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

JUN 14 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 Big Sandy Lake (ID 01-0062) and Lake Minnewawa (ID 70-0033), including support documentation and follow up information. Big Sandy Lake and Lake Minnewawa are located in central Minnesota in Aitkin County. The TMDLs address the Aquatic Recreation Use impairment due to excessive nutrients.

EPA has determined that the Big Sandy Lake and Lake Minnewawa Nutrient 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 L. Johnson, MPCA
Bonnie Finnerty, MPCA

wq-iw8-24g

TMDL: Big Sandy Lake and Lake Minnewawa, Aitkin County, MN
Date: June 13, 2011

DECISION DOCUMENT
FOR BIG SANDY LAKE AND LAKE MINNEWAWA, MINNESOTA, TMDL

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:

Big Sandy Lake (DNR ID 01-0062-00) and Lake Minnewawa (DNR ID 01-0033-00) are located in the Upper Mississippi River basin within the boundaries of the Northern Lakes and Forests (NLF) Ecoregion. Both lakes are within Aitkin County, while the Big Sandy Lake watershed (approximately 260,000 acres) occupies parts of Aitkin, Carlton, and St. Louis counties. The Big Sandy Lake watershed drains into the Mississippi River via the Sandy River in the northwestern corner of Big Sandy Lake (see Figure 2-1 on page 8 of the final TMDL submittal). Lake Minnewawa subwatershed (approx. 13,243 acres) is within the larger Big Sandy Lake watershed. Lake Minnewawa lies southwest of Big Sandy Lake in the western portion of the Big Sandy Lake watershed.

Big Sandy Lake is approximately 6,526 acres in size with an average depth of 16 feet and a maximum depth of 84 feet. The littoral zone, or area of the lake that is 15-feet or less in depth, of Big Sandy Lake is 3,085 acres (47% of the total surface area). The residence time of Big Sandy Lake is approximately 172 days. Big Sandy Lake is a reservoir system, water levels are controlled by the U.S. Army Corps of Engineers (USACE) via a dam at the lake's outlet to the Sandy River. The Sandy River drains to the west, into the Mississippi River. The Mississippi River is located approximately one mile west of Big Sandy Lake.

Lake Minnewawa is approximately 2,355 acres in size with an average depth of 8.2 feet and a maximum depth of 21 feet. The littoral zone of Lake Minnewawa is 2,286 acres or 97% of the total surface area. The residence time of Lake Minnewawa is 2.8 years (2 years and 292 days). Water from Lake Minnewawa flows into Big Sandy Lake via the Sandy River. Lake Minnewawa connects to the Sandy River through a series of agricultural ditches which are to the south of Lake Minnewawa.

Within the Big Sandy Lake watershed are five locations of tribally owned lands. The Mille Lacs Band has four locations within the Big Sandy Lake watershed and the Minnesota Chippewa Indians have one location within the boundaries of the Big Sandy Lake watershed. Two of the Mille Lacs Band's lands are located to the south of Lake Minnewawa and the other two locations are to the north and northeast of Big Sandy Lake (Figure 1-2 in the final TMDL document). The Minnesota Chippewa Indians tribal lands are in the eastern portion of the Big Sandy Lake watershed, just to the northeast of Prairie Lake. In all, the lands governed by tribal authorities with the Big Sandy Lake watershed are 359 acres. The Big Sandy Lake and Lake Minnewawa TMDLs are not applicable to waterbodies or lands located within the boundaries of these tribal lands.

Land Use:

The land use classifications and areal coverage were determined from the United States Geological Survey's (USGS) 2001 National Land Cover Data set. The Big Sandy Lake watershed is dominated by forest and wetland land uses (see Table 1 of this Decision Document). A large portion of the wetlands in the Big Sandy Lake watershed are peat wetlands located in the southern and eastern portions of the watershed. The Lake Minnewawa watershed is dominated by forest, wetland and open water land uses.

Table 1: Land use approximations in Big Sandy Lake watershed and Lake Minnewawa watershed (percentage of total watershed area)

	Big Sandy Lake Watershed	Lake Minnewawa Watershed
Total Watershed Area	260,000	13,243
Percentage of total watershed area	*(%)*	*(%)*
Forest	54.0	51.4
Wetland	29.0	20.3
Pasture/Hay/Cultivated Crops	5.7	4.3
Grassland	4.3	2.0
Open Water	4.1	21.5
Developed (low, medium, & high density)	2.4	0.5

Land uses in the Big Sandy Lake watershed have been altered by draining wetland areas. These draining practices have lead to changes in the hydraulics and nutrient transport cycles within the watershed. The installation of agricultural ditches has been the typical method of draining water from wetland areas. Agricultural ditches have typically lead to increased erosion and soil transport, especially during high flow events.

