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

JUL 20 2011

REPLY TO THE ATTENTION OF:
WW-16J

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

Dear Ms. Flood:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDLs) for Long Lake (DNR ID 34-0192) and Ringo Lake (DNR ID 43-0172), including support documentation and follow up information. Long Lake and Ringo Lake are located in central Minnesota in Kandiyohi County. The TMDLs address the aquatic recreation use impairment due to excessive phosphorus.

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

We wish to acknowledge Minnesota's efforts in submitting these TMDLs and look forward to future TMDL submissions by the State of Minnesota. If you have any questions, please contact Mr. Peter Swenson, Chief of the Watersheds and Wetlands Branch, at 312-886-0236.

Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Dave Johnson, MPCA
Darrell Schindler, MPCA

TMDL: Long and Ringo Lakes Phosphorus TMDL, Kandiyohi County, MN
Date: July 20, 2011

DECISION DOCUMENT FOR THE LONG AND RINGO LAKES PHOSPHORUS TMDLs, KANDIYOHI COUNTY, MN

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

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

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

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

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

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

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

Comment:

Location Description/Spatial Extent:

Long Lake (DNR ID 34-0912) and Ringo Lake (DNR ID-34-0172) are located in the Hawk Creek watershed in Kandiyohi County, Minnesota. Long Lake and Ringo Lake are north of the city of Willmar, Minnesota. The Long Lake watershed has an approximate area of 8,372 acres, including the Ringo Lake subwatershed. The Ringo Lake subwatershed has an approximate area of 4,368 acres. The Long Lake watershed is within the boundaries of the Hawk Creek watershed (HUC-07020004) in central Minnesota. Water flows from Ringo Lake to Long Lake, Long Lake to Hawk Creek, and the Hawk Creek watershed eventually drains into the Minnesota River. Long Lake and Ringo Lake lie within the boundaries of the North Central Hardwood Forest Ecoregion (NCHF).

Long Lake has a surface area of 1,568 acres, a maximum depth of 16 feet, and an average depth of 9.6 feet. The littoral area, or lake area that is less than 15 feet deep, of Long Lake is 1,489 acres (approximately 95% of the surface area). Long Lake has one major tributary, which enters Long Lake in the northeastern corner of the lake. This tributary originates as flow from Ringo Lake, and flows through a wetland complex between Ringo Lake and Long Lake. Water contributions from Ringo Lake to Long Lake via the wetland, are typically consistent throughout the year. Low flow conditions may limit the flow from this tributary. Water levels observed during the 2008-2009 TMDL study were slightly below previously recorded average water levels in Long Lake. A 47-acre island is in the southern portion of Long Lake. This island is home to a colony of waterbirds including: double-crested cormorants, great blue herons, egrets and black-crowned night herons.

Ringo Lake has a surface area of 735 acres, a maximum depth of 10 feet, and an average depth of 4.1 feet. Ringo Lake is considered 100% littoral because Ringo Lake's maximum depth is 10 feet. Ringo Lake receives water from West Twin Lake, which is to the east of Ringo Lake, during high flow events (ex. spring runoff or large storm events). During the TMDL study, Ringo Lake did not receive any water from West Twin Lake. Water levels observed during the 2008-2009 TMDL study were slightly below previously recorded average water levels in Ringo Lake.

Land Use:

The Long Lake watershed encompasses approximately 8,372 acres in Central Minnesota. The Ringo Lake subwatershed lies within the boundaries of the Long Lake watershed and is approximately 4,368 acres in area. Land use in the Long and Ringo Lake watersheds is comprised of: open water/wetland land areas, urban land areas, wooded land areas, cultivated land areas, Conservation Reserve Program (CRP) land areas, pasture/grass/hay/idle grass land areas, and gravel pit land areas. The approximations for these land uses can be found in Table 1 of this Decision Document.

Table 1: Land use within the Long and Ringo Lake Watersheds

	Long Lake[1]		Ringo Lake	
Land Use Category	*(acres)*	*percentage*	*(acres)*	*percentage*
Cultivated Land Area	1037	12%	496	11%
Conservation Reserve Program (CRP) Land Area	571	7%	386	9%
Urban Land Area	1087	13%	640	15%
Wooded Land Area	973	12%	655	15%
Open Water/Wetland Area	3430	41%	1509	35%
Pasture/Grass/Hay/Idle Grass Land Area	1004	12%	506	12%
Gravel Pit Area	271	3%	177	4%
Total Area	8373	100%	4369	100%

[1] Long Lake land use areas include areas of the Ringo Lake subwatershed

Significant development is not expected in the Long Lake watershed. The amount of land use classified as urban/suburban has not changed considerably since 1997. While there has been some development in the lakeshore areas of Long Lake, the Minnesota Pollution Control Agency (MPCA) does not anticipate significant development within the watershed in the future. Therefore, reserve capacity was not included in the Long Lake and Ringo Lake TMDLs.

