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

AUG 10 2011

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 U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Load (TMDL) for Sweeney Lake (DNR ID 27-0035-01) including support documentation and follow up information. Sweeney Lake is located in central Minnesota in Hennepin County. The TMDL addresses an aquatic use impairment due to excessive phosphorus.

EPA has determined that the Sweeney Lake TMDL meets the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations set forth at 40 C.F.R. Part 130. Therefore, EPA approves Minnesota's phosphorus TMDL, addressing excess nutrients. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's efforts in submitting 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,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Dave Johnson, MPCA
Brooke Asleson, MPCA

TMDL: Sweeney Lake, Hennepin County, MN
Date: August 10, 2011

DECISION DOCUMENT FOR THE SWEENEY LAKE PHOSPHORUS TMDL, HENNEPIN COUNTY, MN

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

1. Identification of Waterbody, Pollutant of Concern, Pollutant Sources, and Priority Ranking

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

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

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

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

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

Comment:

Location Description/Spatial Extent:

Sweeney Lake (DNR ID 27-0035-01) is located within the Upper Mississippi River basin, just west of Minneapolis, Minnesota. The boundaries for the Sweeney Lake watershed (approximate total area 2,340 acres) occupy areas within the cities of Golden Valley and St. Louis Park. Sweeney Lake is approximately 67 acres in size and is within the City of Golden Valley. The lake discharges into Bassett Creek via a weir in the northeastern section of the lake. Bassett Creek flows eastward and contributes to the Mississippi River. Surface water inflows to Sweeney Lake come from direct drainage from the surrounding residential and commercial areas, inflow from Schaper Pond (which is located to the south of Sweeney Lake), and inflow from Twin Lake (which is located to the east of Sweeney Lake).

Sweeney Lake lies within the boundaries of the North Central Hardwood Forest (NCHF) ecoregion. The lake has a surface area of 67 acres, a maximum depth of 27 feet, and an average depth of 12 feet. The littoral zone, or area of the lake that is 15 feet or less in depth, is approximately 41 acres of the surface area (approx. 61% of surface area). Sweeney Lake is immediately bordered by residential, commercial, institutional and open space land uses.

Land Use:

Land use in the Sweeney Lake watershed is comprised of residential, commercial, institutional and open space land uses (Section 2.1.2, page 7 of the final TMDL document). Significant development is not expected by the Minnesota Pollution Control Agency (MPCA) in the Sweeney Lake watershed and therefore existing land use conditions are considered as the "ultimate" conditions for calculating TMDL allocations. The wasteload allocations (WLA) and the load allocations (LA) were determined based on the current land use conditions. Any expansion of nutrient source inputs will need to comply with the respective WLAs and LAs calculated in the Sweeney Lake TMDL.

Problem Identification:

Sweeney Lake was identified as not attaining its aquatic recreation designated use. Excessive nutrients were identified as the cause of the impairment. Sweeney Lake was originally listed on the 2004 Minnesota 303(d) list for excessive nutrients (phosphorus). Sweeney Lake is currently on the submitted 2010 Minnesota 303(d) list for excessive nutrients and impaired aquatic recreation. Excess nutrients can lead to frequent algal overgrowth in lakes and hinder aquatic recreation activities (boating, canoeing, fishing, etc.).

Priority Ranking:

The Sweeney Lake watershed was given a priority ranking for TMDL development due to: the impairment impacts on public health and aquatic life, the public value of the impaired water resource, the likelihood of completing the TMDL in an expedient manner, the inclusion of a strong base of existing data and the restorability of the water body, the technical capability and the willingness of local partners to assist with the TMDL, and the appropriate sequencing of TMDLs within a watershed or basin. Sweeney Lake is a popular location for aquatic recreation including boating, canoeing and fishing. Water quality degradation has lead to efforts to improve the water quality within the Sweeney Lake watershed, and to the development of a TMDL.

Pollutant of Concern:
The pollutant of concern is phosphorus.