Land use changes, within the Big Sandy Lake watershed, have also impacted the chemistry of the watershed. Peat soils and wetlands that used to remain flooded are subjected to atmospheric conditions which introduces oxygen into the nutrient rich organic materials in the peat soils. The increase in oxygen exposure can increase the rates of decomposition and can release phosphorus. This phosphorus can be mobilized into the surface water system via storm event flows. Evidence of this process has been observed within surface waters of the Big Sandy Lake watershed.

Problem Identification:

The Big Sandy Lake and Lake Minnewawa nutrient impairments were originally listed on the 2002 Minnesota 303(d) list for excessive nutrients (phosphorus). Excess nutrients in surface waters can lead to frequent algal overgrowth and hinder aquatic recreation activities (swimming, fishing, etc.). The Big Sandy Lake and Lake Minnewawa TMDLs had a target start date of 2006 and were projected to be completed by 2011. Both lakes are currently on the submitted 2010 303(d) list for excessive nutrients and impaired aquatic recreation.

Priority Ranking:

The Big Sandy Lake and Lake Minnewawa TMDLs were given a priority ranking due to: the impairment impacts on public health and aquatic life, the public value of the impaired water resources, the likelihood of completing the TMDLs in an expedient manner, the inclusion of a strong base of existing data, the restorability of the water body, the technical capability and willingness locally to assist with the TMDLs, and the appropriate sequencing of TMDLs within a watershed or basin. The Big Sandy Lake watershed is also an important recreational resource. Big Sandy Lake and Lake Minnewawa are popular locations for aesthetic viewing, canoeing/kayaking, fishing, and swimming. The water quality and recreational use issues have lead to efforts to improve the water quality conditions within the Big Sandy Lake watershed, and to the development of TMDLs for phosphorus derived impairments.

Pollutant of Concern:
The pollutant of concern is phosphorus.

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

Wastewater Treatment Facilities: Wastewater treatment facilities may contribute phosphorus loads to surface waters through facility discharges of treated wastewater. Permitted treatment facilities must discharge treated wastewater according to their National Pollutant Discharge Elimination System (NPDES) permit. The wastewater treatment plants (WWTP) within the Big Sandy Lake watershed are:

- McGregor WWTP *(NPDES# MN0024023)*
- Tamarack WWTP *(NPDES# MN0064564)*
- Cromwell WWTP *(NPDES# MN0051101)*

Stormwater from industrial activities: Phosphorus input via stormwater from industrial activities may contribute phosphorus loading to the Big Sandy Lake watershed. The Big Sandy Lake TMDL assumes that there will be phosphorus inputs from industrial activities and therefore a wasteload allocation (WLA) was assigned to industrial stormwater. The permitted industrial stormwater sources within the Big Sandy Lake watershed are:

- Aitkin Agri Peat Inc. *(NPDES# MN0062375)*
- Premier Horticulture (Peatrex Inc.) *(NPDES# MN005115)*

The Lake Minnewawa subwatershed does not have any permitted dischargers (no WWTP nor industrial stormwater sources) within its subwatershed boundaries.

Nonpoint Source Identification: The potential nonpoint sources to the Big Sandy Lake watershed and Lake Minnewawa subwatershed are:

Internal loading: The release of phosphorus from sediment, the release of phosphorus via physical disturbance from benthic fish (rough fish, ex. carp), 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 Big Sandy Lake and Lake Minnewawa. Phosphorus can build up in the bottom waters of the lake and can be resuspended or mixed into the water column.

Wild rice fields: Phosphorus may be added via: surface runoff from decommissioned wild rice fields, drainage tiles and ditches. These are all potential sources for nutrient transport to Big Sandy Lake and Lake Minnewawa.

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 mobilize nutrients to surface waters from sources such as: 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.

Forest sources: Phosphorus may be added to surface waters in the Big Sandy Lake watershed and Lake Minnewawa subwatershed via runoff from forested areas within the watershed. The runoff can include debris from decomposing vegetation, organic soil particles and silviculture practices.

Non-regulated stormwater runoff: Non-regulated stormwater runoff can add phosphorus to the watershed. The sources of phosphorus in stormwater include: decaying vegetation (leaves, grass clippings, etc.), domestic and wild animal wastes, soil particles, atmospheric deposited particles, and phosphorus containing fertilizers.

Urban/Residential sources: Nutrients may be added via runoff from lake homes directly adjacent the lakes in the watershed. Homes in the 2nd and 3rd tier developments, or those developments set back from the lakeshore, can also contribute phosphorus to the Big Sandy Lake watershed and Lake Minnewawa subwatershed. 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 Big Sandy Lake watershed and Lake Minnewawa subwatershed 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.

Wetland sources: Phosphorus may be added to surface waters by stormwater flows through wetland areas in the Big Sandy Lake watershed and Lake Minnewawa subwatershed. 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.

