



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

JUN 11 2012

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 Bald Eagle Lake, including supporting documentation and follow-up information. The lake is located northeast of the Twin Cities Metropolitan Area in Ramsey County. The TMDL addresses the impairment of the aquatic recreation beneficial use due to elevated levels of total phosphorus.

The TMDL meets the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, EPA hereby approves Minnesota's one TMDL for total phosphorus for Bald Eagle Lake. The statutory and regulatory requirements, and EPA's review of Minnesota's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Minnesota's effort in submitting the 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,

A handwritten signature in blue ink that reads "Tinka G. Hyde".

Tinka G. Hyde
Director, Water Division

Enclosure

cc: David Johnson, MPCA
Chris Zadak, MPCA

wq-iw11-12g

TMDL: Bald Eagle Lake TMDL
Effective Date:

Decision Document for Approval of Bald Eagle Lake, 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 non-point 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 non-point 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:

Summary: The Minnesota Pollution Control Agency (MPCA) submitted a TMDL to EPA for Bald Eagle Lake. Bald Eagle Lake was listed on the Minnesota 303(d) list in 2002 for eutrophication (Total Phosphorus) impairing aquatic recreation. Recent water quality monitoring data for Bald Eagle Lake indicates that the lake is impaired for nutrients thereby requiring the development of a TMDL. Development of the TMDL began in 2008 with the final TMDL submitted in 2012. The Bald Eagle Lake TMDL will not only address the impairment in the watershed, but will also provide the basis for reduced phosphorus loads to the Rice Creek Watershed and ultimately to the Mississippi River. When implemented, the TMDL will reduce the amount of total phosphorus from 4,512 lbs/year to 2,620 lbs/year (58% reduction). EPA is approving the TMDL for the pollutant, total phosphorus, for Bald Eagle Lake.

Location Description: Bald Eagle Lake, (DNR Lake # 62-0002, HUC 0701020), is a 1,071 acre lake located northeast of the Twin Cities Metropolitan Area, in Ramsey County, Minnesota. Bald Eagle Lake is approximately 10 miles north of the City of St. Paul (Figure 2.1 of the TMDL). Three main drainage areas that contribute nutrient loading to Bald Eagle Lake are Judicial Ditch 1 (JD1), County Ditch 11 (CD11), and the direct Bald Eagle Lake watershed. Although White Bear Lake drains to Bald Eagle Lake, White Bear Lake is not a significant source of flow or nutrients to Bald Eagle Lake. Bald Eagle Lake drains to Otter Lake.

Bald Eagle Lake has a maximum water depth of 39 feet, a mean depth of 12 feet, and has approximately 61% littoral area (defined as water depth areas of 15 feet or less) (Section 2 of the TMDL). Since Bald Eagle Lake's maximum water depth is greater than 15 ft and the littoral zone for water depth areas of less than 15 ft is less than 80%, Bald Eagle Lake is subject to MPCA's general eutrophication standards.

Topography and Land Use: Section 2.3 of the TMDL states that the land uses in the Bald Eagle Lake Watershed are predominantly undeveloped (35%) and single family residential land (26%). The majority of the undeveloped land is located at the northern side of the Judicial Drain 1 subwatershed and drains to Pine Tree Lake. Within the Judicial Drain 1 subwatershed, 13% is agricultural.

Pollutant point sources:

The entire watershed load within the Bald Eagle Lake Watershed consists of runoff from the surrounding urbanized area. Stormwater runoff from MS4 communities in the Bald Eagle Lake Watershed is regulated under the NPDES stormwater regulation. Runoff from within the boundaries of regulated MS4s is designated as wasteload allocation. Runoff from within the boundaries of unregulated MS4s is designated as load allocation (Section 4.1.1 of the TMDL). The following NPDES point sources that contribute to the watershed loadings are:

- Current, regulated MS4s: Lino Lakes (MS400100), White Bear Lake (MS400060), White Bear Township (MS300163), Hugo (MS400094), Grant (MS400091), Dellwood (MS400084), Rice County Watershed District (MS400193), Washington County (MS400160), Anoka County (MS400066), Ramsey County (MS400191), MN/DOT (MS400170)
- Construction stormwater activities

No concentrated animal feeding operations (CAFOs) or wastewater treatment plants exist within the Bald Eagle Lake Watershed.