Source Identification (point and nonpoint sources):
Point Source Identification: The potential point sources to the Sweeney Lake watershed are:

Municipal Separate Storm Sewer Systems (MS4): There are four MS4 permits (Table 2 of this Decision Document) in the Sweeney Lake watershed: the City of Golden Valley, the City of St. Louis Park, a MS4 permit for the Minnesota Department of Transportation (MN-DOT) and a MS4 permit for Hennepin County. The MPCA identified six storm sewer outfalls which discharge stormwater into Sweeney Lake. Stormwater also enters Sweeney Lake via inflows from Schaper Pond.

Stormwater can transport phosphorus to surface water bodies via: decaying vegetation (leaves, grass clippings, etc.), domestic and wild animal waste, eroded soil particles, deposited phosphorus particulates from the air, phosphorus bound to oil and grease particles, and phosphorus-containing fertilizer.

Construction and Industrial Areas: Phosphorus inputs via stormwater from construction and industrial activities may contribute phosphorus loading to the Sweeney Lake watershed. The MPCA determined that construction and industrial areas do not contribute a significant phosphorus loading input to the Sweeney Lake watershed. The MPCA estimated that phosphorus inputs from these sources were less than one percent of the WLA calculated in the Sweeney Lake TMDL.

Nonpoint Source Identification: The potential nonpoint sources to the Sweeney Lake watershed are:

Internal Loading: The release of phosphorus from sediment, the release of phosphorus via physical disturbance from benthic fish, the release of phosphorus from wind mixing the water column, and the release of phosphorus from decaying pondweeds, can all contribute internal phosphorus loading to the Sweeney Lake watershed. Phosphorus can be resuspended or mixed into the water column by temperature changes within the water column. Bottom waters, rich in phosphorus, may be mixed with waters closer to the surface during those times when the thermocline decreases and the lake water overturns.

Atmospheric Deposition: Phosphorus may be added via particulate deposition. Particles from the atmosphere may fall onto the lake surface or other surfaces within the Sweeney Lake watershed. Phosphorus can be bound to these particles which can add to the phosphorus inputs to surface water environments.

Future Growth:
Future Growth/Reserve Capacity description is found in the Land Use Section 2.1.2 (page 7 of the final TMDL document). Significant development is not expected in the Sweeney Lake watershed. Existing conditions were considered to be the "ultimate" land use conditions for calculating WLA and LA. The WLA and LA were calculated for all current and future sources. Any expansion of point or nonpoint sources will need to comply with the respective WLA and LA values in the TMDL.

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

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

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

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

Comment:

Designated Uses:

The designated use for Sweeney Lake is for aquatic recreation (boating, canoeing, fishing etc.). The lake is classified as a Class 2B water for the State of Minnesota.

Standards:

The assessment for eutrophic conditions includes a numeric water quality standard and assessment factors from Minnesota Rule 7050. Sweeney Lake is within the boundaries of the NCHF ecoregion. The MPCA assumes that by meeting the loading capacity values set by the WLA and LA, the total phosphorus (TP), the chlorophyll-a (chl-a) and the Secchi Disc (SD) depth water quality criteria will be attained.

In developing the lake nutrient standards for Minnesota lakes (Minn. Rule 7050), the MPCA evaluated data from a large cross-section of lakes within each of the state's ecoregions. Clear relationships were established between the causal factor, total phosphorus, and the response variables chlorophyll-a and Secchi disk. Based on these relationships, the MPCA assumes that by meeting the loading capacity values set by the WLA and the LA, the TP, chl-a and SD depth water quality criteria will be attained. The MPCA's lake eutrophication standards for the NCHF ecoregion are found in Table 1 of this Decision Document.

Table 1: Minnesota Eutrophication Standards, North Central Hardwood Forest Ecoregion

Parameter	Eutrophication Standard
Total Phosphorus (µg/L)	TP < 40
Chlorophyll-a (µg/L)	chl-a < 14
Secchi Depth (m)	SD > 1.4

The MPCA utilized a phosphorus target of 38 µg/L in calculating the WLA and LA for the Sweeney Lake TMDL. The TP target was determined as the average in lake phosphorus concentration during the

summer growing season (June 1 through September 30). The MPCA chose to use a lower phosphorus target for TP instead of the NCHF eutrophication numeric standard (40 µg/L) to account for Margin of Safety (MOS) considerations. The MOS is discussed further in Section 6 of this Decision Document.

