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

REPLY TO THE ATTENTION OF

MAY 16 2019

WW-16J

Glenn Skuta, Watershed Division Director
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Dear Mr. Skuta:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Load (TMDL) for Crystal Lake, including supporting documentation and follow up information. Crystal Lake is located in Blue Earth County, Minnesota. The TMDL was calculated for phosphorus to address the impaired Aquatic Recreation Use.

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

We wish to acknowledge Minnesota's effort in submitting this TMDL addressing Aquatic Recreation Use, and look forward to future submissions by the State of Minnesota. If you have any questions, please contact Mr. David Pfeifer, Acting Chief of the Watersheds and Wetlands Branch, at 312-353-9029.

Sincerely,

Joan M. Tanaka

Joan M. Tanaka
Acting Director, Water Division

Enclosure

cc: Celine Lyman, MPCA
Paul Davis, MPCA

wq-iw7-37g

TMDL: Crystal Lake TMDL, Blue Earth County, MN
Date: MAY 16 2019

DECISION DOCUMENT FOR THE CRYSTAL LAKE TMDL; BLUE EARTH COUNTY, MN

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

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

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

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

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

(1) the spatial extent of the watershed in which the impaired waterbody is located;
(2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;
(4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and

(5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyll *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comment:

Location Description/Spatial Extent:

The Crystal Lake watershed is located in Blue Earth County, Minnesota, in the southcentral portion of Minnesota. The lake is located in the Middle Minnesota River basin, approximately 10 miles southwest of Mankato, Minnesota (Section 2.0 of the TMDL). The TMDL addresses one lake impaired for phosphorus. Table 1 of this Decision Document identifies the lake characteristics.

Table 1: Crystal Lake Physical Data

	Impaired Use	Use classification	Pollutant	Surface area	Watershed Size	Mean depth
Crystal Lake 07-0098-00	Aquatic Recreation	2B	Phosphorus	379 acres	14,000 acres	8 feet

Land Use:

The Crystal Lake watershed is a mixture of agricultural land (70%) and open water (9.3%), with some developed land-open space (8.1%). grassland/pasture (3.6%) and developed land (2.7%) (Table 2.1 of the TMDL).

Problem Identification:

Water quality in Crystal Lake significantly exceeded the phosphorus criterion. The average phosphorus concentration in the lake was 226 ug/L, with a maximum value of over 500 mg/L in July 2016 (Figure 1 of the TMDL). The lake also had average concentrations of 87 ug/L for chlorophyll-a (chl-a), and 0.5 m for Secchi depth. The criteria for Crystal Lake are phosphorus $\leq$ 90 ug/L, chl-a $\leq$ 30 ug/L, and Secchi depth $\geq$ 0.7 m.

In September of 2004, Crystal Lake experienced a toxic algae bloom, with microcystin values over 7000 ug/L, well above the very high risk level of 2000 ug/L (Section 1.2 of the TMDL). Another bloom occurred in 2007, with microcystin values at 3800 ug/L.

Pollutant:

While phosphorus is an essential nutrient for aquatic life, elevated concentrations of phosphorus can lead to nuisance algal blooms that negatively impact aquatic life and recreation (swimming, boating, fishing, etc.). Algal decomposition depletes oxygen levels which stresses benthic macroinvertebrates and fish. Excess algae can shade the water column which limits the distribution of aquatic vegetation. Aquatic vegetation stabilizes bottom sediments, and also is an important habitat for macroinvertebrates and fish. Furthermore, depletion of oxygen can cause phosphorus release from bottom sediments (i.e. internal loading).

Degradations in aquatic habitats or water quality (ex. low dissolved oxygen) can negatively impact aquatic life use. Increased algal growth, brought on by elevated levels of nutrients within the water column, can reduce dissolved oxygen in the water column, and cause large shifts in dissolved oxygen and pH throughout the day. Shifting chemical conditions within the water

column may stress aquatic biota (fish and macroinvertebrate species). In some instances, degradations in aquatic habitats or water quality have reduced fish populations or altered fish communities from those communities supporting sport fish species to communities which support more tolerant rough fish species.