Problem Identification:
Long Lake was originally listed on the 2002 Minnesota 303(d) list and Ringo Lake was added to the 2010 303(d) list. Both lakes are on the submitted 2010 Minnesota 303(d) list for impaired aquatic recreation due to excessive nutrients.

Priority Ranking:
The Long Lake and Ringo Lake watersheds were given a priority ranking for TMDL development due to: the impairment impacts on public health and aquatic life, the public value of the impaired water resource, the likelihood of completing the TMDLs in an expedient manner, the inclusion of a strong base of existing data and the restorability of the water body, the technical capability and the willingness of local partners to assist with the TMDLs, and the appropriate sequencing of TMDLs within a watershed or basin. The Long and Ringo Lake areas are a popular location for aquatic recreation including: boating, fishing, swimming, and hunting.

Pollutant of Concern:
The pollutant of concern is phosphorus.

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

Potential Stormwater from Construction Activities: Phosphorus inputs via stormwater from construction activities may contribute phosphorus loading to the Long Lake watershed, as phosphorus is often

attached to soil particles. Construction activities within the watershed may disturb soils and generate other phosphorus debris. These soils and debris can be transported to surface waters during stormwater events. The TMDLs assume that there will be phosphorus inputs from construction activities within the Long Lake watershed and therefore a wasteload allocation (WLA) was assigned to construction stormwater.

Stormwater from Industrial Activities (Sand & Gravel Operations): Phosphorus inputs via stormwater from industrial activities may contribute phosphorus loading to the Long Lake watershed. Stormwater from sand and gravel operations are defined by the MPCA as an industrial source of stormwater. These operations are covered under a general industrial stormwater permit (*General Permit for Construction Sand and Gravel (MNG49000)*). Sand and gravel operations may contribute phosphorus to local surface waters via stormwater runoff, as phosphorus is often attached to soil particles. The TMDLs assume that there will be phosphorus inputs from industrial activities within the Long Lake watershed and therefore a WLA was assigned to industrial stormwater.

Nonpoint Source Identification: The potential nonpoint sources to the Long Lake watershed and the Ringo Lake subwatershed are:

Forest Sources: Phosphorus may be added to surface waters in the Long Lake watershed via runoff from forested areas within the watershed. The runoff can include phosphorus rich debris from decomposing vegetation and organic soil particles.

Agricultural Sources (Pasture and Open Lands): Phosphorus may be added via surface runoff from upland areas which are being used for Conservation Reserve Program (CRP) lands, grasslands, and agricultural lands used for growing hay. Other potential agricultural sources are related to stormwater runoff which can contribute nutrients to surface waters from livestock manure, fertilizers, vegetation and erodible soils.

Livestock Sources: Phosphorus may be added from livestock sources via the mobilization and transportation of phosphorus laden materials from feeding, holding and manure storage areas.

Urban/Residential Sources: Nutrients may be added via runoff from homes near the lakes in the watershed. Runoff from residential properties can include phosphorus derived from fertilizers, leaf and grass litter, pet wastes, and other sources of anthropogenic derived nutrients.

Inadequate Subsurface Sewage Treatment Systems (SSTS): Phosphorus may be added to the surface waters in the Long Lake watershed from failing septic systems. Age, construction and use of SSTS can vary throughout a watershed and influence the nutrient contribution from these systems. It is likely that those systems that are sited along the lake shore are more likely to contribute nutrients than those systems sited further away from the lake. Failing SSTS can discharge nutrients directly into surface waters by straight pipe connections (considered point sources) or by effluents leaching into groundwater or ponding at the surface where they can be washed into surface waters via stormwater runoff.

Wetland Sources: Phosphorus may be added to surface waters by stormwater flows through wetland areas in the Long Lake watershed. A wetland complex connects water flowing from Ringo Lake to Long Lake. Degradation of wetland environments via ditching and draining of wetlands may liberate

phosphorus from wetland soils (peat). These nutrients may be transported via storm event derived flows through the transport of suspended solids and other organic debris.