Pollutant nonpoint sources:

- Internal total phosphorus loading
- Atmospheric deposition
- Watershed nutrient loading/watershed runoff
- Upstream Lakes (Fish Lake and Pine Tree Lake)

Nonpoint sources identified by MPCA in the TMDL report as contributing to the nutrient impairments are internal total phosphorus loading, atmospheric deposition, watershed nutrient loading, failing septic systems, and upstream lakes. MPCA determined that watershed nutrient loading, including stormwater runoff from within the boundaries of unregulated MS4s, contributes 47% of the total phosphorus loading, internal loading contributes 44% of the total phosphorus loading, upstream lakes contributes 3% of the total phosphorus loading, and atmospheric deposition contributes 6% of the total phosphorus loading to Bald Eagle Lake (Figure 3.4 in the TMDL). According to a 2003 lake management plan for Bald Eagle Lake, septic systems do not appear to be a significant nutrient source to the lake; thus, a septic system load was not separated out from the watershed loading. Details on phosphorus loads from point and nonpoint sources are described in Section 3 in the TMDL.

Population and growth trends:

MPCA did not include the future loading capacity in the TMDL. The Rice Creek Watershed District (RCWD), under Minnesota's Watershed Law, maintains rules meant to govern land development and re-development. The rules require developers and municipalities to provide water quality treatment for any new impervious surface, erosion control measures during the construction phase of development and re-development, authority to issue stop work orders, and staff to carry out and enforce the rules. Because of the development and redevelopment rules that limit runoff volume, development in the watershed will improve water quality loads from the developed land beyond the requirements of this TMDL. For this reason, the MPCA expects watershed phosphorus loads to diminish as development and redevelopment occurs and thus did not include future loading capacity in the TMDL. EPA concurs with MPCA's approach.

Priority Ranking: Minnesota does not include separate priority rankings for its waters in the TMDL. MPCA prioritizes its waters during the development of the impaired waters list. Development of the TMDL was scheduled to begin in 2008 with the final TMDL to be submitted in 2011.

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

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

The TMDL submittal must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the 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 Use of Waterbody: Bald Eagle Lake is classified under Minnesota Rule 7050.0430 as Class 2B, 3B, 4A, 4B, 5, and 6 waters. The most protective of these classes is Class 2 waters, which are protected for aquatic life and recreation. MN Rules Chapter 7050.0140 Water Use Classification for Waters of the State reads:

Subp. 3. Class 2 waters, aquatic life and recreation. Aquatic life and recreation includes all waters of the state which do or may support fish, other aquatic life, bathing, boating, or other recreational purposes, and where quality control is or may be necessary to protect aquatic or terrestrial life or their habitats, or the public health, safety, or welfare.

Water Quality Standard:

Bald Eagle Lake is subject to MN Eutrophication Standards, North Central Hardwood Forests Ecoregion (Table 1.1 in the TMDL and Table 1 below). Bald Eagle Lake has a maximum water depth of 39 feet, a mean depth of 12 feet, and has approximately 61% littoral area (defined as water depth areas of 15 feet or less); thus, Bald Eagle Lake is subject to the general eutrophication standards. Numerical standards are given in MN's Rule 7050.0222 with narrative standards in MN's Rule 7050.0222 subpart 4a. According to the MPCA definition, a lake is considered shallow if its maximum depth is less than 15 ft or if the littoral zone for areas where water depth is less than 15 ft is greater than 80%. Based upon the physical data, Bald Eagle Lake is classified by MPCA as a shallow lake.

Table 1. MN Eutrophication Standards, North Central Hardwood Forests Ecoregion

Parameter	Eutrophication Standard
TP (ug/L)	TP < 40
Chlorophyll-A (ug/L)	Chl-A < 14
Secchi depth (m)	SD > 1.4

Targets: To achieve the designated use and the applicable eutrophication criteria, MPCA selected the total phosphorus criterion (40 µg/L) as the primary target of the TMDL and the Secchi depth as the secondary standard (Section 1.3 of the TMDL).

