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

REPLY TO THE ATTENTION OF:

WW-16J

SEP 30 2010

Paul Eger, Commissioner
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Dear Mr. Eger:

The U.S. Environmental Protection Agency has conducted a complete review of the final Lake Magda Nutrient Total Maximum Daily Load (TMDL), including supporting documentation. Lake Magda is located in southeastern Minnesota, in the City of Brooklyn Park, in Hennepin County. The TMDL addresses the aquatic recreation use impairment due to excess phosphorus.

Based on this review, EPA has determined that the Lake Magda Nutrient TMDL meets the requirements of Section 303(d) of the Clean Water Act, 33 U.S.C. Section 1313(D), and EPA's implementing regulations at 40 CFR Part 130. Therefore, EPA hereby approves one TMDL for phosphorus for Lake Magda. The statutory and regulatory requirements, and the TMDL's compliance with these requirements, 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,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Barb Peichel, MPCA
David Johnson, MPCA

wq-iw8-20g

DECISION DOCUMENT FOR APPROVAL OF THE LAKE MAGDA NUTRIENT TOTAL MAXIMUM DAILY LOAD

Section 303(d) of the Clean Water Act (CWA) and the U.S. Environmental Protection Agency's (EPA's) implementing regulations at 40 C.F.R. Part 130 describe the statutory and regulatory requirements for approvable Total Maximum Daily Loads (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.

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 National Pollutant Discharge Elimination System (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:
Identification of Water Body:
Lake Magda is a shallow lake located in the city of Brooklyn Park, Hennepin County, Minnesota. Section 3.0 of the TMDL report and the Minnesota Pollution Control Agency (MPCA) February 2010 Lake Magda Fact Sheet[1] describe the lake as a neighborhood lake valued for its aesthetic qualities. Homeowners on the lake periodically use the lake for canoeing, paddle boating, fishing and other limited recreational activities. The Fact Sheet and TMDL report describe the lake size as just over 10 acres with a 68.5 acre watershed. The Lake Magda watershed is a fully developed suburban residential watershed with a state truck highway (TH 169) abutting the lake on the west and city-owned open space on the north. According to Table 3.2 in the TMDL report, 62% of the land use in the watershed is single family residential. Lake Magda outlets into wetlands on the west side of TH 169 then through storm sewers to Eagle Creek. Eagle Creek joins with Bass Creek to form Shingle Creek which ultimately discharges to the Mississippi River.

Lake Magda was placed on Minnesota's 303(d) list of impaired waters needing TMDLs in 2002. Minnesota's 2008 303(d) list identifies Lake Magda as impaired for aquatic recreation due to nutrient/eutrophication biological indicators. Lake Magda is in the Upper Mississippi River Basin and has the lake identification number 27-0065-00.[2]

Lake Magda morphometry can be found in Table 3.1 in the TMDL report. Figure 3.1 through Figure 3.3 depict the Lake Magda watershed, watershed boundaries, city boundaries, and surrounding land uses. Table 3.2 provides a breakdown of land use in the watershed.

Pollutant of concern:
The State has identified total phosphorus as the pollutant of concern. Algal production in Lake Magda and other similar Minnesota lakes is typically limited by nutrient availability. Phosphorus has been identified as a limiting nutrient in Lake Magda, meaning that as total phosphorus increases so does algal growth. Chlorophyll-a has been shown to be a good estimator of algal biomass. Section 3.3 and Appendix B of the TMDL report present historical water quality data from 1999, 2000, 2003 and 2006. The historical water quality data show that as total phosphorus increases, an increase in chlorophyll-a occurs. Summer average total phosphorus concentrations in Lake Magda range from 100 µg/L to over 180 µg/L while chlorophyll-a concentrations range from 40 µg/L to over 120 µg/L.

The data presented by the State in Section 3.3 and Appendix B demonstrates that total phosphorus water quality standards have been exceeded, and that as total phosphorus increases an increase in chlorophyll-a concentrations have been observed, which indicates an increase in algal growth.

1 "Lake Magda Total Maximum Daily Load, Excess Nutrient Project Overview." Minnesota Pollution Control Agency. February 2010. Page 1.
2 U.S. EPA Decision Document for the Approval of Minnesota's 2008 303(d) List of Impaired Waters, June 10, 2008, page T1-12.