Atmospheric Deposition: Phosphorus may be added by particulates from the atmosphere falling onto the lake surface. Phosphorus may be bound to these particles which are deposited directly to the lake surface.

Rookery (Wildlife): Nutrients may be added to the surface waters of Long Lake via the island in the southern portion of the lake. This island is the home to a colony of waterbirds of various types which contribute nutrients to the watershed via their excrement. Precipitation falling on the island may move these nutrient laden materials into Long Lake via surface runoff.

Internal Loading: The release of phosphorus from sediment, the release of phosphorus via physical disturbance from benthic fish, the release of phosphorus from wind mixing the water column, and the release of phosphorus from decaying pondweeds, can all contribute internal phosphorus loading to the lakes in the Long Lake watershed. Phosphorus can build up in the bottom waters of the lake and can be resuspended or mixed into the water column when the thermocline decreases and the lake water mixes.

Future Growth:
Future Growth/Reserve Capacity description is found in Section 5.5 (pages 47-48 of the final TMDL document). Significant development is not expected in the Long and Ringo Lake watersheds. The WLA and load allocation (LA) were calculated for all current and future sources. Any expansion of point or nonpoint sources will need to comply with the respective WLA and LA values in the TMDL.

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

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

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

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

Comment:

Designated Uses:

The designated use for Long Lake and Ringo Lake is for aquatic recreation (boating, swimming, fishing, hunting, etc.). The two lakes are classified as Class 2B waters for the State of Minnesota (MN Rule 7050.0222 Subpart 3, and Subpart 3a Class 2B).

Standards:

The assessment for eutrophic conditions includes a numeric water quality standard and assessment factors from Minnesota Rule 7050. Long Lake and Ringo Lake are within the boundaries of the NCHF ecoregion and classified as shallow lakes. The MPCA assumes that by meeting the phosphorus loading capacity values set by the WLA and LA, the total phosphorus (TP), the chlorophyll-a (chl-a) and the Secchi Disc (SD) depth water quality criteria will be attained. The MPCA's Shallow Lake Eutrophication Standards for the NCHF ecoregion are found in Table 2 of this Decision Document.

Table 2: Minnesota Eutrophication Standards, North Central Hardwood Forest Ecoregion, Shallow Lakes

Parameter	Eutrophication Standard
Total Phosphorus (µg/L)	TP < 60
Chlorophyll-a (µg/L)	chl-a < 20
Secchi Depth (m)	SD > 1.0

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

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

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

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

TMDLs must take into account *critical conditions* for steam flow, loading, and water quality parameters as part of the analysis of loading capacity (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable *critical conditions* and describe their approach to estimating both point and nonpoint source loadings under such *critical conditions*. In particular, the TMDL should discuss the approach used to

compute and allocate nonpoint source loadings, e.g., meteorological conditions and land use distribution.

Comment:
The approach to estimating the loading capacity is described in Section 4.0 starting on page 41 of the final TMDL document. The pollutant sources were identified and estimated based on monitoring data and modeling efforts. The loading capacity of the lake was estimated using an in-lake phosphorus model (BATHTUB) and then assigned to the WLA, LA and Margin of Safety (MOS).

Modeling efforts were utilized to gain a better understanding of the water quality impairments in the Long Lake watershed. The Minnesota Lake Eutrophication Analysis Procedure (MINLEAP) model, the Reckhow-Simpson model, and the BATHTUB model were used to determine reductions necessary within the Long Lake watershed to meet the NCHF eutrophication criteria. The modeled outputs were also important in helping to set implementation strategies for reducing the overall total phosphorus loadings to Long Lake and Ringo Lake.

The MINLEAP model was used to assess general watershed health and was not used in the development of the actual TMDL (i.e. calculating WLA, LA or MOS values). MINLEAP was used as a basic assessment tool to gauge lake conditions in Long and Ringo Lakes. MINLEAP utilized general watershed information (ex. land use, precipitation totals, etc.), lake characteristics (ex. depth, lake area, morphology), and ecoregion attributes to run its modeling scenarios. The MINLEAP modeling outputs were average summer conditions for TP, TP loads and TP retained within the system. A second "general" watershed model was run in conjunction with the MINLEAP modeling efforts. The Chiaundani/Vighi (C/V) regression model was used to predict the natural background TP load based on regression analyses.

