



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

77 WEST JACKSON BOULEVARD

CHICAGO, IL 60604-3590

APR 13 2010

REPLY TO THE ATTENTION OF:

WW-16J

Mr. Russ Rasmussen  
Director, Bureau of Watershed Management  
Wisconsin Department of Natural Resources  
101 S. Webster Street  
P.O. Box 7921  
Madison, Wisconsin 53707

RECEIVED

APR 23 2010

BUREAU OF WATERSHED MGMT

Dear Mr. Rasmussen:

The U. S. Environmental Protection Agency has reviewed the final Total Maximum Daily Load (TMDL) submitted by the Wisconsin Department of Natural Resources (WDNR) for Little Lake Wissota embayment of Lake Wissota, Chippewa County, Wisconsin. The TMDLs are for phosphorus and sediment which address the eutrophication and pH criteria exceedance impairments as identified on Wisconsin's 303(d) list.

Based on this review, EPA has determined that Wisconsin's TMDLs for phosphorus and sediment meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations set forth at 40 CFR Part 130. Therefore, EPA hereby approves one TMDL for phosphorus and one TMDL for sediment addressing two impairments in Little Lake Wissota. The statutory and regulatory requirements, and EPA's review of Wisconsin's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Wisconsin's effort in submitting this TMDL and look forward to future TMDL submissions by the State of Wisconsin. 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: Nicole Clayton, WDNR

Approval Date: April 13, 2010

**Decision Document for Approval of  
Little Lake Wissota Total Maximum Daily Loads  
for Phosphorus and Sediment**

*Section 303(d) of the Clean Water Act (CWA) and the United States Environmental Protection Agency's (EPA's) implementing regulations at 40 CFR Part 130 describe the statutory and regulatory requirements for approvable total maximum daily loads (TMDLs). Additional information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) of the CWA and EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation. Use of the term "should" below denotes information that is generally necessary for EPA to determine if a submitted TMDL is approvable.*

**1. Identification of Water body, Pollutant of Concern, Pollutant Sources, and Priority Ranking**

*The TMDL submittal should identify the water body as it appears on the State's/Tribe's 303(d) list, the pollutant for which the TMDL is being established, and the priority ranking of the water body. The TMDL submittal should include an identification of the point and nonpoint sources of the pollutant of concern, including location of the source(s) and the quantity of the loading, e.g., lbs/per day. The TMDL should provide the identification numbers of the National Pollutant Discharge Elimination System (NPDES) permits within the water body. Where it is possible to separate natural background from nonpoint sources, the TMDL should include a description of the natural background. This information is necessary for EPA's review of the load and wasteload allocations, which are required by regulation.*

*The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as: (1) the assumed distribution of land use (e.g., urban, forested, agriculture); (2) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources; (3) present and future growth trends, if taken into consideration in preparing the TMDL; and (4) 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.*

**Comments and Assessment:**

**Identification of Water Body:** Little Lake Wissota is a 400-acre, relatively shallow, eutrophic embayment of Lake Wissota. Lake Wissota is an impoundment of the Chippewa River, near Chippewa Falls, in Chippewa County. Lake Wissota has two embayments, Little Lake Wissota and Moon Bay. The TMDL is only addressing impairments in Little Lake Wissota. Little Lake Wissota is separated from the main body of Lake Wissota by a causeway with a narrow opening. See Figures 1 and 2 in TMDL report and Figure 1 in Appendix 2 of the TMDL report for maps of Little Lake Wissota's location in relation to Lake Wissota.

Little Lake Wissota has a maximum depth of approximately 40 feet, a mean depth of 16.7 feet and a drainage area of approximately 67 square miles. Paint Creek and Stillson Creek are the two main tributaries to Little Lake Wissota. The lake is located in the North Central Hardwood Forest ecoregion.

Wisconsin first identified Lake Wissota as impaired in 1998 due to eutrophication and pH criteria exceedances. Until the development of this TMDL, Wisconsin presented the impairments for Lake Wissota, Little Lake Wissota and Moon Bay as one. During the development of this TMDL, the State looked more discretely at the impairments and determined that eutrophication and pH criteria exceedances are impairments specific to Little Lake Wissota.<sup>1</sup> This TMDL is only addressing the impairments associated with Little Lake Wissota.

Currently, the 2008 303(d) list does not discretely identify Lake Wissota, Little Lake Wissota and Moon Bay as separate assessment units with discrete impairments, however, the proposed 2010 303(d) list does. EPA has considered the information in past approved 303(d) lists, the proposed 2010 303(d) list, and information contained in the final Little Lake Wissota TMDL report and its supporting documentation and concurs that it is reasonable for the State to submit a TMDL for review and approval solely for the Little Lake Wissota embayment. At this time, EPA is not making a final decision on Wisconsin's proposed 2010 303(d) list, however, information from the proposed 2010 303(d) list along with past approved 303(d) lists were considered to present the most accurate identification of the Little Lake Wissota assessment unit.