Source Identification (point and nonpoint sources):
Point Source Identification: MPCA determined that there are no point source discharges (WWTFs, MS4, CSOs) to Crystal Lake (Section 5.1 of the TMDL).

Non-Point Source Identification: The potential nonpoint sources for the Crystal Lake watershed phosphorus TMDL are:

Stormwater runoff from agricultural land use practices: Runoff from agricultural lands may contain significant amounts of nutrients, organic material and organic-rich sediment which may lead to impairments in the lake watersheds. Manure spread onto fields is often a source of phosphorus, and can be exacerbated by tile drainage lines, which channelize the stormwater. Tile lined fields and channelized ditches enable particles to move more efficiently into surface waters. Phosphorus, organic material and organic-rich sediment 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 or other crops. Stormwater runoff may contribute nutrients and organic-rich sediment to surface waters from livestock manure, fertilizers, vegetation and erodible soils.

Failing septic systems: MPCA noted that failing septic systems, where waste material can pond at the surface and eventually flow into the waterbodies or be washed in during precipitation events, are potential sources of phosphorus.

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

Internal loading: The release of phosphorus from lake sediments via physical disturbance from benthic fish (rough fish, ex. carp) and from wind mixing the water column may all contribute internal phosphorus loading to the lake. Phosphorus may build up in the bottom waters of the lake and may be resuspended or mixed into the water column when the thermocline decreases and the lake water mixes (Section 5.1 of the TMDL).

Future Growth:
MPCA expects little change in the allocations between point and nonpoint sources in the future.

Priority Ranking:
The Crystal Lake TMDL was given a priority ranking for TMDL development due to: the impairment impacts on public health and aquatic life, the public value of the impaired water resource, the likelihood of completing the TMDL in an expedient manner, the inclusion of a strong base of existing data, the restorability of the water body, the technical capability and the willingness of local partners to assist with the TMDL, and the appropriate sequencing of TMDLs

within a watershed or basin. The high levels of microcystin and algal blooms in the lake led MPCA to prioritize the TMDL.

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

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

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

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

Comment:

Designated Uses:

Minnesota Rule Chapter 7050 designates uses for waters of the state. As noted in Table 1 of this Decision Document, Crystal Lake is designated as Class 2B. Class 2B waters are protected for aquatic life and recreation use (boating, swimming, fishing, etc.).

The Class 2B aquatic life and recreation designated use is described as:

> *"The quality of Class 2B surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water sport or commercial fish and associated aquatic life, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable."*

Numeric phosphorus criteria:

Numeric criteria for total phosphorus, chlorophyll-a (chl-a), and Secchi Disk (SD) depth are set forth in Minnesota Rules 7050.0222. These three parameters are the eutrophication standards that must be achieved to attain the aquatic recreation designated use. The numeric eutrophication standards which are applicable to Crystal Lake are those set forth for Class 2B shallow lakes in the Western Corn Belt Plains (WCBP) Ecoregion (Table 2 of this Decision Document). In developing the lake nutrient standards for Minnesota lakes, the MPCA evaluated data from a large cross-section of lakes within each of the State's ecoregions. Clear relationships were established between the causal factor, phosphorus, and the response variables, chl-a and SD (Section 3.2 of the TMDL).

Table 2: MPCA Eutrophication Criteria for Crystal Lake in the WCBP Ecoregion

Parameter	Eutrophication Standard Shallow Lakes
Total Phosphorus (µg/L)	phosphorus ≤ 90
Chlorophyll-a (µg/L)	chl-a ≤ 30
Secchi Depth (m)	SD ≥ 0.7

Target:
MPCA selected a target of 90 µg/L of phosphorus for Crystal Lake to develop the lake TMDL. MPCA selected phosphorus as the appropriate parameter to address eutrophication problems in the lake because of the interrelationships amongst phosphorus and chl-a, as well as SD. Algal abundance is measured by chl-a, which is a pigment found in algal cells. As more phosphorus becomes available, algae growth can increase. Increased algae in the water column will decrease water clarity that is measured by SD.