The Reckhow-Simpson (R-S) model was used to assess general watershed health and was not used in the development of the actual TMDL (i.e. setting WLA, LA or MOS values). The R-S model was used in a similar fashion to MINLEAP, to project expected lake conditions in the Long Lake and Ringo Lake watersheds. The R-S model predicted TP, chl-a, and SD values and estimates of livestock phosphorus contributions. These estimates allowed the MPCA to explore phosphorus loading rates for each land use, predicted in-lake phosphorus values and lake residence time. The main difference between the MINLEAP and C/V modeling efforts and the R-S modeling efforts was that the R-S assimilated more specific data than the MINLEAP and C/V modeling efforts. The R-S used data specific to the Long Lake and Ringo Lake watersheds such as; runoff rates, precipitation, evaporation rates, local land use data and local livestock data. The MINLEAP and C/V models used more general watershed attributes.

The BATHTUB model was utilized to link phosphorus loads with in-lake water quality and to calculate loading capacity values for each lake. The BATHTUB model was employed as the main predictive tool to estimate TP, chl-a and SD values for Long Lake and Ringo Lake. The MPCA believes the BATHTUB model is the more sophisticated of the models as it provides flexibility to tailor model inputs to specific lake morphometry, watershed characteristics and watershed inputs. The BATHTUB model also allows the State to assess different impacts of changes in nutrient loading.

The BATHTUB model estimated current phosphorus loading to Long Lake and Ringo Lake and calculated the loading rates which are necessary to meet the NCHF water quality standards (WQS). In

setting the loading rates to each lake, BATHTUB calculated external and internal phosphorus contributions. The BATHTUB model predicted that a significant portion of the phosphorus loading originates from internal sources and that the residence times for both Long Lake (estimated to be 14 years) and Ringo Lake (estimated to be 5 years) prevent the lakes from flushing phosphorus from their systems.

Loading capacities on the annual scale (lbs / year) were calculated by BATHTUB to meet the WQS during the growing season (June through September). The time period of June to September was chosen by MPCA as the growing season because it corresponds to the eutrophication criteria, contains the months that the general public typically uses Long Lake and Ringo Lake for aquatic recreation, and is the time of the year when water quality is likely to be impaired by excessive nutrient loading. Loading capacities were divided by 365 to calculate the daily loading capacities for Long Lake and Ringo Lake.

After determining the water quality in Long Lake and Ringo Lake based upon local watershed conditions, the MPCA used the BATHTUB model to calculate the current loading and loading rate required to meet WQS. The current loading estimate for Long Lake was calculated to be 11,447 lbs/yr (5,192 kg/yr), which was based on an in-lake phosphorus measurement of 127 µg/L. To meet the TP WQS of 60 µg/L, the current loading estimate of 11,447 lbs/yr would need to be reduced to 2,979 lbs/yr. The reduction represents a 74 percent decrease in the current phosphorus loading estimate to Long Lake.

The current loading estimate for Ringo Lake was calculated to be 2,463.6 lbs/yr (1,117.3 kg/yr), which was based on an in-lake phosphorus measurement of 125 µg/L. To meet the NCHF WQS for TP, the current loading estimate for Ringo Lake (2,463.3 lbs/yr) would need to be reduced to 715.9 lbs/yr. The reduction represents a 71 percent decrease in the current phosphorus loading to Ringo Lake.

Table 3 in this Decision Document displays the TMDL allocations for Long Lake and Ringo Lake. These calculations were based on the critical condition, the summer growing season (June through September), which is typically when the water quality in each lake is degraded and phosphorus loading inputs are the greatest. TMDL allocations assigned during the summer growing season will protect Long Lake and Ringo Lake during the worst water quality conditions of the year. The MPCA assumed that the loading capacities established by the TMDLs will be protective of water quality during the remainder of the calendar year (October through May).

Table 3: TMDLs for Long Lake and Ringo Lake

	WLA	**LA**	**MOS**	**Loading Capacity (TMDL)**
	(lbs/day)	*(lbs/day)*	*(lbs/day)*	*(lbs/day)*
Long Lake	0.48	6.87	0.81	**8.16**
Ringo Lake	0.13	1.64	0.20	**1.97**

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

4. Load Allocations (LA)

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

Comment:
Load allocations are addressed in Section 5.3 on page 47 of the final TMDL document. The LA for the Long Lake and Ringo Lake TMDLs were recognized as originating from a variety of nonpoint sources including: internal sources, atmospheric deposition, agricultural nonpoint source runoff, urban nonpoint source runoff, and SSTS. The components of the LA were added together to one LA value for each TMDL, loads were not assigned to the individual nonpoint sources or source categories. The LA for the Long Lake TMDL was calculated to be 6.87 lbs/day (3.12 kg/day). The Ringo Lake TMDL LA was calculated to be 1.64 lbs/day (0.74 kg/day).