Stream channel erosion: Phosphorus may be added to surface waters by soil erosion from stream bottoms and streambanks. Phosphorus may be attached to eroded streambank materials and may be mobilized through the transport of sediment and suspended solids.

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

Future Growth:
Significant future development is not expected in the Big Sandy Lake watershed. Existing land use and land coverages utilized in the development of these TMDLs were considered representative of future land use and land coverages. It was also assumed that population conditions would remain stable in the future.

A reserve capacity was included for the Big Sandy Lake TMDL to account for a future discharge value from a future WWTP for the City of Wright, Minnesota, the conversion of existing SSTS to a transferal system tied into a WWTP, and for discharges from construction stormwater. The Lake Minnewawa

TMDL included a reserve capacity value for discharges from construction stormwater. Reserve capacity allocations were not included for existing and future sources from permitted dischargers in the Big Sandy Lake watershed. Any increases in flow capacity from permitted dischargers in this watershed can only be accommodated with proportionate reductions in the effluent concentrations.

The U.S. EPA finds that the TMDL document submitted by the Minnesota Pollution Control Agency (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 Big Sandy Lake and Lake Minnewawa is for aquatic recreation (swimming, fishing, boating, etc.). The two lakes are classified as Class 2B, 3C, 4A, 4B, and 5 waters for the state of Minnesota.

Standards:
The assessment for eutrophic conditions includes a numeric water quality standard and assessment factors from Minnesota Rule 7050. Big Sandy Lake and Lake Minnewawa are within the boundaries of the NLF ecoregion. The MPCA assumes that by meeting the loading capacity values set by the WLA and load allocation (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 lake eutrophication standards for the NLF ecoregion are found in Table 2 of this Decision Document.

Table 2: MPCA Lake Eutrophication Standards for the North Lakes and Forest (NLF) ecoregion

Water Quality Parameter	Units	MPCA Lake Eutrophication Standard (NLF ecoregion)
Total Phosphorus (TP)	*(µg/L)*	TP < 30
Chlorophyll-a (chl-a)	*(µg/L)*	chl-a < 9.0
Secchi disc (SD)	*(m)*	SD > 2.0

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:

A historical water quality review was completed using monitoring data from Big Sandy Lake and Lake Minnewawa to gain a better understanding of the baseline water quality conditions in each lake. The MPCA used a linear regression model from Chiaudani and Vighi (C&V) to predict growing season total phosphorus loads. The C&V model uses alkalinity values to generate a total phosphorus prediction via the equation ($\text{Log } P = 1.44 + 0.33\ (\pm\ 0.10)\ \text{Log } MEI_{alk}$), where P is the phosphorus value and MEI_{alk} is a morphoedaphic index value for alkalinity developed by C&V from their studies of 53 minimally impacted lakes in Europe, Canada and the United States. The C&V modeling results were useful to the MPCA for setting baseline conditions for the Big Sandy Lake and Lake Minnewawa TMDLs.

The MPCA used a second historical water quality assessment tool to gain additional insight into water quality baseline conditions (historical water quality conditions) in the Big Sandy Lake watershed. The Minnesota Lake Eutrophication Analysis Procedure (MINLEAP) model is based on physical parameters (i.e. lake surface area, mean depth, watershed area and Minnesota ecoregion) and uses these inputs to estimate historical water quality conditions. The model was run and the input parameters were adjusted after comparing the results to empirical data from a sediment core collected from Big Sandy Lake. The TP measurements from the analyzed sediment core provided values which modified the MINLEAP model inputs. The measurements gathered from the sediment core also helped validate the MINLEAP estimates of TP. At the end of this process, the MINLEAP modeling results matched the values from the sediment core and estimated the baseline TP conditions in Big Sandy Lake to be approximately 40 μg/L.

Mississippi River backflow events were also investigated during the development of the TMDL for Big Sandy Lake. Backflow events typically occur when the water level in the Sandy River is above the water level in Big Sandy Lake, and also above the top of the dam in the northwestern corner of Big Sandy Lake. Under these conditions water flows from the Sandy River, which is hydrologically connected to the Mississippi River, into Big Sandy Lake. After examining backflow event data from the USACE it was determined that backflow contributions of TP were more significant on the short term basis than on the annual loading scale.

Watershed loading calculations and in-lake water quality measurements were used to calculate phosphorus source load impacts and nutrient reduction values necessary for Big Sandy Lake and Lake Minnewawa to meet water quality standards (WQS). Water quality sampling data, collected throughout the Big Sandy Lake watershed, was used to estimate nutrient loading values. Samples were collected during the 2008 growing season at seven different locations within the Big Sandy Lake watershed. Flow measurements were collected at four of the seven water quality monitoring locations. Subwatershed phosphorus yields were estimated from the water quality monitoring data and flow measurements. Phosphorus yields were scaled based on the contributing subwatershed area.