Pollutant sources:
The TMDL report identified stormwater run-off, internal lake loading and atmospheric deposition as the primary sources of phosphorus to Lake Magda. Section 4.2 and 4.3 of the TMDL report discuss these three sources.

Atmospheric deposition: Phosphorus contained in precipitation ultimately ends up in the lake from either direct input to the lake surface or as a contribution of load to stormwater runoff. The "Detailed Assessment of Phosphorus Sources to Minnesota Watersheds"[3] study estimated atmospheric deposition of phosphorus for different regions in Minnesota. The atmospheric deposition rate of phosphorus for an average precipitation year in the Twin Cities Metro Area was estimated to be 26.8 kg/km^2. The State estimated the existing total phosphorus load to Lake Magda from atmospheric deposition as 1.1 kg/year. Atmospheric deposition of phosphorus is considered a nonpoint source to Lake Magda.

Internal Lake Loading: Internal lake loading of phosphorus can be a result of low oxygen conditions where poorly bound phosphorus is released from the lake sediment in a form readily available for phytoplankton production. Internal lake loading can also result from sediment resuspension. Section 3.4.1 of the TMDL report notes that lake residents have observed a large carp population. Activities of rough fish, such as carp, can contribute to sediment resuspension. A third contributor to the internal lake loading is curly leaf pondweed. Curly leaf pondweed releases phosphorus during the summer growing season. Section 3.5.3. and MPCA response to EPA comment 18[4] state that curly lead pondweed is present in Lake Magda. The State calculated the existing total phosphorus internal lake loading to Lake Magda as 14.6 kg/year. Internal lake loading of phosphorus is considered a nonpoint source to Lake Magda.

Watershed Load: There are no known permitted municipal or industrial dischargers in the Lake Magda watershed and there are no outfalls into the lake.[5] The only known permitted discharge in the watershed is stormwater. Stormwater is considered the primary source of phosphorus to Lake Magda.[6] Organic materials, lawn fertilizers and sediments are sources of phosphorus in stormwater. The Lake Magda watershed is entirely within an Municipal Separate Storm Sewer System (MS4) community. The watershed is built out with the exception of a small amount of city owned park land.[7] As discussed in Sections 3.6 and 7.2.2.1 and in the Lake Magda Fact Sheet, these built out conditions minimize the infiltration of stormwater through the ground before the stormwater enters Lake Magda, thus increasing the transport of phosphorus to the lake. The State estimated the existing phosphorus watershed loading from stormwater as 37.5 kg/year. Watershed load is considered a point source to Lake Magda since the entire watershed

3 "Detailed Assessment of Phosphorus Sources to Minnesota Watersheds". Barr Engineering. 2004. This study was conducted by Barr Engineering for Minnesota Pollution Control Agency.
4 On November 15, 2009 and February 5, 2010, EPA provided comments on a preliminary draft Lake Magda TMDL. MPCA provided a response to these comments dated February 18, 2010. For purposes of this decision, the EPA comments and MPCA responses will be referred to as "MPCA 2/18/10 Response". EPA's comment 18 asked for clarification regarding the presence of curly leaf pondweed in Lake Magda.
5 See comment 2 and response, page 1, MPCA 2/18/10 Response.
6 "Lake Magda Total Maximum Daily Load, Excess Nutrients Project Overview," Minnesota Pollution Control Agency, February 2010, page 2.
7 See Table 3.2 and Figures 3.1-3.3 in the TMDL report.

is entirely within an MS4 community.

Population and growth trends:
As stated in section 5.4 of the TMDL report, future growth will not affect this TMDL. The Lake Magda watershed is built-out, and no new growth is expected. Any development projects that will occur are expected to be redevelopment. The State did not provide any reserve capacity in the TMDL.

Priority Ranking:
Minnesota's projected schedule for TMDL development included on its 303(d) list of impaired waters reflects the State's priority ranking. The Lake Magda TMDL was scheduled to be initiated in 2008 and completed by 2012.