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

5. Wasteload Allocations (WLAs)

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

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. These individual WLAs may be adjusted during the NPDES permitting process. If the WLAs are adjusted, the individual effluent limits for each permit issued to a discharger on the impaired water must be consistent with the assumptions and requirements of the adjusted WLAs in the TMDL. If the WLAs are not adjusted, effluent limits contained in the permit must be consistent with the individual WLAs specified in the TMDL. If a draft permit provides for a higher load for a discharger than the corresponding individual WLA in the TMDL, the State/Tribe must demonstrate that the total WLA in the TMDL will be achieved through reductions in the remaining individual WLAs and that localized impairments will not result. All permitees 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 wasteload allocations section is found on pages 46-47 of the final TMDL document. The WLA for the Long Lake and Ringo Lake TMDLs were assigned to construction stormwater sources and industrial stormwater sources (sand and gravel operations). The component of the WLA apportioned to potential construction activities was calculated based upon the land area (by percentage) of permitted construction

sites from 2005 to 2010. The MPCA found that 1.4% of the acreage in the Long Lake watershed was covered by construction permits over this 5-year period. The MPCA divided the 1.4% by the 5-year period and set the annual average construction land use at 0.2% of the total land area within the Long Lake watershed. The MPCA rounded up 0.2% to 1.0% and assigned this percentage to the loading capacity. One percent of the loading capacity was assigned to a WLA due to construction activities for both the Long Lake watershed and the Ringo Lake subwatershed.

There are no wastewater treatment facilities, no MS4 communities, no CSOs, nor SSOs within the Long Lake watershed. These potential point sources did not receive an apportionment of the WLA (WLA = 0). The WLA in both of these TMDLs were attributed to construction stormwater and industrial stormwater inputs. The construction stormwater and industrial stormwater WLA percentages were combined. The Long Lake watershed received a WLA of 6.5% of the loading capacity (1.0% + 5.5%). The Ringo Lake subwatershed received a WLA of 7.2% of the loading capacity (1.0% + 6.2%). The Long Lake TMDL WLA was calculated to be 0.48 lbs/day (0.22 kg/day). The Ringo Lake TMDL was calculated to be 0.13 lbs/day (0.06 kg/day)

The industrial stormwater component of the WLA is covered under a general industrial stormwater permit (*General Permit for Construction Sand and Gravel (MNG49000)*). This permit is granted by the MPCA. Under the MPCA's Stormwater General Permit, managers of sites under construction or industrial stormwater permits, must review the adequacy of local Stormwater Pollution Prevention Plans (SWPPPs) to ensure that each plan meets WLA set by EPA approved TMDLs. If the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18 months of the approval of the TMDL by the U.S. EPA.

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

6. Margin of Safety (MOS)

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

Comment:
Section 5.4 of the final TMDL submittal outlines the Margin of Safety used in the Long Lake and Ringo Lake TMDLs. The MOS accounts for the level of uncertainty in setting the TMDL allocations for each of the TMDLs. The MOS was set as an explicit value of 10 percent of the calculated loading capacity. The MOS was calculated after the loading capacity values were determined by the BATHTUB model. The MOS serves to lower the phosphorus target to 54 µg/L (60 µg/L is reduced to 54 µg/L by subtracting 6 µg/L, or 10 percent of 60 µg/L).

The MOS was set at 10 percent to account for uncertainty in the modeling processes (calibration and validation) of the Long Lake and Ringo Lake TMDL calculations, the uncertainty in the understanding of the aquatic systems in Long Lake and Ringo Lake, and the limitations of the data which were collected over a 2-year period (2008 & 2009). Although the MINLEAP and R-S models were not used for load calculations, results from those models compared favorably to the BATHTUB results. The MINLEAP and R-S modeling results indicated that the BATHTUB model adequately represented the aquatic system. Therefore, no additional MOS was indicated.

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

7. Seasonal Variation

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

Comment:
Seasonal variation was considered in calculating the TMDLs for Long Lake and Ringo Lake as described in Section 5.7 (pages 48-49 of the final TMDL document). Water quality monitoring in Long Lake and Ringo Lake suggested that total phosphorus concentrations vary significantly over the growing season (June through September). Typically the total phosphorus concentrations peak in the mid-late summer and exceed the NCHF WQS.

