs are given for each flow category in Table 4 above.

Construction Stormwater and Industrial Stormwater Categorical WLAs
The wasteload allocation for construction and industrial stormwater was determined based on percentage of land in the watershed requiring a NPDES permit. MPCA determined that less than 0.1% of the land area is covered by a construction or industrial stormwater NPDES permit, but assumed a land area of 0.1% to address any uncertainty. The WLA for these sources is in Table 4 above.

EPA finds MPCA's approach for calculating the Waste Load capacity to be reasonable and meets EPA Guidance. 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:
The MOS for the Bluff Creek TMDL is an explicit ten percent of the total loading capacity at each of the flow zones (Table 4 above). MPCA determined that this MOS is appropriate because of the very close agreement between the paired turbidity and TSS samples (Section 3 of the TMDL). The statistical analysis of the data determined that the r^2 value was greater than 0.9, indicating the turbidity values and TSS values were very closely related. The MOS is expected

to provide an adequate accounting of uncertainty for the mechanisms for soil loss from urban and agricultural sources and the factors that affect the loading that have been extensively studied over the decades that are presented as supplemental information to the TMDL.

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 load duration approach used in developing the TMDL for TSS inherently accounts for the full range of flow conditions over all seasons. The MPCA used a long-term gage in the watershed to provide the baseline flow and turbidity data for Bluff Creek. The flow data was used to determine the appropriate flow curve to use in the development of the TMDL. EPA has reviewed the procedure used by MPCA, and determined it is consistent with EPA guidelines (*An Approach for Using Load Duration Curves in the Development of TMDLs*, August 2007, EPA; *Draft Options for the Expression of Daily Loads in TMDLs*, June 2007, EPA).

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:
Section 3.2 of the TMDL Report identifies potential sources of TSS. Section 8 of the TMDL Report discusses mechanisms that give reasonable assurance that the TMDL can be met. Section 7 of the TMDL also describes a number of mechanisms to achieve the identified load reductions in Bluff Creek needed to reach the State Standard for turbidity.

Within one year of the approval of the Turbidity TMDL by the USEPA, a Final Implementation Plan will be released. The Implementation Plan will identify the responsible entities and actions to incorporate TMDL results into local management activities to achieve reductions necessary to achieve the TMDL. Monitoring, as described in Section 5, will be conducted to track progress and suggest adjustment in the implementation approach.

To address the nonpoint source reductions needed to achieve the water quality standard, MPCA noted that previous work has been done in the watershed. Watershed management standards and specifications are in place for the common elements relating to watershed resource management (e.g. water quantity, water quality, erosion and sediment control, wetland protection, financing, regulatory responsibility and public education) in various local plans. Water management requirements are contained in the City of Chanhassen's Surface Water Management Plan, the Riley-Purgatory-Bluff Creek Watershed District's Watershed Management Plan, the Carver County Water Plan, and the City of Chaska's Comprehensive Plan.

Section 6 of the TMDL discusses the water quality model used by MPCA to simulate loadings in the creek and the impacts of various remediation efforts on water quality. MPCA used the Program for Predicting Polluting Particles Passage thru Pits, Puddles, & Ponds (P8) to compare removal efficiencies of various pollutant removal devices (detention ponds, infiltration basins, etc.). MPCA also used results of the modeling to estimate the largest sources of sediment erosion from ravines and bluffs to lower Bluff Creek (Section 6.4 of the TMDL).

Section 7 of the TMDL describes the Erosion Study that was performed in 2007 to identify specific gullies and ravines in the lower watershed that have the potential to contribute significant amounts of sediment. The study identified priority sites that are most likely to be contributing the largest loads to the creek, as well as cost estimates for treating the various sites. Results of the terrain analysis, erosion analysis and P8 modeling were tabulated and results presented in a Combined Ravine Analysis (Table 7.1 of the TMDL).

Chapter 7 of the Minnesota Stormwater Manual (MPCA 2008) provides information for various BMPs, stormwater controls and the determination of appropriate BMPS. 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 some of the implementing programs for ensuring effluent limits are consistent with the TMDL. 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.

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 Bluff Creek TMDL. In the event that the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18-months of the approval of the TMDL by the U.S. EPA.