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

TMDLs must take into account *critical conditions* for 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:

The approach to calculating the loading capacity is outlined in the final TMDL document within Sections 5.0 to 6.3 (pages 22 to 40 of the final TMDL document). The MPCA first estimated existing nutrient input values to the Sweeney Lake watershed. To complete the review of existing sources, pollutant sources were identified and estimated based on monitoring data and modeling efforts. Three separate models were utilized to gain a better understanding of the conditions causing water quality impairments within the watershed. P8, BATHTUB and the finite difference lake response model (FDLRM) were used to determine the values necessary for Sweeney Lake to attain water quality standards (WQS). These modeling results were used to calculate the WLA and LA.

The P8 model (Program for Predicting Polluting Particle Passage through Pits, Puddles and Ponds) is a model used to predict the generation and transport of stormwater runoff pollutants in watersheds. Continuous water-balance and mass-balance calculations are performed via simulations driven by

continuous hourly rainfall and daily air temperature time series. The model was developed for use by engineers and planners in designing and evaluating runoff treatment schemes for existing or proposed urban developments.

The P8 model was used to create a nutrient characterization/nutrient budget in order to better understand the nutrient inputs and outputs of the watershed system. The P8 nutrient budgeting modeling efforts also provided insight into flow conditions which were vital to developing the WLA and LA of the TMDL. The MPCA incorporated previous P8 modeling efforts from the Bassett Creek Watershed Management Commission (BCWMC) which had completed their own P8 modeling during the development of the Sweeney Lake Management Plan. The MPCA updated the efforts of the BCWMC with empirical data collected in 2004 and 2005. The results from the MPCA's P8 modeling efforts aided in the understanding of flow conditions and phosphorus loads, while also incorporating the influence of Best Management Practices (BMPs) in the watershed.

The P8 modeling efforts estimated TP loading values for each of the MS4 communities within the watershed (see Table 2 of this Decision Document). Nutrient loads were based on the percentage of the total area of each MS4 community within the Sweeney Lake watershed. In the calculation of the Sweeney Lake TMDL, the MPCA combined the individual allocations from each MS4 community into one categorical WLA. The MPCA explained in the final TMDL document (Section 6.1.1 on page 34) that using a categorical WLA was appropriate in this case because of the local commitment of the BCWMC to implement nutrient reductions in a cooperative manner. The MPCA also explained that the categorical MS4 value could be subdivided and assigned to individual MS4 communities (see email, Exhibit #6 of the Administrative Record). Dividing the categorical WLA and assigning it to each MS4 community based on the land area percentages in Table 2 (Table 4.1 from the final TMDL document) would be an appropriate method to subdivide and assign individual WLA.

Table 2: Current Loading Estimate (based on 2004 data) of Permitted MS4 Contributions to the Sweeney Lake Watershed

MS4 Community	MS4 Permit #	Current Loading Estimate	
		TP Load	Percent of Total Area
		(lbs/year)	*(%)*
City of Golden Valley	MS400021	1132	77
City of St. Louis Park	MS400053	132	9
MN-DOT	MS400170	206	14
Hennepin County	MS400138	Insignificant	<1

The BATHTUB model was utilized to link phosphorus loads with in-lake water quality and to calculate loading capacity values for each lake. The BATHTUB model was employed as the main predictive tool to estimate TP, chl-a and SD values for Sweeney Lake. The BATHTUB model provides flexibility to tailor model inputs to specific lake morphometry, watershed characteristics and watershed inputs. The BATHTUB model also allows the State to assess different impacts of changes in nutrient loading. The FDLRM is a spreadsheet based model developed by Barr Engineering. The FDLRM was used to develop load allocation estimates and to capture the rapid changes in water chemistry in Sweeney Lake.