EPA finds that the TMDL submittal for Lake Magda adequately identifies the impaired water body, the pollutant of concern, and pollutant sources. EPA acknowledges that the State did not account for any future growth in the development of this TMDL. EPA also acknowledges that the State has submitted this TMDL consistent with the priority ranking reflected on its 2008 303(d) list of impaired waters.

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:
Water Quality Standards:
Section 2.0 of the TMDL report identifies the applicable designated uses and water quality standards for Lake Magda.

Lake Magda has been identified by MPCA as a shallow lake[8] and classified as a class 2B water with both narrative and numeric water quality standards. The applicable narrative water quality standard can be found at Minnesota Rules 7050.0150 subpart 3:

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

Applicable numeric water quality standards for shallow lakes in the North Central Hardwood Forest Ecoregion are set forth at 7050.0222 subpart 4 and subpart 4a.B.:

> Total phosphorus concentration, ≤ 60µg/L
>
> Chlorophyll-a concentration, ≤ 20µg/L
>
> Secchi disk transparency, ≥ 1.0 meters
>
> Eutrophication standards are compared to data averaged over the summer season (June through September). Exceedance of the total phosphorus and either the chlorophyll-a or Secchi disk standard is required to indicate a polluted condition.

TMDL Targets:

The State is using the numeric water quality standard for total phosphorus for shallow lakes in the North Central Hardwood Forest ecoregion, 60µg/L, as the numeric TMDL target for Lake Magda. As acknowledged by the State in Section 2.1.1 of the TMDL report, in order for water quality standards to be attained Lake Magda must not only attain the total phosphorus numeric TMDL target/water quality standard, but also one of the two other eutrophication standards must be met. According to information presented in Section 5.2 and Appendix A of the TMDL report, when the TMDL established in Table 5.2 of the TMDL report is attained, the State expects Lake Magda to meet the total phosphorus and Secchi disk transparency numeric standards for shallow lakes in the North Central Hardwood Forest Ecoregion.[9]

EPA finds that the TMDL submittal adequately identifies the applicable water quality standards and established an appropriate TMDL target for attaining water quality standards in Lake Magda.

8 MPCA defines a shallow lake as a lake with a maximum depth of 15 feet or less, or with 80% or more of the lake area shallow enough to support emergent and submerged rooted aquatic plants (littoral zone).
9 See comment 4 and response, page 5, MPCA 2/18/10 Response.

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 stream flow, loading, and water quality parameters as part of the analysis of loading capacity. (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable *critical conditions* and describe their approach to estimating both point and nonpoint source loadings under such *critical conditions*. In particular, the TMDL should discuss the approach used to compute and allocate nonpoint source loadings, e.g., meteorological conditions and land use distribution.

Comment:
Modeling used to support TMDL development:
The State used monitoring data, hydrologic models and literature values to develop a nutrient budget for Lake Magda. The nutrient budget estimated phosphorus loading from each of the three sources, i.e., atmospheric deposition, internal lake load and watershed load. The nutrient budget and monitoring data were used to develop a calibrated lake response model that was used to establish the TMDL.

The State used two hydrologic models, Storm Water Management Model (SWMM) and Program for Predicting Polluting Particle Passage thru Pits, Puddles & Ponds (P8), to estimate the annual volume of runoff from the Lake Magda watershed. Prior to the development of the Lake Magda TMDL, the Shingle Creek Watershed Management Commission developed and calibrated SWMM for the entire Shingle Creek watershed, which includes the Lake Magda watershed. The calibrated SWMM model was used to help calibrate P8 for the Lake Magda watershed. P8 predicted annual runoff volume from the Lake Magda watershed was compared to annual runoff predicted by SWMM and appropriate adjustments to runoff coefficients were made.[10] Once P8 was calibrated, the model was run using a ten year period of record for rainfall (1997-2006) and at conditions that represent an average urban loading. Annual total phosphorus loads for the ten

10 See comment 1 and response, page 5, MPCA 2/18/10 Response.

years along with the average annual total phosphorus load from the Lake Magda watershed are presented in Table 4.3 in the TMDL report.