#### LITTLE LAKE WISSOTA

Official name: Lake Wissota                      Local Name: Little Lake Wissota  
WATERS ID: 1521682                      WBIC: 2152800                      Wisconsin Unique ID/TMDL ID: 538  
Lake surface area: 363.87 acres  
Pollutants: phosphorus and sediment  
Impairments: eutrophication and pH

*Pollutant of Concern:* Wisconsin 303(d) lists and the TMDL report identify phosphorus and sediment as the pollutants of concern. EPA agrees with the State's decision to establish TMDLs for both of these pollutants of concern because phosphorus is bound to the sediment particles entering Little Lake Wissota. Once in the lake system, sediment has the capacity to transfer phosphorus to the lake bottom. The relatively shallow depth of Little Lake Wissota along with the phosphorus-laden sediments and excessive water column phosphorus levels cause the lake to experience excessive algal blooms during the growing season, i.e., May through September. Algal blooms in the lake are often accompanied by exceedances of the Wisconsin water quality criteria for pH. The elevated lake pH levels are due to removal of carbon dioxide from water during photosynthesis. The reduction in carbon dioxide levels during daylight causes an increase in pH. Reduction in sediment loadings will reduce phosphorus levels and the corresponding reduction in phosphorus levels will cause a reduction in maximum pH levels.

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<sup>1</sup> See March 31, 2009 series of electronic mail messages from Kenneth Schreiber, WDNR, to Lisa Helmuth, WDNR and others.

*Land Use:* Table 2 in the TMDL report and Appendix 2 of the TMDL report provide information about land use in the Little Lake Wissota watershed. The State used the 1992 WISCLAND land cover GIS layer to determine the land cover within the watershed. The 1992 WISCLAND is the Wisconsin Initiative for Statewide Cooperation on Landscape Analysis and Data, a partnership of public and private organizations seeking to facilitate landscape GIS data development and analysis. The 1992 data was derived primarily from 1992 satellite imagery, having a minimum mapping unit of 5 acres. Land cover types were summarized to indicate how much of each land cover is present over an area of interest, such as a county or watershed. The State made adjustments to the 1992 WISCLAND land cover GIS layer to account for land use changes which occurred in the watershed between 1992 and 2003.

*Sources of Pollutant Loads:* Phosphorus and sediment enter Little Lake Wissota primarily through rainfall and runoff in the watershed. Phosphorus enters tributaries and Little Lake Wissota as dissolved phosphorus and bound to sediment during rainfall and runoff events. Sediment deposited in Little Lake Wissota contributes phosphorus to the water column via recycling under anoxia or high pH conditions. Both point sources and nonpoint sources are present in the watershed.

Permitted point sources include storm water outfalls in the Town of Lafayette storm water management area and storm water from industrial facilities and construction sites. Wisconsin Pollutant Discharge Elimination System (WPDES) permit WI-S050121 regulates discharges from storm water outfalls in the Town of Lafayette. Using the Source Loading and Management Model (SLAMM)<sup>2</sup>, the State estimated the existing annual load of phosphorus and sediment from the Town of Lafayette's storm water conveyance system to be 60 lbs of phosphorus and 10 tons of sediment. SLAMM is a sequential event based model that simulates rainfall runoff to analyze urban drainage areas. SLAMM determines the runoff from a series of normal rainfall events and calculates the pollutant loading created by these rainfall events.

Industrial storm water discharges within the watershed are subject to WPDES general storm water permits. All construction sites greater than one acre that are in the watershed are also regulated by WPDES general storm water permits. Applicable WPDES general storm water permits are:

WI-S067831-3	Construction Site Storm Water Runoff
WI-S067849-2	TIER 1 Storm Water Associated with Industrial Activity
WI-S067857-2	TIER 2 Storm Water Associated with Industrial Activity
WI-S059145-1	Dismantling of Vehicles for Parts Selling and Salvage
WI-S058831-1	Recycling of Scrap and Waste Materials
WI-0046515-5	Nonmetallic Mining Operations

Runoff from various land covers within the watershed is the primary nonpoint source for both sediment and phosphorus. Cropland runoff is a primary concern. Crop growth has an impact on the amount of biomass and residue remaining in the fields and this biomass and residue is a contributing factor in sediment transport. Although considered by the State to be relatively small sources of

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<sup>2</sup> Refer to response to comment 25 in WDNR's response to EPA comments for more information from WDNR on its selection of SLAMM.

phosphorus when compared to cropland runoff, other agricultural sources of phosphorus include barnyards and milk house waste.<sup>3</sup> Tables 2 and 3 of the TMDL report show the percentages of land uses within the watershed. Table 3 of the TMDL report shows measured nonpoint source sediment and phosphorus loads and yields by land use. The measured loads were based on data collected by the Wisconsin Department of Natural Resources (WDNR) and the U.S. Army Corp of Engineers (USACE) in 2001-2002. The measured results are only representative of loads from the Paint Creek watershed not the entire Little Lake Wissota watershed. The State used the Soil and Water Assessment Tool (SWAT) to further define current annual loads from nonpoint sources for the entire Little Lake Wissota watershed, including Paint Creek watershed, Stillson Creek watershed and direct runoff to Little Lake Wissota. The SWAT modeled current loads for phosphorus and sediment can be found in Tables 5 and 6 of the TMDL report, respectively.

*Future Growth:* The State considered future growth by including a wasteload allocation (WLA) as reserve capacity for general permits.