The BATHTUB model and FDLRM were both employed to calculate the necessary reductions to loads from external and internal sources in order for Sweeney Lake to attain the NCHF eutrophication

standards. Of the two models, the MPCA determined that the FDLRM model provided more accurate results in characterizing the hydrologic characteristics of Sweeney Lake. The FDLRM was more proficient at characterizing rapid concentration changes observed within Sweeney Lake, the shorter residence time of the lake (1-2 months), and frequent large inflow events. The FDLRM results also compared more favorably to empirical water quality monitoring data collected in the watershed.

The FDLRM was set to meet the NCHF WQS for the summer growing season (122-day summer period from June 1 to September 30). The summer growing season is identified in the NCHF eutrophication criteria and also corresponds to the time of the year when Sweeney Lake water quality is impacted by excessive nutrient loading. The summer season is also typically the time of the year when the public uses Sweeney Lake for aquatic recreation.

After estimating the external nutrient inputs to Sweeney Lake the MPCA calculated the nonpoint source contributions to Sweeney Lake. The nonpoint source contributions were attributed to internal loading and atmospheric inputs. To calculate the internal loading estimate the MPCA used U.S. Army Corps of Engineers (USACE) sediment core data and the FDLRM model. The USACE collected sediment cores from Sweeney Lake in 2007. From these sediment cores the USACE determined phosphorus release rates for samples subjected to oxic (with oxygen) and anoxic (reduced oxygen) conditions. The USACE concluded that sediments in Sweeney Lake under anoxic conditions released greater amounts of phosphorus than those under oxic conditions.

Sweeney Lake typically experiences anoxic conditions in its water column in the late summer months (August – September). The late summer months, based on the USACE's finding, has a greater potential to release phosphorus from lake sediments. The USACE determined that the maximum potential internal load to Sweeney Lake under anoxic conditions is 575.40 lbs (261 kg) per 122-day summer period.

The FDLRM calculated an existing internal load estimate of 319.67 lbs (145 kg) for the 122-day summer period (See Table 3 of this Decision Document). This estimate was based on water quality monitoring data collected in 2004 water quality monitoring data. This internal loading estimate was chosen as the "baseline" condition for the internal loading component to Sweeney Lake. Water quality monitoring data from 2004 was chosen by the MPCA because the 2004 data displayed: a robust flow monitoring data set, a robust in-lake water quality data set, average levels of phosphorus loading attributed to internal loading activities, and high levels of external loading. The 2004 water quality monitoring data was characterized as having a higher overall phosphorus loading component when compared to other water quality monitoring data sets from the Sweeney Lake watershed. The higher TP loading rates factored into conservative assumptions made in setting the MOS and for calculating loading capacity values to meet the WQS. The differences between the FDLRM derived internal load estimate (319 lbs/122-day summer period) and USACE estimate (575 lbs/122-day summer period) was attributed to the varying oxic and anoxic conditions within Minnesota lakes over the summer season. The FDLRM value, while lower, was considered more reasonable by the MPCA in the development of the Sweeney Lake TMDL.

After completing the existing estimate for external nutrient inputs (via the P8 model) and the existing estimate for internal loading inputs (via the FDLRM), the MPCA calculated an atmospheric contribution. The atmospheric deposition rate was calculated using an annual precipitation

measurements and the surface area of Sweeney Lake. The MPCA did not account for any additional point or nonpoint sources in the Sweeney Lake TMDL. The point sources (given a WLA) were MS4 communities and the nonpoint sources (given a LA) were internal loading and atmospheric loading.

The values calculated for the components of the TMDL (WLA and LA) were set to assure that WQS would be attained. For the purposes of the Sweeney Lake TMDL calculation, a categorical WLA was assigned to MS4 communities of the City of Golden Valley (MS400021), the City of St. Louis Park (MS400053) and the Hennepin County (MS400138) MS4 permit. This categorical WLA was set at 488 lbs/122-day summer period (See Table 3 of this Decision Document). The Minnesota Department of Transportation (MN-DOT) MS4 permit (MS400170) was assigned its own WLA of 79 lbs/122-day summer period.

The MPCA determined that phosphorus inputs from construction and industrial stormwater inputs were less than one percent of the total WLA and did not warrant a separate WLA for each of these inputs. Contributions from construction stormwater were added to the categorical WLA. Lumping the WLA together into a categorical value was deemed to be an appropriate strategy due to the similarities in land use and municipal operations between each of the municipalities within the Sweeney Lake watershed. There are no NPDES permitted industrial facilities within the Sweeney Lake watershed, these potential point sources were assigned a WLA of zero (WLA = 0).