To complete the nutrient budget for the Lake Magda watershed, the State used literature values to estimate the atmospheric deposition load and the internal lake load. The atmospheric deposition load was calculated by multiplying the lake area by the literature value applicable to an average precipitation year. The literature value used for deposition rate was selected from a Minnesota specific study for the Twin City Metro Area.[11]

The State used an anoxic factor approach to estimate the internal load in Lake Magda. This approach estimates the period where anoxic conditions exist over the sediments, and uses a sediment phosphorus release rate from literature to estimate the internal load. The release rate is selected based on the eutrophic state of the lake. The State selected the 25th percentile of eutrophic lakes. The State's response to Comment 9 in their June 25, 2010 correspondence to Ms. Beth Neuendork, Mn/DOT[12] – Metro District Water Resources, provides the explanation of best professional judgment used to support the State's selection of the 25th percentile of eutrophic lakes.

The annual and average total phosphorus budgets for Lake Magda for the ten year period of record is presented in Table 4.5 of the TMDL report.

The Lake Magda nutrient budgets were used as input to the U.S. Army Corp of Engineers' BATHTUB model. BATHTUB predicts eutrophication-related water quality conditions using empirical relationships previously tested for lakes and reservoirs. The State modeled four years, 1999, 2000, 2003 and 2006, in BATHTUB and compared model results with observed in-lake water quality measured between 1997 and 2006. Table 4.6 in the TMDL report presents the model predicted values and the observed values. In Section 4.4.2 of the TMDL report, the State concludes that the model is a fair representation of lake responses in Lake Magda. Appendix A of the TMDL report presents a detailed summary of the BATHTUB modeled loading summaries and lake responses for each year and averaged year.

Loading Capacity and Critical Condition:
As discussed in Section 5.3.1 of the TMDL report, critical condition for Lake Magda is the summer growing season for an average precipitation year. Although summer season represents the critical period for Lake Magda with respect to excessive nutrients, lakes in general are not sensitive to short term changes in water quality, rather lakes respond to long term changes. For this reason, the loading capacity was established considering annual loads, not just summer season loads.

To calculate the loading capacity, the State first calculated the load allocations and wasteload allocations, then, summed these allocations to establish the loading capacity.

11 "Detailed Assessment of Phosphorus Sources to Minnesota Watersheds," Barr Engineering, 2004.
12 Minnesota Department of Transportation

As discussed further in the Load Allocation and Wasteload Allocation sections of this decision, the load allocation is established as 6.0 kg/year and the wasteload allocation is established as 10.7 kg/year. Adding these together, an annual loading capacity was established as 16.7 kg/year. The annual loading capacity was divided by 365.25 days per year to arrive at a daily loading capacity of 0.045 kg/day.

Figures 5.1 through 5.3 in the TMDL report show the modeled lake response for total phosphorus load reductions applied to all sources. Figure 5.1 shows that the total phosphorus concentration of 60 µg/L, the applicable numeric water quality standard and TMDL target, will be attained at the established loading capacity. Figure 5.3 shows that at the total phosphorus loading capacity Secchi depth will be slightly better than the applicable water quality standard of 1.0 meter. Figure 5.2 shows that chlorophyll-a concentrations will decrease at the total phosphorus loading capacity, however, the applicable water quality standard of 20 µg/L will not be attained. As previously discussed in this decision, Minnesota Rule 7050.0222 Subpart 4.B. states that a polluted condition will exist if the total phosphorus and either Secchi disk transparency or chlorophyll-a is not met. Figures 5.1 and 5.3 show that this TMDL will attain total phosphorus and Secchi disk transparency, therefore, Lake Magda is expected to meet the water quality standards for shallow lakes in the North Central Hardwood Forest ecoregion.

EPA finds that the TMDL submittal adequately established a loading capacity while considering critical conditions for the Lake Magda.

4. Load Allocations (LAs)

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

Comment:
Two load allocations were established, one for atmospheric deposition and the other for the internal lake load.

The atmospheric deposition load allocation was established as 0.003 kg/day. This load allocation is the same as the atmospheric deposition load used in the nutrient budget for Lake Magda. The State did not incorporate any reductions to the current nutrient budget atmospheric loading since the State has no control over atmospheric deposition.

The internal load allocation was established using the same approach described in the previous *Modeling* discussion for the nutrient budget, except, instead of using the 25th percentile eutrophic lake release rate, a release rate more representative of an oligotrophic or low end mesotrophic lake was used. The load allocation for internal load was established as 0.013 kg/day.