*Priority Ranking:* According to Wisconsin's 303(d) list, Little Lake Wissota has a high priority ranking. A ranking of high indicates likely completion of a TMDL within a two-year time period.

EPA finds that the Little Lake Wissota TMDLs submitted by the State of Wisconsin adequately identify the water body, pollutants of concern, pollutant sources, priority ranking, and important assumptions made in developing the TMDLs.

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

*The TMDL submittal must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the water body, the applicable numeric or narrative water quality criterion, and the antidegradation policy. (40 CFR §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.*

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<sup>3</sup> See WDNR response to EPA comment 39.

Comments and Assessment:

*Use Designation and Applicable Water Quality Standard:* The goals of the Little Lake Wissota TMDLs are to reduce phosphorus and sediment loading to the lake to address pH criteria exceedances and decrease algal blooms during the growing season to a level sufficient to meet applicable water quality standards (WQS) and the lake's designated use. Wisconsin does not have numeric WQSs for phosphorus or sediment. Nor does the State have numeric WQS specific to algal blooms. The State does have numeric pH criteria.

The designated use applicable to Little Lake Wissota as set forth at Chapter NR 102.04(3) intro., and (b) of the Wisconsin Administrative Code (WAC) is warm water sport fish communities. To meet this designated use, WDNR has identified the narrative standard set forth at Chapter NR 102.04(1) of the WAC as the applicable standard for sediment and phosphorus. The standard states in part, "Substances that will cause objectionable deposits on the shore or in the bed of a body of water, shall not be present in such amounts as to interfere with public rights in waters of the state." WDNR considers sediment to be an objectionable deposit.

The numeric WQS for pH is set forth in Chapter NR 102.04(4) intro, and (c) of WAC. In accordance with these WQS, the pH of Little Lake Wissota shall be within the range of 6.0 to 9.0. WDNR has documented exceedances of this WQS in Little Lake Wissota. The State considers these exceedances due to algal productivity. The State has chosen to reduce the sediment and phosphorus loads to Little Lake Wissota as the mechanism of reducing the frequency and extent of algal blooms which in return will reduce pH exceedances in the lake.

*TMDL target:* WDNR has established 48 ppb phosphorus as the numeric target for this TMDL. The State determined that this phosphorus target corresponds to a summer mean chlorophyll-a target concentration of 20 ppb and a Secchi depth of 1.5 meters. Additionally, the State has determined that a 26% reduction in sediment is needed. These targets represent 70% of baseline conditions<sup>4</sup> which is reflective of a 30% seasonal phosphorus load reduction.

To establish the targets for this TMDL the State considered trophic status and existing monitoring data collected by the WDNR and USACE. The State utilized the BATHTUB model and SWAT to predict targets that would address eutrophication and pH exceedances in the lake.

A typical trophic status index (TSI) boundary between mesotrophic and eutrophic lakes is 50 ppb phosphorus. The concept of trophic status is based on the fact that changes in nutrient levels (measured by total phosphorus) causes changes in algal biomass (measured by chlorophyll-a) which in turn causes changes in lake clarity (measured by Secchi disk transparency). A TSI is a convenient way to quantify this relationship. The TSI is a continuum scale of 0 to 100, where TSI values range from low (<30), representing very clear, nutrient-poor lakes, to high (>50) for extremely productive, nutrient-rich lakes. Based on monitoring completed in 2001 and 2002 by WDNR and the USACE Little Lake Wissota was found eutrophic at a mean phosphorus TSI of 65.<sup>5</sup>

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<sup>4</sup> Baseline conditions are defined as a 10-year, 1994 – 2003, mean estimated summer load to Little Lake Wissota.

<sup>5</sup> See page 6 of TMDL report.

BATHTUB is an USACE mass-balancing model which applies a simple approach to link nutrient loads and water quality parameters. BATHTUB applies steady-state water and nutrient balance calculations in a spatially segmented hydraulic network. BATHTUB outputs include hydraulics, water and nutrient balances, predictions of nutrient concentrations, transparency, chlorophyll-a concentrations and oxygen depletion for the spatially segmented network. SWAT is a watershed model used to assess nonpoint source loadings from watersheds and subwatersheds. SWAT was specifically developed for agricultural areas. It simulates hydrology and related processes to predict the effect of land management practices on water, sediment, nutrient and pesticide export. By simulating different land management practices the relative reduction of pollutant loading for the various practices can be simulated.

The State used SWAT to predict flow, sediment and phosphorus loads for Little Lake Wissota watershed. The watershed was divided into seven subwatersheds.<sup>6</sup> Automated routines within SWAT were used to generate stream and hydrological characteristics, slope and slope lengths, and flow path and channel characteristics for each subwatershed. 1992 WISCLAND land cover GIS layer was used with appropriate adjustments to account for land use changes between 1992 and 2003.<sup>7</sup> Three crop rotations were used to simulate crop management practices within the watershed. Table 3 of Appendix 2 of the TMDL report describes the current estimation of management practices in the watershed and Table 4 shows how the three crop rotations were distributed among the seven subwatersheds. SWAT was calibrated and validated using available monitoring data from 2001-2003. Refer to Figures 2, 3 and 4 and Table 5 of Appendix 2 of the TMDL report for detailed comparisons of observed and SWAT predicted monthly flow and phosphorus and sediment loads. The information presented in Appendix 2 of the TMDL report shows that SWAT predicted flows and loads had good correlation to observed data. Once SWAT was calibrated and validated seasonal phosphorus loads considering six different management scenarios were simulated. The TMDL targets were based on a no till + optimum Bray P1 management scenario. This scenario assumes conversion of all cash crop rotations to no-till cropping systems, no changes in tillage for dairy rotations, and brings all cropping soils in the basin from their current average Bray P-1 values<sup>8</sup> down to agronomic optimum.