The 2008 growing season (mid-May or June through September) was used as a baseline for modeled water quality conditions in Big Sandy Lake and Lake Minnewawa. The 2008 water year represented an average year in terms of precipitation and it also was the year with the most recent and complete watershed and lake monitoring data. The MPCA determined that the 2008 water year was a representative sample of total phosphorus loading to the Big Sandy Lake watershed and that this time period would be appropriate for modeled scenarios focusing on phosphorus loading from nonpoint sources.

Phosphorus yields for the subwatersheds that were not monitored by the water quality sampling efforts of 2008 were estimated. The MPCA used phosphorus export coefficients allocated to the different land use classifications within the Big Sandy Lake watershed to set phosphorus yields. The export coefficients were matched with the land use classifications for each subwatershed. The land use classifications were determined from the USGS 2001 National Land Cover Data Set. The MPCA was able to estimate phosphorus loading from these unmonitored subwatersheds using the export coefficients and runoff relationships from the FLUX model.

The BATHTUB model was utilized to link phosphorus loads with in-lake water quality and to calculate a loading capacity value (TMDL) for each lake. Phosphorus loads from permitted sources (NPDES permitted sources), atmospheric sources, internal sources and watershed runoff sources (i.e. the subwatershed phosphorus yields) were used as inputs for the model. The BATHTUB model used the phosphorus loads to determine the in-lake concentrations of phosphorus and to calculate the TMDLs. The BATHTUB model applied steady-state water and nutrient balance calculations based on lake morphometry and tributary inputs.

The watershed phosphorus loads for the 2008 water year were estimated for each lake using the FLUX model and via land use based runoff coefficients. These phosphorus loads (derived from export coefficient and FLUX calculations) were then used with observed in-lake data in the BATHTUB model to determine which phosphorus sedimentation model was the most appropriate for the given conditions. Big Sandy Lake used the Canfield and Bachmann Reservoir model with dispersion and Lake Minnewawa used the Canfield and Bachmann Reservoir without dispersion.

The Big Sandy Lake BATHTUB modeling results were calibrated using 2008 climatic and water quality data. The Lake Minnewawa BATHTUB modeling results were also calibrated with the 2008 climatic and water quality data. The loading capacities for each lake were determined on an annual basis (kg/yr) before the annual loads were transformed into daily loads by dividing the annual loads by 365 (kg/day). Loading capacity values were separated into WLA and LA for each lake.

WLAs were calculated for the Big Sandy Lake. Lake Minnewawa does not have any permitted dischargers within its watershed boundaries. WLAs for the Big Sandy Lake watershed were calculated for; McGregor WWTP, Tamarack WWTP, Cromwell WWTP, AgriPeat and Premier Horticulture. The WLA for each source was set based on the state discharge limits for each individual discharger (see Table 5 of this Decision Document). If no limits were set for phosphorus, a value of 1 mg/L TP was used in combination with the average flow capacity of the facility (as indicated in the permit) to calculate a loading capacity for that facility.

A 76.5 percent phosphorus delivery factor was applied to the total permitted phosphorus load for the Big Sandy Lake TMDL to estimate the total loading capacity, including the WLAs. The 76.5 percent delivery factor was based on a comparison between the observed phosphorus load (2008) and the phosphorus load predicted from the phosphorus land use export coefficient model. The 23.5 percent difference represents phosphorus that is removed before reaching Big Sandy Lake, or phosphorus that is removed by intermediate lakes and wetlands. No reserve capacity was included for existing and future sources from permitted dischargers. The final WLA for the Big Sandy Lake TMDL was the sum of the individual WLAs found in Table 5 of this Decision Document.

The load allocations for Big Sandy Lake and Lake Minnewawa were assigned to internal, atmospheric and watershed nonpoint source loads. Reductions for nonpoint source loads were estimated from existing phosphorus loading rates and then compared against background loading rates from the MINLEAP estimations. Nonpoint source calculations were estimated from existing phosphorus loading rates, based on monitoring data from the 2008 water year, and the internal source calculations were estimated using the BATHTUB model.

The Big Sandy Lake internal source calculation was estimated using a calibrated BATHTUB in-lake model and the loading capacity from the 2008 water year. The Lake Minnewawa internal phosphorus loading was set to zero because the BATHTUB modeling revealed that internal loading reductions were not necessary to meet the loading capacity targets for Lake Minnewawa. In the process of calculating internal phosphorus loads it was assumed that the SSTS in both Big Sandy Lake and Lake Minnewawa were fully conforming to water quality guidelines and no loading reductions were necessary in these systems. Each lake was assigned unique nonpoint watershed sources for their respective TMDLs.