The Minnesota eutrophication standards state that total phosphorus WQS are defined as the mean concentration of phosphorus values measured during the growing season. In the Long Lake and Ringo Lake phosphorus TMDLs, the LA and WLA estimates were calculated from modeling efforts which incorporated mean growing season total phosphorus values. Nutrient loading capacities were set in the TMDL development process to meet the WQS during the most critical period (mid-late summer). The mid-late summer is typically when eutrophication standards are exceeded and water quality in Long Lake and Ringo Lake is deficient. By calibrating the modeling efforts to protect these waterbodies during worst water quality conditions of the year, it is assumed that the loading capacities established by the TMDLs will be protective of water quality during the remainder of the calendar year (October through May).

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

8. Reasonable Assurances

When a TMDL is developed for waters impaired by point sources only, the issuance of a National Pollutant Discharge Elimination System (NPDES) permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R.

122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL.

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

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

Comment:

The Long Lake and Ringo Lake phosphorus TMDLs outline reasonable assurance activities in Section 7.4 (page 53 of the final TMDL document). The reasonable assurance practices discussed in the final TMDL document will be implemented over the next several years. The implementation efforts can be achieved through federal, state and local action. Federal funding, via the Section 319 grants program, can provide money to implement voluntary nonpoint source programs within the Long Lake watershed. State efforts can be via NPDES permit enforcement, Clean Water Legacy Act grant money, and the Clean Water Partnership program. Table 4 shows the estimated TP load for Long Lake and Ringo Lake, developed by the BATHTUB model. The BATHTUB model predicted that a loading reduction of approximately 74% would be necessary to achieve the NCHF WQS in Long Lake. The BATHTUB model predicted that a loading reduction of approximately 71% would be necessary to achieve the NCHF WQS in Ringo Lake.

Table 4: Annual TP loading (lbs / year) and the reductions necessary to meet WQS

	Estimated Current TP Load	TP Reduction necessary to meet WQS	TMDL	TMDL
	(lbs / year)	*(lbs / year)*	*(lbs / year)*	*(lbs / day)*
Long Lake	11447	8468	2979	8.16
Ringo Lake	2464	1749	715	1.96

Several agency and non-profit groups will be involved in phosphorus reduction efforts to Long Lake and Ringo Lake. These organizations include: the Hawk Creek Watershed Project (HCWP), Natural Resources Conservation Service (NRCS), the Kandiyohi County Soil and Water Conservation District (SWCD), the Long Lake Association, and local landowners and private citizens. The HCWP and MPCA will be responsible for monitoring water quality in the Long Lake watershed to determine whether Best Management Practices (BMPs) are successfully functioning and reducing nutrient loading into Long Lake and Ringo Lake.

A Long Lake and Ringo Lake technical committee will be formed to compose an implementation plan after the approval of the TMDLs. The technical committee will be composed of members from the HWCP, Minnesota Department of Natural Resources (MN-DNR), MPCA, U.S. Fish and Wildlife Service (USFWS), the Kandiyohi County SWCD and the Minnesota Board of Water and Soil Resources (MN-BWSR). This implementation plan will outline the specific BMP strategies which will be employed in the Long Lake watershed so that Long Lake and Ringo Lake will meet WQS. The technical committee will reflect on the progress or lack of progress, and will have the opportunity to change course if progress is unsatisfactory.

The methods outlined below are designed to reduce nutrient inputs and improve water quality in the Long Lake watershed.

- Continued water quality monitoring efforts to ensure that watershed management strategies are effective and efficient in reducing nutrient inflows to Long Lake and Ringo Lake.
- Feedback from stakeholders, government agencies, technical experts and citizens on monitoring efforts and BMP improvements.
- New development, redevelopment, industrial or construction projects within the Long Lake watershed will need to be designed to maintain or improve on stormwater practices and BMP structures.
- Under the MPCA's Stormwater General Permit, managers of sites under construction or industrial stormwater permits, must review the adequacy of local SWPPPs to ensure that each plan meets WLA set by the Long Lake and Ringo Lake TMDLs. If the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18 months of the approval of the TMDL by the U.S. EPA. This would be applicable to those sites under the MPCA's general industrial stormwater permit (*General Permit for Construction Sand and Gravel (MNG49000)*).