The State used BATHTUB to predict the trophic response of Little Lake Wissota. BATHTUB was used to predict total phosphorus, chlorophyll-a and Secchi depth. Since the SWAT results conducted for this TMDL included the entire drainage area of the watershed and the measured phosphorus and sediment loads calculated from WDNR and USACE 2001-2003 monitoring effort<sup>9</sup> only considered loading from a portion of the watershed, the State chose to more closely link the BATHTUB model with the SWAT model results. Therefore, the SWAT simulated loads and observed water quality data were used as inputs to the BATHTUB model. BATHTUB model coefficients were calibrated against the 2001 monitoring data then the calibrated coefficients were used to predict lake responses for the summer 2002. Figures 5 and 6 of Appendix 2 of the TMDL report show results of the BATHTUB modeling and observed values. The calibrated BATHTUB model was used to estimate longer term

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<sup>6</sup> See Figure 1 and Table 1 of Appendix 2 of the TMDL report for subwatershed location and area.

<sup>7</sup> See Table 2 of Appendix 2 of the TMDL report for summary of land uses considered by SWAT.

<sup>8</sup> Bray P-1 is a soil chemistry testing method commonly used in Wisconsin to measure soil phosphorus availability to crops.

<sup>9</sup> See Table 3 of the TMDL report for the measured sediment and phosphorus loads.

average water quality in the lake. Estimation of a longer term average water quality data was accomplished by determining the lake response to the 10 year mean loading calculated by SWAT. The State examined changes in algal bloom frequency under simulated decreases and increases in external phosphorus loading. The TMDL report states that by meeting the TMDL target of 48 ppb the narrative water quality criteria stated in Wisconsin Code NR 102.04(1) will be attained. Achieving the phosphorus goal will decrease the frequency and intensity of algal blooms that currently impair uses of Little Lake Wissota and will reduce pH exceedances. Response curves for total phosphorus, Secchi depth, chlorophyll-a and algal bloom frequencies can be found in Figures 7 through 10 of Appendix 2 of the TMDL report.

Once the phosphorus target of 48 ppb was established for Little Lake Wissota, the State determined the necessary sediment reduction target. The State has determined sediment to be a transport mechanism for phosphorus to the lake. To predict the corresponding sediment reduction needed to attain the 48 ppb phosphorus target the State used SWAT. Appendix 1 of the TMDL report provides SWAT model output showing that a 26% reduction in annual sediment load to Little Lake Wissota will attain a total phosphorus concentration of 48 ppb.

EPA finds that the State of Wisconsin adequately described the applicable WQS and reasonably demonstrated the appropriateness of the numeric TMDL targets for phosphorus, chlorophyll-a, Secchi depth, and the associated sediment reduction. EPA finds it reasonable for the State to use model predictions to establish a TMDL target for a narrative standard. The BATHTUB response curves in Figures 7 through 10 of Appendix 2 of the TMDL report demonstrate that with a 34% reduction in the current phosphorus loading the total seasonal phosphorus concentration is 48 ug/L (the TMDL target); Secchi depth is slightly greater than 1.5 meters; chlorophyll-a should be between 15 and 20 ug/L; and summer algal blooms will occur approximately 38% of the time. Appendix 3 of the TMDL report shows that when chlorophyll-a is less than 20 ug/L but greater than or equal to 10 ug/L no pH values over 9 are expected. Exceedances of the pH criteria of 9 are not expected to occur until chlorophyll-a reach greater than 30 ug/L.

### **3. Loading Capacity - Linking Water Quality and Pollutant Sources**

*A TMDL must identify the loading capacity of a water body for the applicable pollutant. EPA regulations define loading capacity as the greatest amount of a pollutant that a water can receive without violating water quality standards (40 CFR §130.2(f)). The TMDL submittal should describe the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In many instances, this method will be a water quality model. The TMDL submittal should contain documentation supporting the TMDL analysis, including the basis for any assumptions; a discussion of strengths and weaknesses in the analytical process; and results from any water quality modeling. EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.*

*TMDLs must take into account critical conditions for stream flow, loading, and water quality parameters as part of the analysis of loading capacity. (40 CFR §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.*

Comments and Assessment:

*The loading capacity established for Little Lake Wissota by the State of Wisconsin and approved by EPA are 16.17 pounds/day phosphorus and 2.08 tons/day sediment.*