Table 3: Big Sandy Lake Total Phosphorus Wasteload and Load Allocations

Watershed TP Sources	Existing TP Load	TMDL Allocation	Daily TMDL Allocation	Percent Reduction of Existing TP Load
	(kg)	*WLA (kg)*	*WLA (kg/day)*	(%)
Permitted Discharges	273	259	0.71	5.1%
Total Wasteload Sources	**273**	**259**	**0.71**	**5.1%**
Watershed TP Sources	Existing TP Load	TMDL Allocation	Daily TMDL Allocation	Percent Reduction of Existing TP Load
	(kg)	*LA (kg)*	*LA (kg/day)*	(%)
Internal Sources	4,709	0	0.00	100%
Nonpoint watershed sources				
Agriculture	2,284	1,709	4.7	25%
Forest	5,886	5,827	16	1%
Developed	1,153	655	1.8	43%
Open Water/Wetlands	4,322	4,322	12	0%
Stream Channel Erosion	1,522	875	2.4	43%
Atmospheric Sources	443	443	1.2	0%
Total Load Sources	**20,319**	**13,831**	**38**	**32**
City of Wright WWTP Reserve Capacity (RC)	0	44	0.12	0
Other Reserve Capacity (RC)	0	33	0.09	0
Margin of Safety (MOS)	**0**	**746**	**2.0**	**0**
Overall Source Total	**20,592**	**14,913**	**41**	**28**

Table 4: Lake Minnewawa Total Phosphorus Wasteload and Load Allocations

Watershed TP Sources	Existing TP Load	TMDL Allocation	Daily TMDL Allocation	Percent Reduction of Existing TP Load
	(kg)	*WLA (kg)*	*WLA (kg/day)*	(%)
Permitted Discharges	0	0	0	0.0%
Total Wasteload Sources	**0**	**0**	**0**	**0.0%**
Watershed TP Sources	Existing TP Load	TMDL Allocation	Daily TMDL Allocation	Percent Reduction of Existing TP Load
	(kg)	*LA (kg)*	*LA (kg/day)*	(%)
Internal Sources	0	0	0.00	0%
Nonpoint watershed sources				
Agriculture	57	43	0.12	25%
Forest	214	212	0.58	1%
Developed	344	187	0.51	46%
Open Water/Wetlands	149	149	0.41	0%
Atmospheric Sources	178	178	0.49	0%
Total Load Sources	**942**	**769**	**2.1**	**18**
Reserve Capacity (RC)	**0**	**0.7**	**0.0**	**0**
Margin of Safety (MOS)	**0**	**40**	**0.11**	**0**
Overall Source Total	**942**	**809**	**2.2**	**14**

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

4. Load Allocations (LAs)

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

Comment:

Load allocations were calculated for each lake and subdivided into the following nonpoint source loads: internal sources, agriculture nonpoint sources, forest nonpoint sources, non-regulated stormwater runoff from developed lands, open water/wetland nonpoint sources and atmospheric nonpoint sources. The LA values for each lake can be found in Tables 3 and 4 of this Decision Document.

Potential nonpoint source loading reductions were calculated for the Big Sandy Lake TMDL and the Lake Minnewawa TMDL. These reductions were determined from comparing existing loads, from the 2008 monitoring data, to the background nutrient loading estimates. The background nutrient loading estimates were the values based off of the MINLEAP modeling efforts. The reductions projected for nonpoint sources in these TMDLs will be made by reductions to: internal sources (100% for Big Sandy

Lake and 0% for Lake Minnewawa), agriculture (25% for both lakes), nutrient reductions from developed lands (43% for Big Sandy Lake and 46% for Lake Minnewawa), and stream channel erosion (43% for Big Sandy Lake). These nonpoint source reductions will be addressed by the installation of Best Management Practices (BMPs) and other measures employed via the watershed management plan.

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

5. Wasteload Allocations (WLAs)

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

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

Comment:

The wasteload allocations (WLA) section is found on pages 52-53 of the final TMDL document. WLA were calculated for the Big Sandy Lake TMDL. Lake Minnewawa does not have any permitted dischargers within its' watershed boundaries, so no WLAs were determined. The WLAs for the Big Sandy Lake watershed were calculated for: McGregor WWTP, Tamarack WWTP, Cromwell WWTP, AgriPeat and Premier Horticulture. The wasteload allocations for each facility were set based on the state discharge limits for each individual discharger (see Table 5 of this Decision Document).

The current annual phosphorus load was determined by summing the annual phosphorus loads from each of the individual NPDES permitted facilities in the Big Sandy Lake watershed. The current annual permitted phosphorus load was estimated to be 357 kg/year (0.978 kg/day) (see Table 5 of this Decision Document). The MPCA estimated that the annual phosphorus load (357 kg/yr) would be reduced by 5 percent due to changes in the TP limits set in the NPDES permitting process. A 5 percent reduction from the current annual phosphorus load of 357 kg/year decreases the annual load to 339 kg/year. The annual phosphorus load was transformed into a daily phosphorus load (0.93 kg/day) by dividing the annual load by 365.