The Clean Water Legacy Act (CWLA) is a statute passed in Minnesota in 2006 for the purposes of protecting, restoring, and preserving Minnesota's waters. The CWLA provides the process to be used in Minnesota to develop TMDL implementation plans, which detail the restoration activities needed to achieve the allocations in the TMDL. The TMDL implementation plans are required by the State to obtain funding from the Clean Water Fund. These plans are generally developed by third party groups, but may be developed by MPCA. The Act discusses how MPCA and the involved public agencies and private entities will coordinate efforts regarding land use, land management, water management, etc. Cooperation is also expected between agencies and other entities regarding planning efforts, and various local authorities and responsibilities. These efforts are expected to include informal and formal agreements and joint utilization of technical, educational, and financial resources. These cooperative efforts and coordination activities are to be included in the implementation plans. MPCA expects the implementation plans to be developed within a year of TMDL approval. MPCA reviews and approves all plans.

The CWLA also provides details on public and stakeholder participation in development and implementation of TMDLs and implementation plans, and how the funding will be used. The implementation plans are required to contain ranges of cost estimates for both point and nonpoint source load reductions, as well as for monitoring efforts to determine effectiveness of implementation efforts. MPCA has developed guidance on what is required in the implementation plans (Implementation Plan Review Combined Checklist and Comment, MPCA). To be eligible for CWLA funding, plans must include cost estimates, general timelines for implementation, and interim milestones and measures. The

Minnesota Board of Soil and Water Resources administers the Clean Water Fund, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (FY '11 Clean Water Fund Competitive Grants Policy; Minnesota Board of Soil and Water Resources, 2011).

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

9. Monitoring Plan to Track TMDL Effectiveness

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

Comment:
Section 7.3 of the final TMDL document outlines the planned water monitoring efforts by the HCWP and the MPCA. Both of these organizations will continue to monitor water quality in Long Lake and Ringo Lake. The monitoring plan outlined in the final TMDL consists of visiting Long Lake and Ringo Lake twice monthly between June to September in order to collect water quality measurements for dissolved oxygen, temperature, pH and conductivity. Total phosphorus, chlorophyll-a, and Secchi disc depth would be measured once every three years, at a minimum. The MPCA recommends that Secchi depth measurements continue in Long Lake on a regular basis. The Secchi depth measurements are collected by the Cooperative Lakes Monitoring Program (CLMP) to evaluate long-term water quality trends.

There are no plans to continue the phytoplankton (microscopic plant organisms) or zooplankton (microscopic "animal" plankton that typically feed on phytoplankton) monitoring in Long Lake and Ringo Lake. Additional fishery surveys will be conducted by the MN-DNR. Results of biological monitoring will aid watershed managers in their understanding how BMP phosphorus removal efforts are impacting the ecological community. The MPCA recommends that the biological surveys be conducted during those years which water quality measurements are also collected, thus linking biological and chemical monitoring data.

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

10. Implementation

EPA policy encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in

fact be achieved. In addition, EPA policy recognizes that other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.

Comment:
Implementation strategies are outlined in Section 7.0 (pages 50 to 52 of the final TMDL document). A detailed implementation plan will be developed by the Long Lake and Ringo Lake technical committee after the approval of the TMDL. The Long Lake and Ringo Lake technical committee will be composed of members from the HWCP, MN-DNR, MPCA, USFWS, the Kandiyohi County SWCD and MN-BWSR. These agencies will be responsible for assisting in the management of public lands and waters within the Long Lake watershed and for creating adaptive management strategies to meet changing water quality conditions within the watershed. BMP strategies will focus on: reducing nutrient inputs from urban and residential areas, agricultural areas, sand and gravel operation areas, and from internal sources.

Urban/Residential Nutrient Reduction Strategies: These strategies involve reducing stormwater runoff from lakeshore homes and other residences within the Long Lake watershed. These nutrient reduction practices could include the installation of rain gardens, stormwater settling basins, lake shore buffer strips, permeable pavement, biofiltration basins, and other low impact practices. Other nutrient reduction strategies involve vegetation management and lawn fertilizer reduction practices.

Septic Field Maintenance: Local septic management programs and educational opportunities can aid in the reduction of septic pollution. Educating the public on proper septic maintenance, finding and eliminating illicit discharges and repairing failing systems could lessen the impacts of septic derived nutrients inputs into the Long Lake watershed.