The goal of this TMDL is to reduce the amount of phosphorus and sediment loading to Little Lake Wissota along with the frequency and severity of algal blooms. The State has determined that phosphorus and related sediment loadings to the lake have created a eutrophic condition. The eutrophic condition is characterized by excessive algal blooms and pH fluctuations. Algal blooms result in pH increases due to the removal of carbon dioxide during photosynthesis. Reductions in carbon dioxide result in pH exceedances. A reduction in phosphorus and sediment levels in the lake would result in a decrease in chlorophyll a levels and subsequent reductions in pH levels. As previously discussed in the TMDL target discussion in this decision document the State has adequately demonstrated that when reductions in phosphorus loading are attained to reach the 48 ppb TMDL target the eutrophication and pH impairments will be addressed. Considering the linkage provided by the State between the pollutants, impairments, applicable water quality standards and the numeric target for these TMDLs, EPA finds that the State of Wisconsin adequately identified phosphorus and sediment as pollutants needing loading capacities to address the impairments in Little Lake Wissota.

As previously discussed in the TMDL target discussion in this decision document, the State utilized SWAT to establish current annual loads of phosphorus and sediment to Little Lake Wissota. Applying the reductions necessary to attain the TMDL targets, 34% phosphorus reduction and 26% sediment reduction, to the predicted current loads, annual loading capacities were calculated. The State then converted the annual capacities to daily loading capacities for submittal to EPA for approval. The daily loading capacities submitted by the State can be found in Tables 5 and 6 of the TMDL report. 40 CFR 130.7(c)(1) requires that TMDLs take into account critical conditions as part of the analysis of loading capacity. The 34% phosphorus reduction and 26% sediment reduction that were used to calculate the daily loading capacities did consider critical conditions. According to the State's response to EPA comments<sup>10</sup> critical conditions occur during the growing season, May through September. The State used seasonal monitoring data to calibrate and validate BATHTUB and SWAT thereby making sure that the models appropriately accounted for the critical conditions observed during the growing season. Additionally, the State made land use adjustments to subwatersheds in SWAT to account for land use changes from 1992 to 2003 (1992 WISCLAND land cover GIS layer was used in SWAT and 2003 was the end year of monitoring data used to calibrate and validate SWAT). Making adjustments in land cover allows for better consideration of current factors that impact runoff from nonpoint sources which in turn can impact the predicted phosphorus and sediment loads during the critical growing season.

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<sup>10</sup> See WDNR response to EPA comment 1.

EPA finds that the State of Wisconsin adequately established loading capacities for phosphorus and sediment, while considering critical conditions, to attain the TMDL target and in turn attain the applicable water quality standards for Little Lake Wissota.

#### 4. Wasteload Allocations (WLAs)

*EPA regulations require that a TMDL include wasteload allocations, which identify the portion of the loading capacity allocated to individual existing and future point source(s) (40 CFR §130.2(h), 40 CFR §130.2(i)). In preparing the wasteload allocations, it is not necessary that each individual point source be assigned a portion of the allocation of pollutant loading capacity. When the source is a minor discharger of the pollutant of concern or if the source is contained within an aggregated general permit, an aggregated wasteload allocation can be assigned to the group of dischargers.*

##### Comments and Assessment:

Point sources in the Little Lake Wissota watershed include storm water outfalls within the Town of Lafayette storm water management area and storm water from industrial facilities and construction sites. The State established WLAs for all these sources. The approved WLAs can be found in the WLA table below and in Tables 5 and 6 in the TMDL report.

The State established a phosphorus and sediment WLA for the Town of Lafayette's municipal separate storm sewer system (MS4), WPDES permit number WI-S050121. The State is not requiring any reductions from this source. According to the State, the current MS4 collection system captures 95-99% of the current storm water phosphorus load. The State does not anticipate much discharge from future development within the drainage area because the Town of Lafayette is requiring all new developments to have on-site storm water treatment. Additionally, the drainage area has highly permeable soils so a high percentage of the storm water runoff infiltrates before it reaches Little Lake Wissota.

The State also established aggregate phosphorus and sediment WLAs for industrial storm water and storm water from construction sites outside the MS4 storm water management area. These sources fall subject to six different WPDES general storm water permits (see permit numbers in Section 1 of this decision document and in the WLA table below).

In addition to assigning a WLA to existing point sources in the watershed, the State established a WLA for future growth. EPA guidance encourages States to consider present and future growth in establishment of TMDLs. The State established allocations for future growth associated with the general storm water permits. EPA considers the State's consideration of growth outside of the current storm water management area reasonable. As land is developed outside of the Town of Lafayette storm water management area it is reasonable for the State to anticipate an increase in industrial and construction storm water.

EPA finds that the State of Wisconsin satisfied all requirements for establishing wasteload allocations

for Little Lake Wissota. The following table presents the WLAs that EPA is approving.