For the load allocation component of the Sweeney Lake TMDL, the existing internal load estimate, based on the 2004 water quality monitoring data, was calculated to be approximately 319 lbs/122-day summer period. The determination of the internal load value in the Sweeney Lake TMDL was calculated to be 143 lbs/122-day summer period. This represented a 55-percent reduction from the existing internal load estimate. The atmospheric load component was not reduced between the existing atmospheric load estimate (8.4 lbs/122-day summer period) and the TMDL atmospheric load calculation (8.4 lbs/122-day summer period). The MPCA determined that the atmospheric loading component of the TMDL could not be reduced via implementation strategies and chose to keep this value constant for the purposes of the Sweeney Lake TMDL. The WLA and LA values of the Sweeney Lake TMDL are found in Table 3 of this Decision Document.

Table 3: Existing Load (122-day summer period) vs. Sweeney Lake TMDL (122-day summer period)

*Wasteload Allocation (WLA) **				
Source		**Existing *Annual Load*** *(lbs/ summer season)*	***TMDL*** *(lbs/122-day summer season)*	***Daily Load*** *(lbs/day summer period)*
MS4 Categorical City of Golden Valley City of St. Louis Park Hennepin County Construction Stormwater	**Permit #** MS400021 MS400053 MS400138 Various	574	488	4.000
Industrial Stormwater	N/A	0	0	0
MN-DOT	MS400170	93	79	0.648
WLA Totals		***667***	***567***	***4.648***
Load Allocation (LA) *				
Atmospheric Load		8	8	0.066
Internal Load		319	143	1.172
LA Totals		***327***	***151***	***1.238***
TMDL Totals (WLA + LA)		***994***	***718***	***5.885***

* Values adjusted for rounding

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

4. Load Allocations (LA)

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

Comment:
Load allocations are addressed in Section 6.1.2 on page 35 of the final TMDL document. The LA for the Sweeney Lake TMDL was recognized as originating from internal sources and atmospheric deposition. Each of these nonpoint sources was assigned a portion of the phosphorus load, 319 lbs/122-day summer period for the internal load and 8.4 lbs/122-day summer period for the atmospheric load.

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

5. Wasteload Allocations (WLAs)

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

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

Comment:

The WLAs assigned to the permitted sources within the Sweeney Lake watershed were calculated based on empirical water quality monitoring data from 2004. A categorical WLA was assigned to the MS4 communities of the City of Golden Valley (MS400021), the City of St. Louis Park (MS400053), Hennepin County (MS400138) and construction stormwater contributions. The categorical WLA assigned to these sources was 488 lbs/122-day summer period. Stormwater from MN-DOT (MS400170) areas within the watershed was assigned its own WLA, 79 lbs/122-day summer period.

There are no NPDES permitted industrial facilities within the Sweeney Lake watershed, these potential point sources were assigned a WLA of zero (WLA = 0). There are no wastewater treatment plants (WWTPs), no combined sewer overflows (CSOs), sanitary sewer overflows (SSOs) within the Sweeney Lake watershed. Therefore, these potential point sources did not receive any portion of the WLA (WLA = 0).

The U.S. EPA finds that the TMDL document submitted by the MPCA satisfies the requirements of the fifth criterion.

6. Margin of Safety (MOS)

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

implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

Comment:
Section 6.1.3 of the final TMDL submittal outlines the Margin of Safety used in the Sweeney Lake TMDL. The Sweeney Lake TMDL utilized implicit (i.e., incorporated into the TMDL analysis through conservative assumptions) and explicit (i.e., expressed in the TMDL as a portion of the loadings) methods to set the MOS. The implicit portion was based conservative assumptions made through the development of the Sweeney Lake TMDL. These conservative assumptions involved using the "worst case" phosphorus loading scenario to estimate nutrient input conditions via the FDLRM. Water quality monitoring data from the 2004 monitoring year produced the worst case phosphorus loading measurements, when compared to other lake monitoring data examined in this TMDL. This worst case nutrient input scenario was used to set the load allocations for the Sweeney Lake TMDL.