To determine the daily phosphorus load which reaches Big Sandy Lake from the permitted facilities, the 76.5 percent phosphorus delivery factor was applied to the load (0.93 kg/day). The delivery factor reduced the daily phosphorus load to 0.71 kg/day. The phosphorus delivery factor was incorporated to represent phosphorus removed in the Big Sandy Lake watershed by intermediate lakes and wetlands (See Section 3 of this Decision Document). The effective WLA, or TP load reaching Big Sandy Lake from the permitted sources within the Big Sandy Lake watershed, was set at 0.71 kg/day.

Reserve capacities were included for the Big Sandy Lake watershed to allow for a future WWTP and for converting SSTS wasteload or load allocations to WWTP wasteload allocation. The future WWTP is planned for the City of Wright, Minnesota which is in the southeastern portion of the Big Sandy Lake watershed. The reserve capacity for this future facility was set at 44 kg/year (0.12 kg/day) (see Table 3 of this Decision Document). The conversion of SSTSs in the Big Sandy Lake watershed to WWTP resulted in a reserve capacity of 31 kg/year (0.09 kg/day).

Table 5: Phosphorus Loads From Monitored Permitted Dischargers, 10/1/07 - 9/30/08

Permitted Discharger	Current TP Load	Current Flow	WLA					Tributary Watershed
			Flow	TP Limit#	TP Load	Permitted TP Load	Effective WLA	
	(kg / yr)	*(acre - ft)*	*(mgd)*	*(mg / L)*	*(kg / yr)*	*(kg / day)*	*(kg / day)*	
McGregor WWTP	232	76	0.0729	1*	101*	0.28	0.21	Sandy River
Tamarack WWTP	33	4	0.007	3.5	34	0.09	0.07	Sandy River
AgriPeat	10	66	--	1	22	0.06	0.05	Sandy River
Cromwell WWTP	42	27	0.052	1	71.8*	0.20	0.15	Prairie River
Premier Horticulture	40**	181**	0.017	1*	110***	0.30	0.23	Prairie River
Total	**357**	**353**	**NA**	**NA**	**339**	**0.93**	**0.71**	

* Permit limits estimated using 1 mg/L discharge limit

** Values are estimated due to erroneous DMR reports for 2008

*** Value estimate of average yearly load for period of 2005-2009

Determined in the NPDES permitting process

All phosphorus loads are for end of pipe

Lake Minnewawa:

The Lake Minnewawa watershed does not have any permitted dischargers within its boundaries. Its WLA value was set to zero (see Table 4 of this Decision Document). A reserve capacity value was calculated for the Lake Minnewawa TMDL. This capacity was allocated for construction stormwater.

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 3.6.3 of the final TMDL submittal outlines the Margin of Safety (MOS) used in the Big Sandy Lake and Lake Minnewawa TMDLs. The MOS for the Big Sandy Lake and Lake Minnewawa TMDLs were set as an explicit value at five percent of the total loading capacity. The MPCA determined this level of the MOS was appropriate because of the large amount of sampling data gathered in the Big Sandy Lake watershed. The robust sampling data set provides a lower level of uncertainty in setting baseline water quality conditions and provides a level of confidence for the data used in the modeling efforts of these TMDLs. The baseline water quality conditions were verified using the MINLEAP and a historical reconstruction of TP conditions by using TP measurements from a sediment core from the Big Sandy Lake. The 2008 water quality data for the Big Sandy Lake watershed was determined to be the most complete and appropriate for model use. The BATHTUB modeling results for both lakes were calibrated using this data set.

Reserve capacities were also included for the Big Sandy Lake and Lake Minnewawa TMDLs. Reserve capacities were set to account for future permitted source inputs to the Big Sandy Lake watershed. These future sources included allocations for an anticipated WWTP, the conversion of loads for SSTS to WWTP, and construction stormwater.

The U.S. EPA finds that the MOS is appropriate for the Big Sandy Lake and Lake Minnewawa TMDLs and satisfies 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 this TMDL as described in Section 3.8, "Seasonal Variation". Water quality monitoring data suggested that TP concentrations vary significantly over the growing season (mid-May or June through September) in the Big Sandy Lake watershed. Typically the TP concentrations peaked in the later summer months. The growing season was determined to be the "critical period" for Big Sandy Lake and Lake Minnewawa TMDLs. The critical period corresponds to conditions when phosphorus concentrations peak and state water quality standards are violated. The lake response modeling focused on meeting the water quality standards during the critical period. By

meeting the water quality standards during the critical period, it was assumed that the loading capacity values would be protective of water quality during the remainder of the calendar year (October through May).