The 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:
Functionally a TMDL is represented by the equation:

$$TMDL = LC = \Sigma WLA + \Sigma LA + MOS + RC,$$

where: LC is the loading capacity; WLA is the wasteload allocation; LA is the load allocation; MOS is the margin of safety; and (pursuant to MPCA rules) RC is any reserve capacity set aside for future growth.

MPCA used the U.S. Army Corps of Engineers BATHTUB model to calculate the loading capacity (LC) for Crystal Lake (Section 4.7 of the TMDL). BATHTUB is a model for lakes and reservoirs to determine steady-state water and nutrient mass balances in a spatially segmented hydraulic network. BATHTUB uses empirical relationships to determine "eutrophication-related water quality conditions".[1] This TMDL uses the BATHTUB model to link observed phosphorus water quality conditions and modeled phosphorus loading to in-lake water quality estimates. BATHTUB can be a steady-state annual or seasonal model that predicts a lake's water quality. BATHTUB utilizes annual or seasonal time-scales which are appropriate because watershed phosphorus loads are normally impacted by seasonal conditions.

The model estimates in-lake phosphorus concentration by calculating net phosphorus loss (phosphorus sedimentation) from annual phosphorus loads as functions of inflows to the lake, lake depth, and hydraulic flushing rate. To estimate loading capacity the model is rerun, reducing current loading to the lake until the modeled result shows that in-lake total phosphorus would meet the applicable WQS.[2] The BATHTUB model also allows MPCA to assess impacts of changes in nutrient loading from the various sources.

The loading capacity is the maximum phosphorus load which the waterbody can receive over an annual period and still meet the lake nutrient WQS. The loading capacity was calculated to meet the WQS during the growing season (June 1 through September 30). This time period contains the months that the general public typically uses the lake for aquatic recreation. This time of the year also corresponds to the growing season when water quality is likely to be impaired by excessive nutrient loading.

The Crystal Lake TMDL had internal loading of phosphorus incorporated in the model. MPCA utilized two methods to account for internal loading in the TMDL (Section 4 of the TMDL). First, MPCA used two additional models to determine the relative impact of internal loading of phosphorus on the lake. MPCA used MINLEAP (Minnesota Lake Eutrophication Analysis Procedure) and the Reckhow-Simpson model to further analyze the internal loading of phosphorus. Both models confirmed that internal loading is a significant source of phosphorus loading int Crystal Lake (Sections 4.5 and 4.6 of the TMDL).

Second, MPCA used two subroutines in the BATHTUB model to determine internal phosphorus loading. MPCA utilized the First Order and the Canfield-Bachmann subroutines in the use of the BATHTUB model (Section 4.7 of the TMDL). These subroutines resulted in two differing internal loading results. MPCA explained that these two subroutines focus on different sources

[1] BATHTUB Manual - http://www.wwwalker.net/bathtub/help/bathtubWebMain.html
[2] BATHTUB Manual - http://www.wwwalker.net/bathtub/help/bathtubWebMain.html

of phosphorus loading. The First Order subroutine tends to overestimate watershed run-off, and underestimate internal loading of phosphorus, as a winter sample (taken when the lake was ice-covered and therefore little run-off was occuring), was extremely high, indicating very significant impacts from internal loads of phosphorus. MPCA explained that the Canfield-Bachmann subroutine likely overestimated internal loading of phosphorus, as the results are much higher than typical in similar lakes in Minnesota.

To address these model results, MPCA decided to use the average of both models to determine the loading capacity to Crystal Lake, as discussed in Section 4.7 and Page 44 of the TMDL. Table 3 of this Decision Document shows the TMDL summary for the lake.

Table 3: Crystal Lake Phosphorus TMDL Summary (lbs/day)

	LC	WLA	LA	MOS	Current load*	Reduction %
Crystal Lake 07-0098-00	6.04	0.05	5.39	0.60	12.2 to 28.4	55% to 80%

*- varies based upon wet or dry year

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

4. Load Allocations (LA)

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

Comment:
Load allocations are addressed in Section 5 of the TMDL document. The LA for the Crystal Lake phosphorus TMDL is in Table 3 of this Decision Document. The LA was not subdivided by source type, but were calculated as "gross allotments" as per 40 CFR 130.2(g).