Additionally, during the development of the Sweeney Lake TMDL, the MPCA chose to adjust the nutrient target via 5-percent decrease to the target concentration. The TP NCHF eutrophication criteria is 40 µg/L. For the FDLRM modeling efforts, the MPCA decreased the TP target by 5-percent to 38 µg/L. This adjusted TP target was used in the FDLRM loading reduction scenarios.

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

7. Seasonal Variation

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

Comment:
Seasonal variation was considered in the Sweeney Lake TMDL as described in Section 6.2 (page 36). Minnesota lakes typically respond negatively to nutrient inputs during the summer growing season (June 1 through September 30). Negative impacts to water quality include algal blooms and fish kills which can impact the recreational use of the resource. The unique hydrologic flow conditions within Sweeney Lake result in the lake having a relatively short residence time. The flow patterns and shorter residence time increases the likelihood that Sweeney Lake will respond to changes in nutrient inputs during the summer growing season.

The FDLRM focused on the 122-day summer growing season and identified this time period as the critical period for Sweeney Lake. The MPCA identified the summer growing season as critical for meeting WQS because this time of the year corresponds to the NCHF eutrophication criteria, contains the months when the public typically uses Sweeney Lake for aquatic recreation activities, and corresponds to the time of the year when water quality is likely to be impaired by excessive nutrient loading. The WLA and LA were calculated from modeling efforts which incorporated the 122-day summer growing season into their modeling scenarios. The WLA and LA were calculated to attain the WQS during the most critical period of the calendar year, the summer growing season. Therefore, the

MPCA assumes that the allocations set by the Sweeney Lake TMDL will be protective of water quality during the remainder of the calendar year (October through April).

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

8. Reasonable Assurances

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

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

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

Comment:
The Sweeney Lake TMDL outlines reasonable assurance activities in Sections 9.0 - 9.1 (page 52 of the final TMDL document). The Sweeney Lake TMDL indicates that external (MS4 communities) and internal loading reduction strategies will be implemented in the watershed over the next several years. During the development of the Sweeney Lake TMDL, the MPCA explored various loading reduction strategies. A external only load reduction scenario, an internal only load reduction scenario, and a combination external and internal load reduction scenario were calculated via the FDLRM. The external and internal load reduction scenario was chosen because it presented the most realistic load reduction scenario for Sweeney Lake.

The BCWMC will be the local group assigned with following through on the recommendations outlined in the Sweeney Lake TMDL Implementation Plan. The BCWMC is expected to implement nutrient reduction strategies within the watershed and lead a cooperative effort among other stakeholders to improve water quality within the watershed. The MPCA hopes that the commitment displayed by the BCWMC will encourage other stakeholders within the watershed to reduce their nutrient usage and its potential export to the surface waters within the Sweeney Lake watershed.

The MPCA believes that the collective involvement of multiple stakeholders within the watershed will reduce phosphorus inputs to Sweeney Lake. This collective effort will be coordinated by the BCWMC.

The BCWMC will work to reduce the external inputs to Sweeney Lake and will then focus on reducing the internal source load. Feedback from stakeholders will be encouraged to maximize the nutrient removal efforts given the funding mechanisms of the implementation efforts. A variety of funding sources will be explored by the BCWMC. Federal, state and local funding resources will be employed to reduce the external and internal nutrient load to Sweeney Lake.

The Clean Water Legacy Act (CWLA) is a statute passed in Minnesota in 2006 for the purposes of protecting, restoring, and preserving Minnesota's waters. 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. These plans are generally developed by third party groups, but may be developed by MPCA. 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. These efforts are expected to include informal and formal agreements and joint utilization of technical, educational, and financial resources. These cooperative efforts and coordination activities are to be included in the implementation plans. MPCA expects the implementation plans to be developed within a year of TMDL approval. MPCA reviews and approves all plans.