The MPCA determined that the water quality in the Big Sandy Lake and Lake Minnewawa responds to long term changes, such as changes in annual loads. The MPCA therefore used annual load calculations in setting the WLA and LA. The NLF eutrophication standards are set for the average values of the growing season. The WQS for both of these TMDLs were designed to meet the eutrophication standards during the period of the year where the frequency and severity of algal growth is the greatest.

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 Big Sandy Lake and Lake Minnewawa TMDL document outlines reasonable assurance activities in Sections 6.0 (page 68 of the final TMDL document). The loading reduction strategies will be implemented over the next several years. The implementation efforts will 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 Big Sandy Lake watershed. State efforts will be via NPDES permit enforcement, Clean Water Legacy Act grant money, and the Clean Water Partnership program.

Table 6 shows the 2008 average growing season concentration for the three main water quality parameters in Big Sandy Lake and Lake Minnewawa. The BATHTUB model predicted that 28% phosphorus loading reduction in Big Sandy Lake would be necessary to achieve the NLF water quality standards. The BATHTUB model predicted that 9% phosphorus loading reduction for Lake Minnewawa would be necessary to achieve the NLF water quality standards.

Table 6: NLF Eutrophication Standards and 2008 Summer Averages for Big Sandy Lake and Lake Minnewawa

Water Quality Parameter	MPCA Lake Eutrophication Standards (NLF)	Big Sandy Lake 2008 Summer Average Water Quality (Area Weighted)	Lake Minnewawa 2008 Summer Average Water Quality
Total Phosphorus (µg/L)	30.0	38.0	31.0
Chlorophyll-a (µg/L)	9.0	9.8	9.6
Secchi Disc (m)	2.0	1.0	1.5

The MPCA will work with the Aitken County Soil and Water Conservation District (SWCD) over the course of the next several years to implement various BMPs and other strategies to reduce nutrient loading into the Big Sandy Lake watershed. Water quality monitoring efforts will assess the success or failure of these strategies. Watershed managers 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 Big Sandy Lake watershed.

- Assessment of already installed BMP practices and possible improvements to existing BMPs to maintain current nutrient loading levels into Big Sandy Lake and Lake Minnewawa.
- Continued water quality monitoring efforts to ensure that watershed management strategies are effective and efficient in reducing nutrient inflows to Big Sandy Lake and Lake Minnewawa.
- Feedback from stakeholders, government agencies, technical experts and citizens on monitoring efforts and BMP improvements.
- New development, redevelopment, industrial or construction projects within the Big Sandy 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 MS4 communities and those sites under construction or industrial stormwater permit, must review the adequacy of local Stormwater Pollution Prevention Plans (SWPPPs) to ensure that each plan meets WLA set by the Big Sandy and Lake Minnewawa 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 MPCA estimated that the annual phosphorus load would be reduced by approximately 5 percent due to changes in the TP limits set in the NPDES permitting process. This was incorporated into the calculation of the WLA for the Big Sandy Lake TMDL.

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 4.0-4.1 of the TMDL submittal outlines the planned water monitoring efforts and BMP installation and testing that is planned for Big Sandy Lake and Lake Minnewawa.

The MPCA recommends continuing efforts to monitor water quality parameters in Big Sandy Lake and Lake Minnewawa. Water quality has been monitored for the past 30 years and continuing to measure water quality would be beneficial toward building a stronger understanding of the chemistry in the lake environment. Water quality monitoring will also assess water quality improvements within the Big Sandy Lake watershed, test the efficiency of water quality improvement projects (i.e. BMPs), and improve the understanding of the dynamics of phosphorus cycling within the lakes.

The MPCA advocates that the following water quality parameters be measured once every two weeks in Big Sandy Lake and Lake Minnewawa from May through September: dissolved oxygen (DO), dissolved phosphorus, pH, temperature, TP, and turbidity. If the funding is available to do further water quality analyses, the MPCA believes that chl-a, SD, color, and dissolved organic carbon (DOC), should also be measured in Big Sandy Lake and Lake Minnewawa. Continuing to measure flow and total suspended solids at the watershed monitoring stations in the larger Big Sandy Watershed was also recommended by the MPCA.

The MPCA advises adding a monitoring site at the outlet of a peat wetland. This site would measure nutrient export from peat wetland systems and provide watershed managers with a better understanding of nutrient mobilization and its impact on water quality. Phytoplankton (microscopic plant organisms), zooplankton (microscopic plankton that typically feed on phytoplankton), macrophytes (rooted aquatic plants) and fishery surveys will enable watershed managers to understand and measure how BMP phosphorus removal practices are impacting local ecological communities. It is recommended that the biological surveys be conducted during years which water quality measurements are also collected, thus linking the 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 5.0 of the TMDL submittal. These implementation strategies were designed to reduce phosphorus loadings to Big Sandy Lake and Lake Minnewawa and allow the in lake phosphorus concentrations to meet the eutrophication WQS. Reducing external phosphorus sources will improve internal phosphorus concentrations and will lead to improvements in water quality. These implementation efforts are designed to be flexible and to be adaptive to the water quality changes in the lakes. Phosphorus reduction efforts involve the following efforts:

