

**TMDL:** Silver Lake, Wisconsin  
**Effective Date:**

## **DECISION DOCUMENT FOR THE APPROVAL OF THE SILVER LAKE, WISCONSIN TMDL**

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

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

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

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

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

- (1) the spatial extent of the watershed in which the impaired waterbody is located;
- (2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
- (3) population characteristics, wildlife resources, and other relevant information affecting

- the characterization of the pollutant of concern and its allocation to sources;
- (4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and
- (5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyll *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comments:

The Wisconsin Department of Natural Resources (WDNR) developed a TMDL for phosphorus for Silver Lake (Table 1). The TMDL addresses the organic enrichment/low DO, and fish kill impairments which were identified on the Wisconsin 1998 and 2002 303(d) list. The pollutant causing these impairments was identified as phosphorus. The segment was ranked as high priority on the Wisconsin 1998 and 2002 303(d) list.

The lake is located in Manitowoc County, Wisconsin. The lake is 69 acres in size, and drains an area of approximately 18 square miles. About 84% of the Silver Lake subwatershed is used for cropland, and wood and wetlands account for another 11%, based upon 1998 data.

There is one point source on the impaired water that discharges phosphorus, a small waste water treatment facility. Non-point sources are identified in the Non-point Source Pollution Control Plan for the Sevenmile-Silver Creek Priority Watershed plan (Watershed Plan) and supplemental update. The Watershed Plan and update are an attachment to the TMDL. Non-point sources identified in the Watershed Plan as contributing to the impairments include agricultural field run-off, phosphorus coming in from Silver Creek, and phosphorus contained in lake sediments. Table 1 of the TMDL shows the current phosphorus loads and allocations.

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

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

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

The TMDL submittal must identify a numeric water quality target(s) – a quantitative value used to measure whether or not the applicable water quality standard is attained. Generally, the pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical (e.g., chromium)

contained in the water quality standard. The TMDL expresses the relationship between any necessary reduction of the pollutant of concern and the attainment of the numeric water quality target. Occasionally, the pollutant of concern is different from the pollutant that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorus and the numeric water quality target is expressed as Dissolved Oxygen (DO) criteria). In such cases, the TMDL submittal should explain the linkage between the pollutant of concern and the chosen numeric water quality target.

Comments:

The State identified the narrative standard set forth at Section NR 102.04 (1) introduction and (a) of the Wisconsin Administrative Code (WAC) as the applicable standard. This 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 has determined that excessive algal growths are impairing Silver Lake. WDNR has further determined that excessive phosphorus is the pollutant that needs to be reduced to allow Silver Lake to meet the WQS. Therefore, WDNR has developed a site-specific in-water target for phosphorus. As explained in the TMDL, this phosphorus target is 80 µg/l of total phosphorus (TP), which correlates to a loading of 386 lbs/yr. WDNR believes that achieving this target will reduce algal growth and chlorophyll-a, improving water clarity and quality, and thereby attaining the water quality standard.

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

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

A TMDL must identify the loading capacity of a 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 stream flow, loading, and water

quality parameters as part of the analysis of loading capacity. (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable *critical conditions* and describe their approach to estimating both point and non-point source loadings under such *critical conditions*. In particular, the TMDL should discuss the approach used to compute and allocate non-point source loadings, e.g., meteorological conditions and land use distribution.

Comments:

WDNR will consider that Silver Lake is meeting the narrative water quality standard when the algal growth is reduced. To do this, WDNR has established a water quality target of 80 µg/l of TP. Table 2 (below) shows the total loading capacity of Silver Lake, which is calculated to be 386 lbs/yr of TP.

This total load capacity represents an approximate 44% reduction in TP concentration, and a 88% reduction in annual TP loading to Silver Lake. Much of this reduction will be achieved by diverting most if not all of Silver Creek from entering Silver Lake. This process has already been underway for several years. Through calculations and best professional judgement, WDNR believes that achieving the water quality target of 80 µg/l of TP will result in a reduction in algal growth and achievement of the WQS, as explained in the TMDL. To determine the target, the Canfield-Bachman natural lake model was used (page 3 of the TMDL).