The CWLA also provides details on public and stakeholder participation in development and implementation of TMDLs and implementation plans, 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 for monitoring efforts to determine effectiveness of implementation efforts. MPCA has developed guidance on what is required in the implementation plans (Implementation Plan Review Combined Checklist and Comment, MPCA). To be eligible for CWLA funding, plans must include cost estimates, general timelines for implementation, and interim milestones and measures. The Minnesota Board of Soil and Water Resources administers the Clean Water Fund, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (FY '11 Clean Water Fund Competitive Grants Policy; Minnesota Board of Soil and Water Resources, 2011).

Water quality monitoring by the BCWMC and the Citizen Assisted Monitoring Program (CAMP) group will monitor the success or failure of BMPs designed to reduce nutrient loading into Sweeney Lake. Watershed managers will have the opportunity to reflect on the progress or lack of progress, and adjust their efforts accordingly. BMP assessments will be conducted on an iterative basis so watershed managers will have the opportunity to change course if progress is unsatisfactory.

Under the MPCA's Stormwater General Permit, municipal managers in charge of MS4 communities must review the adequacy of local Stormwater Pollution Prevention Plans (SWPPPs) to ensure that each plan meets WLA set by the Sweeney Lake TMDL. If 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.

Table 4 of this Decision Document outlines the baseline water quality conditions represented in the "Existing Annual Load" column which were generated from the 2004 water quality monitoring data, and the projected WLA and LA from the Sweeney Lake TMDL. The TP sources linked to the WLA are

expected to be reduced by 15%, internal TP sources are expected to be reduced by 55% and atmospheric TP sources are not expected to be reduced in the Sweeney Lake TMDL.

Table 4: Current Loading vs. Projected Loading in the Sweeney Lake watershed

	Source	***Existing Annual Load ****	***TMDL ****	***Projected Reduction***
		(lbs/122-day summer period)		***(%)***
WLA	MS4 Categorical + MN-DOT	667	568	15%
LA	Internal TP Load	319	143	55%
LA	Atmospheric Load	8	8	0%
	Total Load	*994*	*719*	

* Values adjusted for rounding

The U.S. EPA finds that this criterion has been adequately addressed.

9. Monitoring Plan to Track TMDL Effectiveness

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

Comment:
Section 9.2 (on page 53) of the final TMDL submittal outlines the planned water quality monitoring efforts by the BCWMC. The BCWMC water quality monitoring program will assess water quality improvements in Sweeney Lake and test the efficiency of BMP phosphorus removal strategies. The overall goal of these monitoring activities will be to ensure that BMP structures are functioning properly and reducing phosphorus inputs to Sweeney Lake. The BCWMC will continue to monitor water quality in Sweeney Lake through a variety of efforts. The BCWMC will complete a more intensive water quality monitoring regiment of Sweeney Lake once every three to four years. The CAMP group will continue their annual water quality monitoring efforts.

The intensive water quality monitoring conducted by the BCWMC will include: temperature, dissolved oxygen, specific conductivity, pH, chlorophyll-a, total phosphorus, total nitrogen, Secchi disc transparency and phytoplankton and zooplankton measurements. Phytoplankton (microscopic plant organisms), zooplankton (microscopic aquatic organisms) were recommended by the MPCA to monitor water quality in Sweeney Lake. These surveys will aid watershed managers in their understanding how BMP phosphorus removal efforts are impacting the ecological community in these lakes.

The U.S. EPA finds that this criterion has been adequately addressed.

10. Implementation

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

Comment:

Implementation strategies are outlined in Section 8.0 (pages 43-51 of the final TMDL document). The BCWMC will have the lead role in implementing the mitigation strategies suggested in the final TMDL. The BCWMC will focus on efforts to reduce nutrient inputs from point and nonpoint sources within the watershed. The BCWMC will work with other municipal partners to reduce stormwater runoff, improve BMPs within the Sweeney Lake watershed, and implement programs that reduce nutrient export. Adaptive management strategies will be utilized by the BCWMC. Assessments of BMP efficiency will be monitored and changes to nutrient reduction efforts will be made where deemed appropriate.