The 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:
MPCA determined that there are no WWTF, MS4s, CAFOs, or CSOs, in the Crystal Lake watershed (WLA = 0 for these sources).

MPCA set aside a portion of the total WLA to account for phosphorus loading from construction stormwater of 1.0% of the loading capacity (not including the MOS)(Section 5.1 of the TMDL). MPCA reviewed the areal coverage of construction permits issued in the watershed, and calculated coverage based upon the areal extent. The WLA for construction stormwater is estimated to be 0.05 lbs/day (Table 3 of this Decision Document). For industrial stormwater, MPCA reviewed the state-wide industrial stormwater permit data, and determined that there were no sources on industrial stormwater in the watershed.

MPCA explained that BMPs and other stormwater control measures should be implemented at active construction sites to limit the discharge of pollutants of concern; they are defined in the State's NPDES/State Disposal System (SDS) General Stormwater Permit for Construction Activity (MNR100001). If a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit and properly selects, installs and maintains all BMPs required under the permit, including those related to impaired waters discharges and any applicable additional requirements found in Appendix A of the Construction General Permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL.

The 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:
The Crystal Lake phosphorus TMDL incorporated an explicit MOS of 10% (0.60 lb/day) of the TMDL (Table 3 of this Decision Document). MPCA noted that the MOS is reasonable due to

the use of multiple models (BATHTUB, MINLEAP, Reckhow-Simpson) for hydrology and pollutant loading (Section 4 of the TMDL). The results indicate the model adequately characterize the lake, and therefore additional MOS is not needed.

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

7. Seasonal Variation

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

Comment:
The nutrient criteria employed in the Crystal Lake nutrient TMDL were based on the average nutrient values collected during the growing season (June 1 to September 30). The water quality criteria were designed to meet the period of the year where the frequency and severity of algal growth and low D● is the greatest, the mid-late summer. The mid-late summer time period is typically when eutrophication standards are exceeded and water quality in the lakes is deficient. By calibrating the TMDL development efforts to protect water bodies during the worst water quality conditions of the year, MPCA assumes that the loading capacity established by the TMDL will be protective of water quality during the remainder of the calendar year (October through May).

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

8. Reasonable Assurance

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

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

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

Comment:
Section 7 of the TMDL provides information on actions and activities to reduce pollutant loading in the watershed. The main entities responsible for overseeing the pollutant reduction activities will be the MPCA, Blue Earth County and the Blue Earth Soil and Water Conservation District (SWCD).

The local watershed group Crystal Waters Project (CWP) has been active in the watershed. The CWP's goal is to improve water quality in the Crystal Lake watershed (CWP website, 2019). The CWP has spent considerable time and money on implementation activities such as lake bank restoration and stormwater controls in the last several years. The efforts have also focused on clean-up activities in the watershed, particularly in County Drain 56, which is a major tributary to Crystal Lake. In 2015, the CWP led an effort to remove carp from the lake (Mankato Free Press, May 15, 2015). Over 32,500 pounds of carp were removed from the lake. Carp feed on bottom sediments and materials, stirring up sediment and making the attached phosphorus available for use by plants and algae.

The Blue Earth SWCD has also begun implementing BMPs in the Crystal Lake watershed. In 2016, the SWCD received a grant to install bioreactors to reduce nitrates and phosphorus from agricultural runoff and into Crystal Lake (Minnesota Board of Water and Soil Resources, 2019). The SWCD estimated that phosphorus reductions could be over 70% where the BMPs are installed.

Clean Water Legacy Act: The CWLA was passed in Minnesota in 2006 for the purposes of protecting, restoring, and preserving Minnesota water. The CWLA provides the protocols and practices to be followed in order to protect, enhance, and restore water quality in Minnesota. The CWLA outlines how MPCA, public agencies and private entities should coordinate in their efforts toward improving land use management practices and water management. The CWLA anticipates that all agencies (i.e., MPCA, public agencies, local authorities and private entities, etc.) will cooperate regarding planning and restoration efforts. Cooperative efforts would likely include informal and formal agreements to jointly use technical, educational, and financial resources.