The TMDL discusses future monitoring to demonstrate whether or not progress has been made towards establishment of the water quality target. This includes water quality monitoring as well as more comprehensive data collection. The critical condition was identified as summer, when temperatures are highest and flushing of the lake is lowest. WDNR performed all calculations and modeling at the critical condition, to ensure sufficient pollutant reduction.

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

#### **4. Load Allocations (LAs)**

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

Comments:

The load allocation for Silver Lake is in Table 2 (below). Overall, the LA is 324 lbs/yr. The LA is subdivided by gross source (Silver Creek, internal loading (from lake sediments), and direct tributary drainage). The calculations and models used to determine the phosphorus loading from various non-point source categories are found in the TMDL and in the *Silver Lake Update Supplement to the Nonpoint Source Pollution Control Plan for the Sevenmile-Silver Creek Priority Watershed*.

Silver Creek was recently (2001) diverted from flowing into Silver Lake. Silver Lake had been a significant source of phosphorus to Silver Lake. This diversion has reduced significantly the amount of phosphorus entering the system. However, the diversion also reduces the outflow of water from the lake, thereby increasing the significance of the internal source of phosphorus (phosphorus in the lake sediments). Implementation efforts are discussed in Section 10 below.

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

## **5. Wasteload Allocations (WLAs)**

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

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQs 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.

Comments:

The WLA for Silver Lake is 62 lbs/yr, which is the existing load from the one existing facility (Holy Family Convent waste water treatment facility, Table 2 attached) .

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

## **6. Margin of Safety (MOS)**

The statute and regulations require that a TMDL include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). EPA's 1991 TMDL Guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL

through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

Comments:

WDNR included an implicit margin of safety by using conservative assumptions in the development of the TMDL. WDNR underestimated the amount of phosphorus reduction that would be achieved by various reduction efforts. For example, one assumption was to use a 50% reduction in direct area run-off, when WDNR believes it would be more appropriate to use 60%-70%. In addition, the Silver Creek load reduction was modeled at 60%, when it is closer to 95% (and has already occurred). The effect of these conservative assumptions is to underestimate the load of phosphorus reduced. If these measures are implemented, WDNR believes there will likely be far more reduction than needed to meet the water quality target.

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

## **7. Seasonal Variation**

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

Comments:

Loads are greatest into Silver Lake during the peak spring runoff events in February, March, and April. WDNR has stated that the goal of the TMDL is to eliminate those land practices that contribute to the spring surges. In addition, storm design flows were calculated into the phosphorus loading in Silver Lake (1998 TMDL supplement).

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

## **8. Reasonable Assurances**

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

When a TMDL is developed for waters impaired by both point and non-point sources, and the WLA is based on an assumption that non-point source load reductions will occur, EPA’s

1991 TMDL Guidance states that the TMDL should provide reasonable assurances that non-point source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

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

Comments:

WDNR has demonstrated adequate reasonable assurance that the necessary non-point source reductions will occur by having various programs in place that will address the phosphorus load into Silver Lake.

First, Silver Lake is part of a larger priority watershed project, Non-point Source Pollution Control Plan for the Sevenmile-Silver Creek Priority Watershed plan. A copy of the approved Watershed Plan is included as an attachment to the TMDL, as well as the 1998 supplemental update. The project has already been underway for over 15 years. Although the original Watershed Plan was scheduled for 8 years, work is still ongoing in the watershed, and resources and staff are still being committed to the Watershed Plan. Fishery restock will occur in 2003, as well as lake-wide alum treatments to reduce in-sediment phosphorus.

In addition, WDNR has an approved 319 Management Plan (approved by U.S. EPA in 2000). This 319 Management Plan describes a variety of financial, technical and educational programs in the state which support non-point source programs. Wisconsin's Non-point Source Water Pollution Abatement Program set forth in Section 281.65 of the Wisconsin Statutes and Chapter NR 120 of the WAC is described in the 319 Management Plan. WDNR has a variety of voluntary and "back-up" enforcement authorities available under the 319 plan. Administrative rules passed by the Natural Resources Board indicate that watersheds with impaired waters will have the highest priority for enforcement.

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this eighth element.

## **9. Monitoring Plan to Track TMDL Effectiveness**

EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and non-point sources, and the WLA is based on an assumption that non-point source load reductions will occur. Such a TMDL should provide assurances that non-point source controls will achieve expected load reductions and,

such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

Comments:

WDNR included a description of a monitoring program for Silver Lake. Annual monitoring has been ongoing for 5 years, and WDNR intends to monitor Silver lake on an annual basis as implementation continues. Comprehensive monitoring will occur after 3 and 6 years .