The preliminary implementation framework outlined in the Sweeney Lake TMDL will attempt to reduce nutrient influxes to Sweeney Lake via: source reduction strategies (ex. BMP installation, street sweeping, etc.), regulatory controls (runoff quality and volume retention requirements), in-lake management strategies, and lake inflow treatment strategies. A combination of these techniques will be employed by the BCWMC and their local partners. The MPCA supports the strategy that improvements to overall water quality within the Sweeney Lake watershed will require participation by a variety of stakeholders within the watershed.

The MPCA has identified the following methods to aid in reducing external phosphorus loads into Sweeney Lake: the installation of rain gardens and native plantings to filter stormwater, the development and re-development of BMP structures (ex. stormwater detention basins, pervious surfaces, biofiltration basins, and grit chambers), targeted street sweeping activities, shoreline buffer BMP development projects, and water quality education programs for the general public. The MPCA also discussed efforts to reduce phosphorus inputs from internal sources. These efforts could include the following strategies: hypolimnetic withdrawal and treatment, installation of constructed wetlands to treat hypolimnetic waters, aerating hypolimnetic waters, chemical treatment with alum, aeration system management, and fish population management. A combination of external and internal nutrient reduction strategies will reduce the nutrient inputs to Sweeney Lake. Watershed partners will need to work together to maximize their efforts with the allotted monetary resources.

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

11. Public Participation

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

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

Comment:

The public participation section of the TMDL submittal is found in Section 7.0 (page 41 of the final TMDL submittal). The MPCA incorporated stakeholder involvment throughout the development of the TMDL. The MPCA held a series of meetings within the Sweeney Lake watershed. The first public meeting was held in March of 2007 where the MPCA discussed the technical work plan, communicated the goals of the TMDL, and presented data analysis techniques which would be employed in the calculation of the TMDL components. A project webpage was created after the first public meeting which allowed the public access to information related to the status of the project and future meeting times and locations. The MPCA updated the project webpage periodically throughout the course of the Sweeney Lake TMDL effort.

A second public meeting was held in June 2009 to discuss the monitoring data collected in 2007-2008 and an overview of the initial draft TMDL report. In addition to the public meetings, the MPCA hosted several technical team meetings. Members from the following organizations were invited to participate on the Sweeney Lake TMDL technical team: City of Golden Valley, City of St. Louis Park, Hennepin County, Minneapolis Parks and Recreation Board, Minnesota Department of Transportation, Minnesota Department of Natural Resources, the Sweeney Lake Homeowners Association, the Metropolitan Council of Environmental Services and the Minnesota Board of Soil and Water Resources.

The draft TMDL was posted online for review and public comment by the MPCA at (http://www.pca.state.mn.us/water/tmdl). The 30-day public comment period was started on March 14, 2011 and ended on April 13, 2011. The MPCA received 4 public comments and adequately addressed these comments. The MPCA submitted all of the public comments and responses in the final TMDL submittal packet received by the U.S. EPA on August 2, 2011.

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

12. Submittal Letter

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

Comment:

The U.S. EPA received the final Sweeney Lake nutrient TMDL document, submittal letter and accompanying documentation from the MPCA on August 2, 2011. The transmittal letter explicitly stated that the final Sweeney Lake (DNR ID 27-0035-01) TMDL for excess nutrients was being submitted to U.S. EPA pursuant to Section 303(d) of the Clean Water Act for U.S. EPA review and approval. The letter clearly stated that this was a final TMDL submittal under Section 303(d) of CWA. The letter also contained the name of the watershed as it appears on Minnesota's 303(d) list, and the causes/pollutants of concern. This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130.

The U.S. EPA finds that the TMDL transmittal letter submitted for Sweeney Lake by the MPCA satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the U.S. EPA finds that the TMDL for Sweeney Lake satisfies all of the elements of an approvable TMDL. This approval is for one TMDL, addressing one waterbody for recreational use impairments, for Sweeney Lake (DNR ID 27-0035-01).

The U.S. EPA's approval of this TMDL extends to the water bodies which are identified as Sweeney Lake (DNR ID 27-0035-01), with the exception of any portions of the water bodies that are within Indian Country, as defined in 18 U.S.C. Section 1151. The U.S. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. The U.S. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.