Point Source	WPDES Permit Number	Phosphorus Allocation (pounds/day)	Sediment Allocation (tons/day)
Town of Lafayette MS4	WI-S050121	0.16	0.03
General Storm water permits	WI-S067831-3 WI-S067849-2 WI-S067857-2 WI-S059145-1 WI-S058831-1 WI-0046515-5	0.04	<0.01
Reserve capacity for general permits		0.05	<0.01

## 5. 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 CFR §130.2(g)). Where possible, load allocations should be described separately for natural background and nonpoint sources.*

### Comments and Assessment:

*The daily phosphorus load allocation for nonpoint sources established by the State and approved by EPA is 15.92 pounds/day. The daily sediment load allocation for nonpoint sources established by the State and approved by EPA is 2.04 tons/day.*

Using SWAT the State calculated the 10 year average annual phosphorus load from nonpoint sources to be 8832 pounds.<sup>11</sup> Applying a 34% reduction to the calculated 10 year average annual phosphorus load an annual allocation was found to be 5829 pounds. The State established a slightly more stringent load allocation by establishing an annual allocation of 5810 pounds.

Using SWAT the State calculated the 10 year average annual sediment load from nonpoint sources to be 1008 tons.<sup>12</sup> Applying the 26% reduction in annual sediment load established by the TMDL to the calculated 10 year average annual sediment load an annual allocation was found to be 745 tons. The State established a slightly more stringent load allocation by establishing an annual allocation of 742.8 tons.

The State did not provide specific nonpoint source category load allocations; rather the State established a gross load allocation applicable to all nonpoint sources in the watershed. EPA's implementing regulations found at 40 CFR 130.2(g) allow for gross load allocations.

<sup>11</sup> See Table 5 in the TMDL report and WDNR response to EPA comment 10.

<sup>12</sup> See Table 6 in the TMDL report and WDNR response to EPA comments 11 and 20.

EPA finds that the State of Wisconsin satisfied all requirements for establishing load allocations for Little Lake Wissota.

## 6. Margin of Safety (MOS)

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

### Comments and Assessment:

The State incorporated an implicit margin of safety for both the phosphorus and sediment TMDLs. Appendix 2 of the TMDL report explains the set-up, calibration and validation of BATHTUB and SWAT. Figures 2, 3 and 4 along with Table 5 in Appendix 2 of the TMDL report provide comparisons of predicted values versus observed along with calibration statistics, all of which show that a good correlation exists between the SWAT predicted values and the observed data. The better the correlation between predicted and observed the less uncertainty within the relationship between pollutant targets, loadings and allocations. The BATHTUB model was used to predict the trophic response of Little Lake Wissota. Figures 5 and 6 in Appendix 2 of the TMDL report show the results of the BATHTUB modeling for phosphorus and chlorophyll a, respectively. BATHTUB model results for phosphorus for both modeled years (2001 and 2002) show good correlation with observed data. BATHTUB model results for chlorophyll a for one of the modeled years (2001) shows good correlation with observed data. The other modeled year (2002) and the area weighted mean do not show good correlation with observed data. The BATHTUB-predicted chlorophyll a is higher than most observed data, indicating that BATHTUB over predicted chlorophyll a.<sup>13</sup> This over prediction was not accounted for when the State established the relationship between the phosphorus TMDL target and the associated chlorophyll a and Secchi targets. Not accounting for the over prediction of chlorophyll a in development of the TMDL targets provides an implicit margin of safety. The State would expect that when in-lake phosphorus TMDL targets are attained, chlorophyll a levels should be lower than those predicted by the model, and lower chlorophyll a will help create fewer exceedances of the pH criterion than described in Appendix 3 of the TMDL report.

Another implicit margin of safety results from the lack of consideration by the models of all reduction scenarios. The State considered various land management reduction scenarios associated with

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<sup>13</sup> The State did note in Appendix 2 of the TMDL report that there was a method change between the two years of observed data with respect to chlorophyll a. The State noted that reviews of data for other Wisconsin lakes revealed similar differences but no clear bias was shown between the two methods. The State reviewed the Secchi data for the two years from Little Lake Wissota. There was only a 0.1m difference in Secchi depth between the two years therefore, the State concluded that chlorophyll a should not vary significantly between the two years.

cropland runoff in the model runs. However, reductions associated with other agricultural best management practices not considered by the model may yield more effective reductions on a percentage basis than various cropland practices.<sup>14</sup> Due to model limitations these other agricultural best management practices could not be incorporated into model predictions thereby incorporating some conservativeness into the model predictions.

EPA finds that the State of Wisconsin adequately included an implicit margin of safety into the phosphorus and sediment TMDLs approved by this decision.

## **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 CFR §130.7(c)(1)).*

### Comments and Assessment:

EPA finds that the State adequately considered seasonal variation in the development of the phosphorus and sediment TMDLs for Little Lake Wissota. Although, the State provided daily loads for EPA's review and approval, these daily loads were based upon seasonal monitoring data, a 10 year average of loads modeled by SWAT, and annual predictions and allocations of phosphorus and sediment loading to Little Lake Wissota. Phosphorus contributions during spring, summer, fall and winter contribute differently to the eutrophic condition of Little Lake Wissota and the pH exceedances. Early spring has short residence times, cold temperatures, and high runoff flows that cause the phosphorus laden water to flush through the lake. Fall and winter runoff can contribute phosphorus laden sediments that can release phosphorus to the water column during summer anoxic conditions. Late spring and summer warm temperatures, increased residence times and anoxic conditions increases internal cycling of phosphorus that contributes to algal blooms. The State's evaluation of seasonal data and annual loadings to the lake is a reasonable way to account for the impacts of phosphorus and sediment over time and seasons. Typically, daily and short term loadings do not have the most significant impact on lake conditions, therefore, the State's selection of a 10 year average phosphorus and sediment load as predicted by SWAT was another way for the State to consider seasonal variation.