Public Education Efforts: Public programs will be developed to provide guidance to the general public on nutrient reduction efforts and their impact on water quality. These educational efforts could also be used to inform the general public on what they can do to protect the overall health of Long Lake and Ringo Lake.

Agricultural Reduction Strategies: These strategies involve reducing nutrient transport from fields, via manure and fertilizers, and minimizing soil loss. Specific practices would include: stream buffer strips, lake shore buffer strips, streambank stabilization practices (gully stabilization), manure runoff controls, installation of fencing near streams, wetland restoration, and nutrient management planning.

Gravel Operations/Construction Stormwater Reduction Strategies: Construction and industrial (sand and gravel operations) stormwater will be considered in compliance with the TMDL if the operators of these facilities review the adequacy of local SWPPPs to ensure that each plan meets the WLA set by the Long Lake and Ringo Lake TMDLs. If the SWPPP does not meet the WLA, the SWPPP will need to be modified within 18 months of the approval of the TMDL by the U.S. EPA. The operators must follow the guidelines of the permit to ensure that the site remains in compliance with the National Pollutant Discharge Elimination System (NPDES) regulations.

Internal Loading Reduction Strategies: The main strategy for improving internal phosphorus loads requires reducing external sources to Long Lake and Ringo Lake. Once the external sources have been

eliminated, mitigation efforts can be focused on managing the internal phosphorus sources (i.e. phosphorus found in lake sediments). The following strategies may be employed to reduce the internal phosphorus sources.

- Improved management of fisheries, to maintain healthy game fish populations and reduce the rough fish populations (i.e. carp, bullheads, fathead minnows).
- Improved management of in-lake vegetation in order to limit phosphorus loading and to increase water clarity.
- Redesigning boating traffic patterns, to limit boat operation in shallow or vegetated areas which may resuspend phosphorus from lake bottom sediments.

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

11. Public Participation

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

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

Comment:
The public participation section of the TMDL submittal is found in Section 6.0 (page 49 of the final TMDL document). The HWCP hosted six meetings with a stakeholder committee between August 2008 and June 2011. Meetings were held to inform the public about the TMDL process, data collection, and to solicit input on the TMDL draft. The stakeholder committee meeting in April 2009 introduced the TMDL process and reviewed water quality data from the 1997 Long Lake Lake Assessment Program (LAP) Study. A meeting was held in June 2010 to review the water quality monitoring data collected during the sampling season (2008 & 2009). In November of 2010, another stakeholder meeting was held to discuss the modeling results and the MPCA provided an overview of the draft Long Lake and Ringo Lake phosphorus TMDLs. Public comments on the draft TMDL were requested by December 2010. A final meeting was held on April 28, 2011, during the public comment period. This meeting was held to answer questions about the draft TMDL and to encourage formal public comments.

The draft TMDL was posted online by the MPCA at (http://www.pca.state.mn.us/water/tmdl). The 30-day public comment period was started on April 18, 2011 and ended on May 18, 2011. The MPCA received 1 public comment and adequately addressed this comment. The MPCA submitted all of the

public comments and responses in the final TMDL submittal packet received by the U.S. EPA on June 29, 2011.

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

12. Submittal Letter

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

Comment:
The U.S. EPA received the final Long and Ringo Lake phosphorus TMDL document, submittal letter and accompanying documentation from the MPCA on June 29, 2011. The transmittal letter explicitly stated that the final Long Lake (DNR ID 34-0192) and Ringo Lake (DNR ID 34-0172) TMDLs for excess nutrients were being submitted to U.S. EPA pursuant to Section 303(d) of the Clean Water Act for U.S. EPA review and approval. The letter clearly stated that this was a final TMDL submittal under Section 303(d) of CWA. The letter also contained the name of the watershed as it appears on Minnesota's 303(d) list, and the causes/pollutants of concern. This TMDL was submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130.

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

13. Conclusion

After a full and complete review, the U.S. EPA finds that the TMDLs for Long Lake and Ringo Lake satisfy all of the elements of approvable TMDLs. This approval is for two TMDLs, addressing two waterbodies for recreational use impairments, for Long Lake (DNR ID 34-0192) and Ringo Lake (DNR ID 34-0172).

The U.S. EPA's approval of this TMDL extends to the water bodies which are identified as Long Lake (DNR ID 34-0192) and Ringo Lake (DNR ID 34-0172), with the exception of any portions of the water bodies that are within Indian Country, as defined in 18 U.S.C. Section 1151. The U.S. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. The U.S. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.