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

TMDLs must take into account *critical conditions* for 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:

Loading Capacity:

The loading capacity for Bald Eagle Lake is **5.2 lbs/day** of phosphorus.

Models and a mathematical calculation were used by MPCA to calculate the phosphorus loads from each source as part of the loading capacity calculation for Bald Eagle Lake. Phosphorus loads to Bald Eagle Lake consist of regulated MS4s/watershed nutrient loading (wasteload allocation), construction stormwater activities (wasteload allocation), upstream lakes (load allocation), internal loading (load allocation), and atmospheric deposition (load allocation). Phosphorus loads from watershed runoff and upstream lakes were modeled and used as inputs to the BATHTUB lake response model using Program Predicting Polluting Particle Passage thru Pits, Puddles and Ponds Water Quality Model (P8). The current TP internal loading was based on an anoxic factor of 11 to 29 days, with an average of 19 days, for Bald Eagle Lake and a sediment release rate of 10.8 mg/m²/day resulting in the current TP internal loading of 1,991 lbs/yr (Appendix F of the TMDL). This value coupled with a sediment release rate of 1 to 2 mg/m²/day was used as an input to the BATHTUB lake response model. The phosphorus load from atmospheric deposition was calculated by multiplying the atmospheric deposition rate (lbs/acre-year) (refer to Section 3.2.3 of the TMDL) to the lake area (acres). Since MPCA determined that failing septic systems do not appear to be a significant nutrient source, it was not accounted for in the loading capacity calculation. After nutrient loadings were identified, the lake response model calculated the loading capacity.

The P8 model is designed to simulate flow conditions and pollutant transport in an urban environment in addition to modeling best management practices (Section 3.2 of the TMDL). The P8 model was built for the entire Bald Eagle watershed and was used to address watershed runoff loading and upstream lakes. Within the model, the Judicial Ditch 1 (JD1) subwatershed was calibrated for both volume and nutrient concentrations using monitoring data. Since monitoring data was not available for the remaining subwatersheds (County Ditch 11 and Direct Drainage), the P8 model default was used for volume, and the 50th percentile particle dataset from the National Urban Runoff Program was used for pollutant concentrations (Appendix C of the TMDL). Two upstream lakes in the JD1 subwatershed, Pine Tree Lake (DNR ID 62-0122), and Fish Lake (DNR ID 82-0137), contribute to nutrient loading to Bald Eagle Lake. Pine Tree Lake is not an impaired water and is not on the 303(d) list (31 ug/L TP growing season mean). Fish Lake is impaired for nutrients and is currently on the 303(d) list (171 ug/L TP growing season mean in 2002; 42 ug/L TP growing season mean in 2007). Drainage coming from Pine Tree Lake and its subwatershed is approximately 40% of the total water balance for the JD1 subwatershed. Fish Lake comprises 10% of the total water balance for the JD1 subwatershed. The watershed runoff nutrient loading into Bald Eagle Lake was calculated to be 2,132 lbs/yr and 135 lbs/yr from upstream lakes (Table 4.1 in the TMDL).

Atmospheric deposition was calculated by multiplying atmospheric deposition rate (lbs/acre-year) by the lake area (acres). Atmospheric deposition was calculated to be 254 lbs/yr (Section 3.3.1 of the TMDL).

Total phosphorus is released from sediments under anoxic conditions. Internal loading was estimated by using the anoxic factor and sediment release rate. The anoxic factor estimates the amount of time where anoxic conditions exist over the sediments. This indicates the amount of time (days) that TP would be released from sediments. MPCA determined that the anoxic factor for Bald Eagle Lake was 11 to 29 days and the sediment release rate was 10.8 mg/m²/day resulting in the current TP internal loading 1,991 lbs/yr (Appendix F of the TMDL). MPCA decided to base TP reductions in Bald Eagle's internal loading on the potential effectiveness of

internal load control technologies. Control technology methods such as hypolimnetic aeration, hypolimnetic withdrawal, and alum treatment have been demonstrated to show an 80 to 90% reduction in internal loading when applied to lakes similar to Bald Eagle Lake. An 80 to 90% reduction in TP corresponds to a sediment release rate between 1 to 2 mg/m²/day. MPCA determined a sediment release rate of 1 mg/m²/day for Bald Eagle Lake based on the release rates demonstrated in nearby lakes and the expected results from internal load controls (Section 4.1.2 of the TMDL). This rate and the anoxic factor results in an allocation of 181 lbs/yr in TP internal loading for Bald Eagle Lake.