EPA finds that the TMDL submittal for Lake Magda adequately established load allocations for nonpoint sources.

5. Wasteload Allocations (WLAs)

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

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

Comment:
There are no municipal or industrial point sources in the Lake Magda watershed. The City of Brooklyn Park and Mn/DOT discharge regulated stormwater to Lake Magda. A categorical or gross wasteload allocation has been established for both of these stormwater dischargers. NPDES permit number for City of Brooklyn Park is MS400007 and MS400170 for Mn/DOT.

Using the load allocations for atmospheric deposition and internal lake sources and the annual runoff by year for the ten year period (1997-2006) estimated by P8, the State used BATHTUB to calculate the maximum allowable wasteload allocation that will attain an in-lake concentration of 60 µg/L total phosphorus[13] or less. Table 2 in Appendix A of the TMDL report presents the summary of the lake response model for the ten year period. The wasteload allocation was established by averaging the results of the lake response model for the ten year period.

The gross or categorical wasteload allocation for stormwater in the Lake Magda watershed is 0.029 kg/day.

EPA finds that the TMDL submittal for Lake Magda adequately establishes a wasteload

13 60 µg/L is the TMDL target and the applicable total phosphorus water quality standard for shallow lakes in the North Central Hardwood Forest ecoregion.

allocation for point sources.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a 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 a loading 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:
As discussed in Section 5.1.3 of the TMDL report, the State used an implicit margin of safety by conservatively establishing a TMDL to achieve water quality standards while the lake is in a turbid water state. The lake response model used by the State to develop this TMDL uses the rate of lake sedimentation to predict total phosphorus concentrations. Sedimentation occurs when organic material settles in the lake, algae die and settle, or as algae are grazed by zooplankton. Shallow lakes, such as Lake Magda, exist in two states, turbid water and clear water. As nutrient loads are reduced to a lake and the lake exhibits a more balanced system, shallow lakes tend to go from a turbid lake to a clear lake. When this clear water condition is reached light penetrates and provides for better growth of rooted aquatic vegetation which will stabilize lake sediments. Zooplankton also thrive in clear water conditions which causes a higher grazing rate of algae than in turbid waters. Clear water conditions provide for a higher removal rate of phosphorus from the water column through settling than in turbid water conditions. The lake response model assumed turbid water even after the TMDL target was attained. The response model gave no consideration for clear water. So, the TMDL and associated wasteload allocation have been established to attain water quality standard in a turbid water state. This conservative approach to establishing the TMDL and wasteload allocation provides an implicit margin of safety.

EPA finds that the TMDL submittal for Lake Magda contains an appropriate MOS.

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 accounted for in the Lake Magda TMDL by using a ten year record of data, development of annual loads, and developing targets for the summer period when the frequency and severity of algal blooms is greatest. The ten year record, as presented in Section 3 and Appendix B of the TMDL report, provides data during both wet and dry years.

EPA finds that the TMDL submittal for Lake Magda adequately addresses seasonal variation.

8. Reasonable Assurances

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

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

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

Comment:
Reasonable assurance is discussed in detail in Section 8 of the TMDL report. A summary is provided below.

Watershed Management: The Shingle Creek Watershed Management Commission was formed in 1984 under Minnesota state authority. The Commission works with the local governments to determine capital improvements, establish targets and standards for various improvements in the watershed, and accesses funding needs. The Commission also has established rules for development and redevelopment that require runoff rate control, runoff treatment to National Urban Runoff Program (NURP) standards, and infiltration of 0.5" of runoff volume. In 2007 the Commission adopted a Water Quality Plan, revised Capital Improvement Program and Cost Sharing Policy to further progress toward meeting water quality goals in the watershed. Section 8.2 of the TMDL report states "It is expected that the Commission will continuously update the annual Capital Improvement Program as a part of its annual budget."

NPDES MS4 permits: The entire Lake Magda watershed is covered under NPDES stormwater regulation.

EPA finds that the State has provided an adequate demonstration of reasonable assurances for the Lake Magda TMDL. The ongoing work of the Commission should provide goals, implementation actions, and funding opportunities that can be used to reach water quality standards in Lake Magda. Since the entire watershed load falls subject to NPDES stormwater regulation the NPDES program provides reasonable assurance that stormwater will attain water quality standards.