The CWLA also provides details on public and stakeholder participation, and how the funding will be used. In part to attain these goals, the CWLA requires MPCA to develop a Watershed Restoration and Protection Strategy (WRAPS). The WRAPS are required to contain such elements as the identification of impaired waters, watershed modeling outputs, point and nonpoint sources, load reductions, etc. (Chapter 114D.26; CWLA). The WRAPS also contain an implementation table of strategies and actions that are capable of achieving the needed load reductions, for both point and nonpoint sources (Chapter 114D.26, Subd. 1(8); CWLA). Implementation plans developed for the TMDLs are included in the table, and are considered "priority areas" under the WRAPS process (Watershed Restoration and Protection Strategy Report Template, MPCA). This table includes not only needed actions but a timeline for achieving water quality targets, the reductions needed from both point and nonpoint sources, the governmental units responsible, and interim milestones for achieving the actions. MPCA has developed guidance on what is required in the WRAPS (Watershed Restoration and Protection Strategy Report Template, MPCA). The WRAPS report for the Crystal Lake watershed is

included in the Minnesota River – Mankato WRAPS report, which is currently under development.

The Minnesota Board of Soil and Water Resources administers the Clean Water Fund as well, and has developed a detailed grants policy explaining what is required to be eligible to receive Clean Water Fund money (FY 2014 Clean Water Fund Competitive Grants Request for Proposal (RFP); Minnesota Board of Soil and Water Resources, 2014).

The 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:
The final TMDL document outlines the water monitoring efforts in the Crystal Lake watershed (Section 6.2 of the TMDL). Water quality monitoring is a critical component of the adaptive management strategy employed as part of the implementation planning efforts for the these watersheds.

Follow-up monitoring is integral to the adaptive management approach. Monitoring addresses uncertainty in the efficacy of implementation actions and can provide assurance that implementation measures are succeeding in attaining water quality standards, as well as inform the ongoing TMDL implementation strategy. To assess progress toward meeting the TMDL target, monitoring of Crystal Lake will continue to be a part of the SWCD monitoring program. The Blue Earth County draft Water Management Plan (2017-2022) describes the ongoing monitoring efforts in the county, including waters addressed under the TMDL. At a minimum, the Crystal Lake watershed will be monitored once every 10 years as part of the MPCA's Intensive Watershed Monitoring cycle.

The EPA finds that this criterion has been adequately addressed.

10. Implementation

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

Comment:
Implementation strategies are outlined in Section 7 of the final TMDL document. MPCA presented a variety of possible implementation activities which could be undertaken within the watersheds. Most of these actions will address all three pollutants.

Urban/residential stormwater reduction strategies: Although not a formal MS4 watershed, MPCA noted that the city of Crystal Lake does have stormwater runoff that enters the lake. The City, County, and CWP have begun efforts to label stormwater drains and educate local residents about stormwater contamination.

Riparian Area Management Practices: Protection of streambanks within the watershed through planting of vegetated/buffer areas with grasses, legumes, shrubs or trees will mitigate pollutant inputs into surface waters. These areas will filter runoff before the runoff enters into the creeks.

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

Internal phosphorus reduction: The phosphorus TMDL for Crystal Lake requires a significant reduction in phosphorus load. A diffuser was recently installed in Crystal Lake to reduce the algal growth in the lake (Mankato Free Press, June 18, 2017). Other efforts include a renewed effort to remove carp, as well as the reduction of phosphorus runoff into the lake.

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

11. Public Participation

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

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

Comment:
The public participation section of the TMDL submittal is found in Section 8 of the TMDL. Throughout the development of the Crystal Lake TMDL the public was given various

opportunities to participate in the TMDL process. The MPCA encouraged public participation through public meetings and small group discussions with stakeholders within the watershed.

A technical advisory team was developed in 2008 to provide input on the development of the TMDL. The group met from January 2008 to October 2009 (MPCA Findings of Facts (FOF), 2018). A preliminary meeting was held on October 13, 2008, to allow the public to provide comments on the TMDL effort. Participants included local government officials, stakeholders, and the public.