After the current phosphorus loadings to the lake were estimated from watershed runoff and internal loading sources, the in-lake response to the nutrient load was calculated using Canfield-Bachmann equations extracted from the BATHTUB model. The lake response model predicts that all three variables in the state standard will be met with the designated allocations.

The phosphorus loading from atmospheric deposition was previously calculated to be 254 lbs/yr using the atmospheric deposition rate from the MPCA report, "Detailed Assessment of Phosphorus Sources to Minnesota Watersheds".

BATHTUB model results were compared to observed in-lake water quality data to confirm model accuracy. Ten years (1998 to 2008) were modeled for Bald Eagle Lake to evaluate the performance of the lake response model (Figure 3.5 of TMDL). The results of the modeling effort using the dataset from 2002-2008 were approximate to the observed values being within 15% of the measured values. The results of the modeling effort using the 1998-2001 dataset demonstrated a significant under-prediction compared to observed values. The under-prediction is due to an unexplained phosphorus source from 1998 to 2001. Possible sources are carp or curly-leaf pondweed. Because of this under-prediction, the 2002 to 2008 time period was used to develop the TMDL (Section 3.6 of the TMDL). MPCA found that the residual between observed and modeled water quality values was within the reported standard deviations of annual averages for total phosphorus; therefore, MPCA determined that BATHTUB could accurately represent in-lake response and thus was used to quantify the TMDL for Bald Eagle Lake. BATHTUB model results for allowable watershed runoff were 1,323 lbs/yr, 133 lbs/yr for upstream lakes, and 181 lbs/yr for internal load. Together with the atmospheric load of 254 lbs/yr, the loading capacity for Bald Eagle Lake is 1,890 lbs/yr.

TMDL = 1,890 lbs/yr = 5.17 lbs/day = 1,149 lbs/yr (load allocation) + 741 lbs/yr (wasteload allocation).

The loading capacity, developed to meet total phosphorus criterion of 40 ug/l, and existing phosphorus load for Bald Eagle Lake are presented in Table 2 below and in Table 4.1 in the TMDL report. The loading capacity is the combination of the wasteload allocation, load allocation, and margin of safety (Table 3 below). Thus, the loading capacity is equal to the TMDL assigned for the waterbody.

Table 2. Existing Loads and TMDL

Lake	Model Scenario	Total Load to Lake (lbs/yr)	TMDL (lbs/day)
Bald Eagle	Existing	4,512	--
	Standard (40 ug/L TP)	1,890	5.17

Table 3. TMDL Summary

Lake	Load Allocation (lbs/day)	Wasteload Allocation (lbs/day)	TMDL (lbs/day)
Bald Eagle	3.2	2.0	5.2

Critical conditions: Section 4.3 of the TMDL accounts for critical conditions through the use of annual loads and developing targets for the summer period where the frequency and severity of nuisance algal growth will be the greatest. Although the critical period is in the summer, this lake is not sensitive to short-term changes in water quality; rather, it responds to long-term changes such as changes in the annual load. The load reduction is designed so that Bald Eagle Lake will meet the water quality standard over the course of the growing season (summer), which is the most critical period.

EPA supports the data analysis and modeling approach utilized by MPCA in their calculation of wasteload allocations, load allocations and margin of safety for the Bald Eagle Lake TMDL. Additionally, EPA concurs with the loading capacities calculated by the MPCA in the Bald Eagle Lake TMDL.