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:
As proposed in the Shingle Creek Watershed Management Commission's Water Quality Plan, Lake Magda was monitored in 2009. Lake Magda is next scheduled to be monitored in 2012 and every three years thereafter.

Although no schedule was provided, Section 8.4.2 of the TMDL report mentions that Lake Magda will also be periodically monitored through the Citizen Assisted Monitoring Program (CAMP). This is a volunteer monitoring program where citizen volunteers collect data and sample bi-weekly.

Section 8.4.1. of the TMDL report also states that the Shingle Creek Watershed Management Commission will evaluate success of best management practice implementation in reducing phosphorus concentrations in Lake Magda at the end of every five years. Based on the outcome of this evaluation, if needed, the Technical Advisory Committee can be reconvened to make adjustments to the implementation plan.

EPA finds that the State has adequately set forth its plans for future monitoring to determine if water quality standards are being attained in Lake Magda.

10. Implementation

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

required to and does not approve TMDL implementation plans.

Comment:
Section 7.0 of the TMDL report provides an implementation framework for attaining water quality standards in Lake Magda. The TMDL report provided a reduction strategy that identifies needed annual phosphorus reductions for watershed and internal lake sources. Note that no reductions were included in the TMDL for atmospheric sources. The following actions were suggested as mechanisms for attaining reductions from watershed and internal lake sources.

Suggested Watershed Load Reduction Actions:

- Retrofit best management practices including detention ponds, native plantings, swirl separators and trash collectors;
- Increase infiltration and filtration in the watershed by encouraging the use of rain gardens, native plantings and reforestation;
- Targeted street sweeping;
- Shoreline restoration with native plants to prevent erosion; and
- Conduct education and outreach awareness programs to property owners.

Suggested Internal Load Reduction Actions:

- Chemical Treatments;
- Vegetation Management; and
- Fishery Management.

In a MPCA June 25, 2010 correspondence,[14] MPCA stated that the next step, once the TMDL is approved, will be "for the City of Brooklyn Park, Minnesota Department of Transportation and the Shingle Creek Watershed Management Commission to develop a specific plan of actions (*Lake Magda Implementation Plan)* to start restoring the lake."

EPA reviews, but does not approve implementation plans. EPA does recognize that MPCA's identification of best management actions and other needed actions, in addition to MPCA's identification of the parties responsible for development of the Lake Magda Implementation Plan, indicates that MPCA is committed to implementing the TMDL and attaining water quality standards in Lake Magda.

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

14 June 25, 2010, MPCA correspondence to Ms. Marion Pierson, response to comment 4, page 2.

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:
MPCA has been working with interested local stakeholders on the development of the Lake Magda TMDL since as early as February 2006. The Shingle Creek Watershed Management Commission and a local Technical Advisory Committee were involved in key decisions during the development of the TMDL. Representatives from local cities, Minnesota Department of Natural Resources, Metropolitan Council, United States Geological Survey and MPCA comprised the Technical Advisory Committee. Technical Advisory Committee meetings were held on February 10, 2006, March 9, 2006, and June 27, 2007. All three meetings were open to the public and agenda items included topics relevant to Lake Magda and other TMDL efforts ongoing in the Shingle Creek watershed.[15] Lake Magda lakeshore residents were invited to a stakeholder meeting held on March 9, 2009 in Brooklyn Park.

MPCA made the draft Lake Magda TMDL available for public review and comment March 22, 2010 to April 21, 2010. The draft report was available for review on MPCA's website. In addition to the draft report, the Lake Magda Fact Sheet was available on MPCA's website. The Lake Magda Fact Sheet briefly summarized the nutrient impairment in Lake Magda, pollution sources and needed reductions. Additionally, the Lake Magda Fact Sheet provided the contact information for obtaining more information about the TMDL.

The public review and comment period were announced in the Minnesota State Register on Monday, March 22, 2010, page 1268. The State issued a news release to local media. The State also did a mass mailing to various stakeholders including municipalities, other state government agencies, consultants, environmental interest groups, other interest groups, and individuals.