## **8. Reasonable Assurances**

*When a TMDL is developed for waters impaired by point sources only, the issuance of a NPDES permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 CFR §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.*

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<sup>14</sup> See WDNR response to EPA comment 39.

*When a TMDL is developed for waters impaired by both point and nonpoint sources, and the wasteload allocation 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.*

Comments and Assessment:

EPA finds that the Little Lake Wissota TMDL submitted by the State of Wisconsin provides reasonable assurances that the load allocations will be implemented in a manner to achieve WQS. The State has identified various funding mechanisms that can support implementation of best management practices in the watershed.

Some of the potential funding sources to support implementation identified by the State include the following.

- The WDNR and Chippewa County Land Conservation Department (LCD) will implement agricultural and non-agricultural performance standards to address sediment and nutrient loadings in the watershed. Many landowners voluntarily implement best management practices and cost-sharing provides an incentive for landowners to implement these practices.
- The county can apply for Targeted Runoff Management (TRM) grants. These grants are a competitive financial award that supports small-scale and short-term projects completed locally to reduce runoff pollution. Both urban and agricultural projects can be funded through TRM grants.
- Lake Protection grants are available to lake users, lake communities and local governments to support projects that protect and restore lakes and their ecosystems. Projects eligible for these grants can include watershed management projects, lake restoration, and shoreline and wetland restoration. Chippewa County LCD has received a grant to begin the process of implementation in Little Lake Wissota watershed.<sup>15</sup>
- The Environmental Quality Incentive Program is a federal cost-share program that provides farmers with technical and financial assistance. Farmers can receive flat rate payments for installation and implementation of runoff management practices such as terraces, waterways, diversions and contour strips. The management practices need to be directed at management of agricultural waste, promotion of stream buffers and controlling erosion on agricultural lands.
- Conservation Reserve Program is a voluntary program available to agricultural producers to help them safeguard environmentally sensitive land. Producers enrolled in this program plant

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<sup>15</sup> See WDNR response to comments made by Midwest Environmental Advocates which were included in the State's January 28, 2010 submittal.

long-term, resource conserving covers to improve the quality of water, control soil erosion, and enhance habitats. In return for these actions funding is provided in the form of rental payments and cost share assistance.

## 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.*

Comments and Assessment: The TMDL report states that water quality monitoring will be conducted by the State beginning an appropriate length of time after implementation is initiated, assuming funding is available. The TMDL report states that monitoring will replicate the 2001-2002 USACE study. For two years, pollutant loads will be measured at a location just upstream of where Paint Creek enters Little Lake Wissota. Continuous stream flow measurements would be taken and water chemistry data will be collected bi-weekly. Water quality in Little Lake Wissota will also be monitored following USACE protocols. This two year monitoring effort, along with updated land use data, can then be used to develop an updated watershed SWAT loading model. This updated watershed model, along with an updated lake response model, can be used to evaluate progress in attaining TMDL goals and targets.

EPA finds the TMDL report submitted by the State adequately describes future monitoring efforts. EPA guidance recommends that States develop a monitoring plan to track TMDL effectiveness. EPA finds that the State has described a basic approach to future monitoring that is sufficiently designed to track the effectiveness of the TMDL. EPA is not approving any recommendations for monitoring contained in this TMDL report or any other aspect of Wisconsin's monitoring program through this decision.

## 10. Implementation

*EPA policy<sup>16</sup> 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 load allocations 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.*

### Comments and Assessment:

The TMDL report does not include an implementation plan but the TMDL report does discuss WDNR's plans for initiating an implementation plan upon approval of the TMDL report. The TMDL

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<sup>16</sup> Perciasepe, B., EPA, Office of Water, *New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)*, August 8, 1997.

report states that the implementation planning process will “develop strategies to effectively utilize existing federal, state and county programs to achieve nonpoint source load reduction goals outlined in the TMDL.” The Implementation section of the TMDL report identifies that an implementation plan will be needed for nonpoint sources. The TMDL report also discusses the need to address storm water management in the implementation process. The TMDL report notes that storm water from all construction sites will be controlled pursuant to general storm water permits and that all other storm water outside the MS4 storm water management area is a nonpoint source. The TMDL report provides a recommendation that the Town of Lafayette MS4 incorporate a zero-discharge requirement for the 100 year 5.8 inch design storm, adopt a zero-phosphorus fertilizer ordinance, and promote the installation of rain gardens and infiltration.

EPA is taking no action on the implementation discussions within the TMDL Report.

## **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 CFR §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.*

*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 and Assessment:

A stakeholder advisory group was formed in 2007. The advisory group was formed to provide input into the development of the TMDL. The group consisted of WDNR staff, Chippewa County Land Conservation Department staff, town officials, lake association members and other private individuals. The advisory group meetings were held on February 22 and May 14, 2007 and July 29, 2008. Copies of minutes from advisory group meetings were included in the State's January 28, 2010 correspondence.