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

4. Load Allocations (LAs)

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

Comment: Section 4 of the TMDL states that the LA includes TP loadings from watershed runoff, upstream lakes, internal loading in lake, and atmospheric loads. Although the load designated for each of these sources was estimated separately, they are jointly included as one overall LA. The watershed runoff also includes stormwater runoff from within the boundaries of unregulated MS4s. Upstream lakes were considered as upstream load and no further load segregation was performed by MPCA. Internal loads are the TP contained in the lake sediments. The calculation of the internal load is discussed in Section 3 above. MPCA calculated the atmospheric deposition load was calculated by multiplying the atmospheric deposition rate (lbs/acre-year) from the MPCA report, “Detailed Assessment of Phosphorus Sources to Minnesota Watersheds” to the lake area (acres).

Table 4.1 of the TMDL and Table 4 below present the load allocation. These allocations represent 91% reduction in internal load, 38% reduction in watershed runoff, and a very small (<1%) reduction in upstream loads (Table 4.1 of the TMDL). MPCA assumed that Fish Lake will be restored to water quality standards since EPA approved of the Fish Lake TMDL on September 9, 2010. The upstream lake, Pine Tree, is expected to continue to meet water quality standards.

Table 4. Total Phosphorus Load Allocation

Lake and Standard	Load Allocation (lbs/day)	Source (lbs/day)	
Bald Eagle Lake: (40 ug/L)	3.2	Internal Load	0.5
		Atmospheric Load	0.7
		Upstream Lakes	0.4
		Watershed runoff	1.6

EPA concurs with the State’s approach in determining the LA for which the Bald Eagle Lake TMDL has been established.

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

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

5. Wasteload Allocations (WLAs)

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

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. These individual WLAs may be adjusted during the NPDES permitting process. If the WLAs are adjusted, the individual effluent limits for each permit issued to a discharger on the impaired water must be consistent with the assumptions and requirements of the adjusted WLAs in the TMDL. If the WLAs are not adjusted, effluent limits contained in the permit must be consistent with the individual WLAs specified in the TMDL. If a draft permit provides for a higher load for a discharger than the corresponding individual WLA in the TMDL, the State/Tribe must demonstrate that the total WLA in the TMDL will be achieved through reductions in the remaining individual WLAs and that localized impairments will not result. All permittees should be notified of any deviations from the initial individual WLAs contained in the TMDL. EPA does not require the establishment of a new TMDL to

reflect these revised allocations as long as the total WLA, as expressed in the TMDL, remains the same or decreases, and there is no reallocation between the total WLA and the total LA.

Comment:

The point source identified by MPCA is the stormwater runoff load regulated under NPDES as discussed in Section 4.1.3 of the TMDL. MPCA determined a categorical WLA for industrial facilities discharging stormwater, construction stormwater, and MS4s. MPCA believes using categorical wasteload allocations was justified because: 1) there is considerable uncertainty regarding current loading with regard to municipal boundaries, since monitoring data based on municipal boundaries were not available; and 2) the Rice Creek Watershed District plans to implement the TMDL by focusing on watershed-based water quality improvement projects that span municipal boundaries and to use its funding sources and grant programs for water quality improvement projects.

At the request of Minnesota Department of Transportation (MDOT), MPCA did not include MDOT as part of the categorical WLA. MPCA calculated an individual WLA by the percent area that MDOT maintains as right-of-way in the Bald Lake Watershed to the percent area of the watershed loading.

WLAs were based on 2020 land use projections. MPCA used the P8 model to determine runoff loads as discussed in Section 3 above. Stormwater runoff within its MS4 boundaries from regulated MS4s in the Bald Eagle Lake watershed were assigned a categorical WLA. A 38% reduction in stormwater loading from within the boundaries of regulated MS4s is required to meet the TMDL.

Table 5. Total Phosphorus Wasteload Allocation

Lake and Standard	Permit Name	Permit Number	WLA
Bald Eagle Lake: (40 ug/L)	Lino Lakes MS4	MS400100	1.97
	White Bear Lake MS4	MS400060	
	White Bear Township	MS400163	
	Hugo	MS400094	
	Grant	MS400091	
	Dellwood	MS400084	
	RCWD	MS400193	
	Washington County	MS400160	
	Anoka County	MS400066	
	Ramsey County	MS400191	
	Industrial Stormwater (future permits)	None	
	Construction Stormwater (various)	None	
	MN/DOT	MS400170	0.060

		Total WLA	2.03
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EPA concurs with the State’s approach in determining the WLA for which the Bald Eagle Lake TMDL has been established.