The State received three public comments during the public review and comment period. One commentor requested more monitoring and more accurate quantification of sources to help better identify the best cost-benefit for implementation actions. In response, the State identified an agreement between the Shingle Creek Watershed Management Commission and MPCA that this TMDL, and other lake TMDLs in the Shingle Creek Watershed, would be completed using existing data and information. The State's response noted that the Shingle Creek Watershed Management Commission has begun to conduct additional modeling work and various sampling efforts whose results will be used to help direct implementation actions. The State also noted in their response that analysis and evaluation of some of the new data collected for other lakes in the Shingle Creek watershed were showing consistency with literature values selected for use in the development of these TMDLs.

15 See comment 15 and response, MPCA 2010 Response, pages 3-4.

Another commentor had questions about the outlet under Highway 169. The State obtained responses from the Mn/DOT and the City of Brooklyn Park to these questions. The commentor also raised concern about the benefits associated with "upgrades" to Lake Magda before the runoff from Highway 169 is addressed. The commentor also brought to the State's attention that not all homeowners, especially homeowners not adjacent to the lake, realize that their stormwater goes into Lake Magda, therefore, some educational opportunities may exist. The State provided some further information about the development of an implementation plan for Lake Magda in an effort to address the concerns about upgrading before runoff is addressed. The State discussed in its response that although implementation actions are identified in the TMDL report, the local stakeholders will be responsible for completing an implementation plan to identify appropriate implementation actions. The implementation plan can also take into consideration the cost-benefit of the possible implementation actions. The State thanked the commentor for the educational outreach suggestion and stated that the suggestion would be passed along to the appropriate watershed contact.

The third commentor was Mn/DOT - Metro District Water Resources whose ten comments were specific to different aspects of the TMDL. In response to the ten comments submitted, the State made corrections to Tables 3.1 and 3.2 in the TMDL report. The commentor requested that the allocations be reassessed based on revised modeling assumptions for annual runoff coefficient, internal release rate, and also suggested that the anoxic factor may be incorrect. The State explained its rational for its modeling assumptions and double checked the anoxic factor only to conclude that appropriate assumptions were used and the anoxic factor used was correct. In response to a comment questioning the significance of runoff from the highway the State changed language in Section 7.2.2.1 referring to the runoff component to the lake from the highway as "significant" rather than "major". The State also explained that although highway land cover is a smaller fraction of the land area, runoff rates from the highway land cover is considered greater than runoff rates from residential land cover.

Section 6 of the TMDL report describes the public participation opportunities provided by the State in the development of the Lake Magda TMDL. The State enclosed with the TMDL report the March 2010 Public Notice of Availability announcement for the Draft Lake Magda TMDL report and request for comments, and a 130+ person mailing list of stakeholders sent the announcement. A copy of the March 22, 2010 Minnesota State Register and a news release were also enclosed with the TMDL report. Finally, the State included copies of the three public comments received and the MPCA responses to these comments.

EPA finds that the TMDL submittal for Lake Magda provides satisfactory documentation of public participation.

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:
EPA received the final Lake Magda TMDL on July 21, 2010 accompanied by a submittal letter dated July 9, 2010. In the submittal letter, MPAC stated that the final Magda Lake TMDL study for excess nutrients was being submitted for EPA final approval.

Conclusion

After a full and complete review, EPA finds that the phosphorus TMDL for Lake Magda satisfies all of the elements of an approvable TMDL. This approval is for one (1) TMDL addressing the impaired aquatic recreation use caused by excess nutrient concentrations in Lake Magda. The table below shows the approved TMDL and associated load and wasteload allocations.

EPA's approval of this TMDL does not extend to those waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. EPA, or eligible Indian Tribes as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.

Water Body Name	***Lake ID***	***Affected Use***	***Pollutant***	***TMDL(kg/day)***
Lake Magda	27-0065-00	Aquatic recreation	Total phosphorus	0.045

Source	***Load Allocation (total phosphorus kg/day)***	***Wasteload Allocation (total phosphorus kg/day)***
Atmospheric Deposition	0.003	not applicable
Internal Lake Load	0.013	not applicable
Watershed Load to NPDES Stormwater	not applicable	0.029