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, water management, etc. 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 efforts 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:
As discussed in the Monitoring Section (Section 5) of the TMDL Report, more specific

monitoring plan(s) will be developed as part of implementation plans. The WOMP Site is currently monitored for turbidity by the MCES. Other parameters will be analyzed in grab samples to better target implementation efforts including TSS, total suspended volatile solids and chlorophyll-a. Metals, biological monitoring and geomorphology will also be collected. These surveys should be repeated every 2 to 3 years. Geotechnical readings should help to determine the relationship of soils and groundwater to erosion. MPCA also recommends that further investigations should be performed to determine local sources of runoff to the ravines to determine management practices to reduce volume and rate of runoff from these sources.

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 7 of the TMDL submittal. A detailed implementation plan will be developed within a year of approval of the TMDL submittal. The implementation plan will use the potential source assessment, potential erosion factors, land use, public input, and other sources of information to determine which implementation strategies will best reduce turbidity.

MPCA determined that part of the poor biology in the lower watershed is due to habitat fragmentation; specifically, a large culvert that disrupts fish movement (Section 7.1.5 of the TMDL). A large drop at the downstream end of the regional trail culvert interrupts the connectivity of Bluff Creek. Evaluation of Bluff Creek reaches upstream and downstream of the culvert indicates upstream reaches (Stations B-1 and 00MN009 in Figure 2 of the TMDL) were impaired while a downstream reach (Station 00MN008 in Figure 2 of the TMDL) was not impaired. During 2000, upstream reaches observed IBI scores of 16.8 at Station B-1 and 21.6 at 00MN009 while the downstream reach, 00MN008, noted an IBI score of 31.2 which is above the impairment threshold of 30 or greater. The data indicate habitat fragmentation has adversely impacted Bluff Creek's fishery and has resulted in impairment of stream reaches located upstream of the culvert. MPCA will explore constructing a ramp at each end of the culvert to provide fish passage through the culvert and thereby improving the biology of Bluff Creek.

Ultimately, load reductions must be made to meet the daily load represented by the load duration curve at all flows represented along the flow duration curves. However, analysis of the load duration curve indicates that the TSS contributed during high flow events make up the greatest proportion of exceedances of the TSS target in Bluff Creek. Section 7.4 the TMDL states that

MPCA will focus on the reductions needed under the high flow condition to meet the turbidity standard. MPCA anticipates that given the estimated NTSS loadings under existing conditions, an 88% reduction would be required for each component of the TMDL under the high flow condition to meet the allocated loadings under the TMDL.

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 9 of the final TMDL document discusses the roles of many citizens and entities in the watershed. MPCA noted that over the course of this project a variety of stakeholder participation and outreach efforts have been conducted. To-date, three stakeholder meetings have been conducted to discuss the project work plan and schedule, watershed monitoring and data collection activities, review and comment on the development of the Stressor Identification report, preliminary results of water quality monitoring and pollutant allocations and TMDL implementation strategies. Stakeholder participants at the meetings included representatives from the following entities:

- City of Chanhassen
- Minnesota Pollution Control Agency
- Minnesota Department of Natural Resources
- Minnesota Department of Transportation
- Minnesota Board of Water and Soil Resources
- Metropolitan Council
- Carver County
- Lower Minnesota River Watershed District
- Riley-Purgatory-Bluff Creek Watershed District
- City of Chaska
- City of Eden Prairie

The draft TMDL was public noticed from November 5, 2012, to December 5, 2012. Copies of the draft TMDL were made available upon request, in news releases, and on the Internet web site: http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/tmdl-projects/tmdl-projects-and-staff-contacts.html. Five comment letters were received during the public comment period. The comments were adequately addressed by MPCA and are included in the final TMDL submittal. MPCA also adequately addressed EPA comments within the document.

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 EPA received the final Bluff Creek document, submittal letter and accompanying documentation from the MPCA on March 22, 2013. The MPCA transmittal letter is dated March 18, 2013 from Assistant Commissioner Rebecca J. Flood, to Tinka Hyde, Director, EPA Region 5, Water Division. The submittal letter explicitly stated that enclosed was the final Bluff Creek TMDL report for turbidity, which was being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval. The letter also contained the name of the watershed as it appears on Minnesota's 303(d) list, and the causes/pollutant of concern. This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130. On March 25, 2013 a letter was received from MPCA stating that the original submittal of the TMDL contained an older version of the TMDL. The new letter accompanied the correct final version of the TMDL.

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 the Bluff Creek Watershed satisfies all of the elements of an approvable TMDL. This approval document is for 1 waterbody segment impaired for the aquatic life use due to turbidity and fish bioassessment for a total of 1 TMDL.

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.