EPA finds the MPCA’s approach for calculating the WLA to be reasonable.

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

6. Margin of Safety (MOS)

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

Comment:

The margin of safety (MOS) is an accounting of uncertainty about the relationship between pollutant loads and receiving water quality. The MOS can be provided implicitly through conservative analytical assumptions or explicitly by reserving a portion of loading capacity.

MPCA used an implicit MOS for the Bald Eagle Lake TMDL. The implicit MOS is the assumption of a turbid water state in the lake response model for the TMDL calculation. Shallow lakes exist in two stable states: clear and turbid. The shallow lake can exist in the turbid state and move towards a clear state once the nutrient load is reduced and/or other internal load management activities take place for the lake. As the lake moves towards a clear state, increased light transmission allows aquatic plants to grow, stabilizing the phosphorus-rich sediments. In addition, zooplankton can more efficiently feed on algae, removing additional TP from the system. Since the lake response model does not account for the effects of a shallow lake’s clear state in the model, an overestimation of the TP has resulted. Therefore, achieving the TP loads in the TMDL will likely result in achieving a TP concentration below the water quality standards.

An additional implicit MOS was applied for this TMDL due to no adjustment to model coefficients for model performance over the seven-year period. As a result of a strong database for the lake and its watershed, and a long history of assessment, confidence in the allocations is high.

EPA concurs with the State’s approach in determining the MOS included for this TMDL.

EPA finds the MPCA’s approach for calculating the MOS to be reasonable.

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

7. Seasonal Variation

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

Comment:

Seasonal variation was accounted for through the use of annual loads and developing targets during the summer period (i.e., critical conditions). Bald Eagle Lake responds to changes in water quality over a long period of time versus a short period of time and is not sensitive to short-term changes in water quality, thus determination of an annual load captures variations over the course of a year. The TMDL was set to meet TP standards during the summer period, which is the most protective period since critical conditions occur at Bald Eagle Lake during the summer months. BATHTUB incorporates precipitation data and flow data over a two-year period thus capturing seasonal variations such as spring rain, snowmelt, and summer low flows.

Section 4.3 of the TMDL report provides further information on seasonal variation.

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

8. Reasonable Assurances

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

When a TMDL is developed for waters impaired by both point and non-point sources, and the WLA is based on an assumption that non-point source load reductions will occur, EPA’s 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that non-point 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 non-point sources. However, EPA cannot disapprove a TMDL for non-point 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:

MPCA has identified several sources of funding and activities that provide assurance that load allocations will be achieved.

- 1) Clean Water Legacy Act (CWLA): The CWLA is a statute passed in Minnesota in 2006 for the purposes of protecting, restoring, and preserving Minnesota water. The CWLA provides the process to be used in Minnesota to develop TMDL implementation plans, which detail the restoration activities needed to achieve the allocations in the TMDL. The TMDL implementation plans are required by the State to obtain funding from the Clean Water Fund. The Act discusses how MPCA and the involved public agencies and private entities will coordinate efforts regarding land use, land management, water management, etc. Cooperation is also expected between agencies and other entities regarding planning efforts, and various local authorities and responsibilities. This would also include informal and formal agreements and to jointly utilize technical educational, and financial resources. MPCA expects the implementation plans to be developed within a year of TMDL approval. The CWLA also provides details on public and stakeholder participation, and how the funding will be used. The implementation plans are required to contain ranges of cost estimates for both point and nonpoint source load reductions, as well as monitoring efforts to determine effectiveness. MPCA has developed guidance on what is required in the implementation plans (Implementation Plan Review Combined Checklist and Comment, MPCA), which includes cost estimates, general timelines for implementation, and interim milestones and measures. The Minnesota Board of Soil and Water Resources administers the Clean Water Fund as well, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (FY '11 Clean Water Fund Competitive Grants Policy; Minnesota Board of Soil and Water Resources, 2011).
- 2) The RCWD Watershed Management Plan. The plan includes implementation projects aimed at improving and restoring water quality at Bald Eagle Lake. Details of the plan can be found in Section 7.2 of the TMDL report.
- 3) Stormwater Pollution Prevention Program (SWPPP) under the NPDES Program. The NPDES Phase II stormwater permittees in the watershed must complete a SWPPP that address six minimum control measures, BMPs, and measurable goals for the identified BMPs.
- 4) Funding from the Bald Eagle Lake Water Management District (BEL-WMD). Funds from the BEL-WMD will be used to implement water quality improvement projects. Projects will be carried out by BEL-WMD. The focus of the types of projects will aim at reducing nutrient levels in Bald Eagle Lake due to internal loading. Such projects include invasive species control and emergent plant protection.
- 5) Projects from the Washington Conservation District (WCD). The WCD will fund and provide technical assistance for projects involving protection of natural resources. Technical assistance is provided to county residents, local government units and watershed organizations. The WCD currently collects in-lake water quality data, conducts macrophyte surveys, and provides an annual Lake Water Quality Summary. Together these tools can be used to assess the in-lake water quality to identify trends, namely improvements, for Bald Eagle Lake.