The draft TMDL was posted online by the MPCA at (http://www.pca.state.mn.us/water/tmdl). The 30-day public comment period began on August 27, 2012 and ended on September 26, 2012. The MPCA received six public comments and a request for a contested case hearing. Three of the comments were supportive of the TMDL effort, while three of the comments raised concerns on the TMDL.

Comments were received from the Minnesota Corn Growers Association (MCGA). The MCGA raised concerns including whether or not the TMDL would impact nitrates in the watershed, the possibility that some sources were under-represented, and how the various BMPs would be accounted for and implemented. MPCA explained that while the TMDL is only directly addressing phosphorus, water quality impacts from other nutrients (such as nitrates) are of concern in ensuring that Crystal Lake attains the appropriate water quality standard. MPCA noted that further work is justified to determine the impact from other nutrients, and the role they play in the eutrophication problems in Crystal Lake. Regarding the source question, MPCA discussed how the various sources were used in the modeling effort, and explained that various scenarios were developed to determine the impacts of phosphorus reductions from feedlots, urban area stormwater runoff, excessive loading during wet years, and internal loading. The results from the scenarios will be used in the development of the implementation plan for the Crystal Lake watershed. MPCA discussed how the implementation plan will provide more detail on existing BMPs, and how additional BMPs should be prioritized.

The Minnesota Center for Environmental Advocacy (MCEA) submitted several comments on the TMDL. The comments are summarized below:

Attaining water quality standards: MCEA commented that the TMDL will not meet the all the eutrophication criteria. While the TMDL is modeled to attain the phosphorus portion of the criteria, it will not meet the chlorophyll-a and Secchi depth portion of the criteria. MPCA explained that the BATHTUB model performs well regarding phosphorus, but is less effective regarding chlorophyll-a and Secchi depth. MPCA noted that the process used to develop the lake eutrophication criteria utilized data from a large cross-section of lakes within the state. The results of this process indicates that meeting the phosphorus criteria is very likely going to result in attaining the chlorophyll-a and Secchi depth criteria. Additional language was added to the TMDL clarify this concern.

Source assessment: MCEA commented that the source identification work in the TMDL was insufficient to effectively implement the TMDL. They requested additional details regarding the nonpoint sources, including further refinement of allocations, and information on timing and magnitude on the nonpoint sources. MPCA explained that the EPA does not require a detailed

loading determination for nonpoint sources, but acknowledged that more details will be determined during the development of the implementation plan.

Lack of reasonable assurance: MCEA commented that the TMDL offers little discussion of reasonable assurance that the nonpoint source reductions can and will occur. MPCA responded that the Minnesota Clean Water Legacy Act provides funding to implement actions and activities to reduce pollutant loads. To access this money, an approved TMDL is needed. MCPA also noted the additional work that has been implemented in the watershed since this TMDL was public noticed in 2012.

Several local landowners collectively submitted comments on the impacts of the natural background of phosphorus in or entering Crystal Lake, and requested MPCA determine the natural background of phosphorus entering Crystal Lake. The commenters also requested a contested case hearing under Minnesota Stat. § 116.03, Subd. 1(c). MPCA issued the FOF on March 12, 2017. The FOF upheld the TMDL as written (without a separate natural background allocation), and denied the contested case hearing request. The landowners subsequently appealed the State TMDL decision to the Minnesota Court of Appeals, which upheld the TMDL as written. The commentors then appealed the TMDL to the Minnesota Supreme Court, which denied the review.

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

12. Submittal Letter

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

Comment:
The EPA received the final Crystal Lake TMDL document, submittal letter and accompanying documentation from the MPCA on April 30, 2019. The transmittal letter explicitly stated that the final Crystal Lake TMDL for phosphorus was being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for 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 EPA finds that the TMDL transmittal letter submitted for the Crystal Lake TMDL by the MPCA satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the TMDL for Crystal Lake satisfies all of the elements of an approvable TMDL. This approval is for one TMDL, addressing the aquatic recreational use impairment due to phosphorus.

The EPA's approval of these TMDLs extends to the water bodies which are identified in Table 1 of this Decision Document 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 EPA is taking no action to approve or disapprove TMDLs for those waters at this time. The EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.