- *Public Education Efforts:* Public programs should be developed to provide guidance to the general public on water quality issues and actions that the general public can take to protect the overall health of Big Sandy Lake and Lake Minnewawa.
- *Responsible Environmental Planning:* Local governments should establish integrated land and water resource planning efforts that focus on low impact development, planned/orderly growth, anti-degradation requirements, and minimization of pollutant loads and erosion.
- *Improved Treatment of Stormwater:* The MPCA should continue to administer the requirements of the Clean Water Act (CWA) which encourage stormwater management via Municipal Separate Storm Sewer Systems (MS4s), construction stormwater permits, and industrial stormwater permits.
- *Improved Management of Livestock:* Livestock managers should be encouraged to implement measures to protect riparian areas. Managers should install fencing near stream environments to prevent direct access to these areas. Drainage from confined livestock areas should be directed to nutrient reduction BMPs. Manure has also been identified as a source of nutrients. Nutrients

can be transported to surface water bodies via stormwater runoff. Improved practices in collecting, storing and managing manure can ensure that minimal impacts of nutrients enter surface waters.

- *Improved Agricultural Drainage Practices:* A review of local agricultural drainage networks should be completed to examine how improving drainage ditches and drainage channels could be reorganized to reduce the influx of nutrients to the surface water bodies in the Big Sandy Lake watershed. The reorganization of the drainage network could include the installation of drainage ditches or sediment traps to encourage nutrient settling during high flow events.
- *Decommissioning of Wild Rice Farms:* Wild rice farms near McGregor, Minnesota in the Big Sandy Lake Watershed are expected to be decommissioned. Efforts should be made to ensure that the farms are closed in an appropriate manner to limit the influx of phosphorus to the surface water system.
- *Soil Testing at Turf Farms and Golf Courses:* Efforts should be made to encourage managers of turf farms and golf courses to test their soils before applying fertilizer or nutrients. Soil testing will provide information to the managers to make sound agronomic, economic and environmental decisions.
- *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 Big Sandy Lake watershed.
- *Stream Channel and Lakeshore Erosion:* An assessment of stream channel and lakeshore erosional areas should be completed to evaluate areas where erosion control strategies could be implemented in the Big Sandy Lake watershed. Reducing stream channel and lakeshore erosion may prevent nutrient influxes in improve water quality.
- *Internal Load Reductions:* Internal phosphorus loads should be evaluated to determine the effectiveness of external nutrient reduction strategies.
- *Mississippi River Backflow Control:* Backflow from the Mississippi River has the potential to introduce nutrients to Big Sandy Lake and affect water quality in this system on the short term. A review of the Big Sandy Lake watershed outlet, the Sandy River, under Mississippi River flooding conditions could provide understanding toward minimizing water quality impacts during flooding events.

The U.S. 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:
The final TMDL submittal addresses public participation in Section 7.0. Various efforts were made to engage public interest groups during the development of Big Sandy Lake and Lake Minnewawa TMDLs. The MPCA and the Aitken County SWCD hosted a series of public meetings throughout the development of the TMDLs to discuss the project efforts with watershed representatives and interested stakeholder groups. The first meeting was held in August 2008 and the second meeting was in September 2009, both meetings were held McGregor, Minnesota.

The draft TMDL was posted online by the MPCA at (http://www.pca.state.mn.us/water/tmdl). Copies of the draft TMDL were available upon request. The 30-day public comment period was started on August 2, 2010 and ended on September 1, 2010. The MPCA received three public comments and adequately addressed these comments. The MPCA submitted all of the public comments and responses in the final TMDL submittal packet received by the U.S. EPA on May 11, 2011.

The U.S. EPA finds that the document submitted for Big Sandy Lake and Lake Minnewawa TMDLs 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 Big Sandy Lake and Lake Minnewawa nutrient TMDL document, submittal letter and accompanying documentation from the MPCA on May 11, 2011. The transmittal letter explicitly stated that the final TMDLs for Big Sandy Lake (DNR ID 01-0062-00) and Lake Minnewawa (DNR ID 01-0033-00) 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 document submitted for the Big Sandy Lake TMDL and Lake Minnewawa TMDL 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 Big Sandy Lake (DNR ID 01-0062-00) and Lake Minnewawa (DNR ID 01-0033-00) satisfy all of the elements of approvable TMDLs. This approval is for two TMDLs, addressing two waterbodies for recreational use impairments, for Big Sandy Lake and Lake Minnewawa.

The U.S. EPA's approval of these TMDLs extend to the water bodies which are identified as Big Sandy Lake (DNR ID 01-0062-00) and Lake Minnewawa (DNR ID 01-0033-00), 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.