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

9. Monitoring Plan to Track TMDL Effectiveness

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

Comment:

The RCWD will continue to monitor for flow and water quality at the outlet of JD1. The RCWD plans to obtain stormwater samples at CS11 and direct watershed outfall locations when feasible. In-lake water samples will continue to be collected by Ramsey County Public Works on a bi-monthly basis.

Section 7.6.2 of the TMDL report provides further information on monitoring.

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

10. Implementation

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

Comment:

MPCA's policy is to require an Implementation Plan within one year of EPA approval of the TMDL. The MPCA reviews and approves the Implementation Plans. The Implementation Plan for Bald Eagle Lake will include reduction strategies for nutrients, using existing watershed and local plans, adaptive management, conducting studies and using existing biological management plans, and education and outreach activities, performed by RCWD.

Further detail can be found in Section 6.0 of the TMDL report.

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

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:

MPCA held two technical advisory committee meetings and two public meetings throughout the TMDL development process. The technical advisory committee meetings took place on July 9, 2009 and September 24, 2009. The public meetings took place on January 28, 2009 and March 11, 2010, to discuss the proposed TMDL with lakeshore owners and citizens.

The Bald Eagle Lake TMDL was posted on the MPCA's website for public comment and review for a 30-day public comment period. The review period took place from February 28, 2009 through March 11, 2010. The draft TMDL Study was posted at: <http://www.pca.state.mn.us/index.php/view-document.html?gid=15575>, the MPCA's TMDL web site. During this time the MPCA received and responded to one comment letter from the public. Public comments were submitted with the TMDL report and addressed appropriately by MPCA.

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

12. Submittal Letter

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

Comment:

On April 11, 2012, EPA received the Bald Eagle Lake TMDL, and a submittal letter dated April 2, 2012, signed by Rebecca J. Flood, Assistant Commissioner, addressed to Tinka Hyde, U.S. EPA, Region 5, Water Division. In the submittal letter, MPCA stated “I am pleased to submit the Bald Eagle Lake Total Maximum Daily Load (TMDL) study for excess nutrients to the U.S. Environmental Protection Agency (EPA) for final approval.” The submittal letter included the name and location of the waterbody (Upper Mississippi River Basin) and the pollutant of concern.

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

13. Conclusion

After a full and complete review, EPA finds that the total phosphorus TMDL for Bald Eagle Lake in the Bald Eagle Lake watershed within the Rice Creek Watershed District satisfies all of the elements of an approvable TMDL. This decision document addresses 1 TMDL for 1 waterbody as identified on Minnesota’s 303(d) list (Table 6).

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.

Table 6. Impaired Waters Listing

Waterbody	DNR ID #	HUC Code	Pollutant	Impairment
Bald Eagle Lake	62-0002	0701020	Total Phosphorus	Nutrient/Eutrophication Biological Indicators