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

## **10. Implementation**

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

Silver Lake is part of the Non-point Source pollution Control Plan for the Sevenmile-Silver Lake Priority Watershed plan. The Watershed Plan, discusses the original proposed implementation for non-point source pollution controls for Silver Lake, and the TMDL and 1998 Supplemental Update discuss additional activities to implement the Watershed Plan/TMDL. Implementation includes the following:

- agencies involved
- BMPs necessary to control non-point source run-off
- funding sources
- information and education activities
- schedule for completion
- staffing needs and costs involved

Silver Creek was diverted from most of Silver Lake in 2001, thereby significantly reducing the TP load. The impacts of the diversion are still being assessed, but the state anticipates continued improvement. Eliminating most of the load from Silver Creek will also reduce the factor with the most variation, and WDNR anticipates a more accurate modeling effort in the future. WDNR will be re-modeling the lake in the next few years, to determine how the implementation efforts are progressing. More monitoring is expected, including monitoring of each bay of the lake, to provide more accurate data for the lake (E-mail from WDNR dated 2/17/04).

WDNR has submitted the preliminary data showing the impact of the diversion. Although it is

too early to make any detailed conclusions, WDNR does believe the data clearly shows a substantial decline from the pre-remediation mean of 184 µg/l of total phosphorus to a preliminary mean of 98 µg/l total phosphorus. This is much closer to the target of 80 µg/l total phosphorus (E-mail from WDNR dated 2/18/03).

While this information was reviewed, it did not form a basis for the decision.

## **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.

### **Comments:**

There was public participation in the development of the elements of the six TMDLs consistent with Wisconsin's continuing planning process in Sections NR 120.08 and NR 121.07(1) of the WAC. A public notice was issued on November 11, 2003, for the TMDL. The notice was sent to local stakeholders, and over 1100 entities statewide. The TMDL was available on the WDNR website.

Two comments were received by WDNR on this TMDL, and copies of the comments were submitted to the USEPA along with WDNR's responses. Neither comment required or requested a change to the TMDL. Elements of the TMDL were also presented at a previous public hearing on August 25, 1986. WDNR stated that public comments from that hearing were incorporated into the TMDL. A public hearing was held prior to the Silver Creek diversion project in 2001, and a contested case hearing was held regarding the permit for the Holy Family Convent in April 2003.

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

## **12. Submittal Letter**

A submittal letter should be included with the TMDL submittal, and should specify

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

Comments:

U.S. EPA received the Silver Lake TMDL on January 3, 2003, accompanied by a submittal letter dated December 5, 2002. The submittal letter stated that this is the final TMDL submittal for Silver Lake in Manitowoc County. The USEPA reviewed the TMDL, and determined that additional public participation was needed. (E-mail from EPA dated 2/14/03). WDNR agreed to perform additional public participation (E-mail from WDNR dated 3/3/03), and the TMDL was public noticed on November 11, 2003. The final TMDL was re-submitted on December 29, 2003, and stated that TMDL was being submitted for final review and approval.

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

### **13. Conclusion**

After a full and complete review, EPA finds that the TMDL for Silver Lake satisfies all of the elements of an approvable TMDL. This document addresses a total of 1 TMDL for 1 waterbody with a total of 2 impairments from the 2002 Wisconsin 303d list (Table 1).

**Table 1**Waterbody  
Silver LakePollutant  
phosphorusImpairments  
organic enrichment/low DO, fish kills**Table 2** (From Table 1, page 3 page of the TMDL)  
Silver Lake Phosphorus budget

TP source	Total Load Capacity	WLA	Load Allocation (lb)	Present TP Load (lb)	% of Present TP Load	Waste Load Reduction %	Load Reduction %
Silver Creek	83	---	83	1390	49	---	94
Internal	54	---	54	1080	38	---	95
Direct Trib. Area	187	---	187	311	11	---	40
WWTP	62	62	-----	62	2	0	---
<b>Subtotal</b>	<b>386</b>	<b>62</b>	<b>324</b>	<b>2843</b>	<b>100</b>	<b>0</b>	<b>88</b>