Two public notice and comment periods were held. The first was held January 30 to March 2, 2009 and the second was August 19 to September 16, 2009. The State revised the TMDL in response to comments received during the first public notice and comment period, therefore, the State held a second public notice and comment period to offer the public the opportunities to review and comment on the revised TMDL. A news release was made announcing each public notice and comment period. The news release and public notice draft TMDL reports were also made available on WDNR's website. The State's January 28, 2010 correspondence included copies of public notice announcements along with comments received and WDNR response to comments.



Midwest Environmental Advocates (MEA) submitted comments during the first public notice and comment period. MEA raised three issues in its comment letter. The first issue was that the TMDL phosphorus target established by WDNR, 48 ppb, was not sufficient to attain water quality standard. MEA stated that the State did not establish the TMDL target consistent with Wisconsin's proposed phosphorus rule. WDNR responded that the TMDL target was established using the best available science and WDNR believes the target is appropriate. The State has proposed draft phosphorus criterion, however, this criterion has not yet been promulgated. EPA concurs that a State does not have to establish a TMDL to attain proposed criterion. However, as noted by the State in its January 28, 2010 correspondence, when phosphorus criterion are promulgated, if the Little Lake Wissota TMDL target will not attain the promulgated criterion, the State will need to revisit the TMDL and if necessary establish a new TMDL target that will attain promulgated criterion.

The second issue raised by MEA was the lack of an implementation plan or reasonable assurances that the nonpoint source reductions will be attained. MEA compared the reasonable assurances and implementation discussion within the Little Lake Wissota TMDL report to those in the Silver Lake TMDL to support MEA's position that the information in the Little Lake Wissota TMDL was insufficient and lacking details. WDNR responded that implementation plans are not required elements of TMDLs and that EPA does not require or approve implementation plans as part of TMDLs. EPA concurs with the State's response; implementation plans are not a required element nor does EPA approve or disapprove implementation plans if included in a TMDL. EPA policy encourages EPA and states to work in partnership to achieve necessary reductions. As noted previously in this decision, WDNR did present various funding mechanisms, including a WDNR grant already received by Chippewa County LCD, available to provide financial reasonable assurances that implementation efforts can precede. EPA recognizes that these funding mechanisms can be variable but believes that WDNR has demonstrated a good understanding of the available funding options and the need for an implementation plan to direct implementation efforts in a cost-effective and environmentally efficient manner.

The third issue raised by MEA was the need for point source reductions. WDNR established the wasteload allocation for the Town of Lafayette storm water at the current modeled loading. According to WDNR, model estimations show that the storm water point sources only contribute one percent of the annual phosphorus and sediment loads to Little Lake Wissota. The State also makes recommendations for the Town of Lafayette<sup>17</sup> regarding measures that could be taken to minimize phosphorus and sediment loadings to Little Lake Wissota. Neither Section 303(d) of the CWA nor EPA's implementing regulations establish a specific method for allocating the loading capacity between point and nonpoint sources. EPA finds the State's consideration of the soil permeability, exciting contribution from point sources, changes in land cover in the lower portion of the watershed due to development, and NPDES requirements for point sources reasonable considerations for determining appropriate distribution of the loading capacity between point and nonpoint sources.

In lieu of writing a formal written response to MEA, WDNR met with a representative of MEA on July

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<sup>17</sup> See page 15 of TMDL report.

31, 2009 to discuss the issues raised in MEA's comment letter. WDNR included a summary of the discussions held in its January 28, 2010 correspondence to EPA. WDNR also provided a copy of the revised TMDL to MEA. No additional comments were received by WDNR from MEA, or any other member of the public, during the second public notice and comment period.

EPA finds that the State adequately provided the public the opportunity to participate in the development and review of these TMDLs.

## **12. Submittal Letter**

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

Comment and Assessment: WDNR's January 28, 2010 correspondence signed by Russ Rasmussen, Director, Bureau of Watershed Management, addressed to Dean Maraldo, Watersheds & Wetlands Branch, EPA, Region 5, was received by EPA on February 5, 2010. The January 28 correspondence states that the final TMDL for Little Lake Wissota and supporting documentation and information are submitted under Section 303(d) of the Clean Water Act for EPA final review and approval.

## **13. Conclusion**

After a full and complete review of the January 28 correspondence and other supporting documentation and information provided by WDNR to EPA, EPA finds that pursuant to Section 303(d) of the CWA, 33 U.S.C. Section 1313(d), and EPA's implementing regulations at 40 CFR Part 130, the TMDLs for Little Lake Wissota satisfy the elements of approvable TMDLs. This decision approves one phosphorus and one sediment TMDL, both of which will address eutrophication and pH exceedances which were identified as impairments on Wisconsin's 303(d) list. Annual and daily capacities were established for both sediment and phosphorus. The approved daily loading capacities and allocations are included in the table below.

EPA's approval of these TMDLs extends to Little Lake Wissota as identified in this decision document, with the exception of any portions of Little Lake Wissota that is within Indian Country, as defined in 18 U.S.C. Section 1151. At this time, EPA is taking no action to approve or disapprove these TMDLs with respect to those portions of Little Lake Wissota within Indian Country. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under Section 303(d) for this water body or portion of this water body within Indian Country.

