

1TMDL: Snowden Branch, Wisconsin

Date: September 12, 2006

DECISION DOCUMENT SNOWDEN BRANCH SEDIMENT TMDL

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

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

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

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

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

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

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

Comments:

Location Description: The Wisconsin Department of Natural Resources (WDNR) developed a sediment TMDL for Snowden Branch in Grant County, Wisconsin. By implementing measures to reduce the sediment loading, the TMDL will address degraded habitat impairments in the watershed. The table below identifies the waterbody segment covered by the TMDL submittal as it appears on the Wisconsin 2004 303(d) list. According to Wisconsin’s 303(d) list for 2004, the impaired waterbody segment has a high priority ranking.

WBIC	TMDL_ID	Impaired Stream Segment Name	County	Pollutant/ Impairment	Priority	Stream Segment Length
944600	441	Snowden Branch	Grant	Sediment & Degraded Habitat	high	5 miles

Snowden Branch, in southwestern Wisconsin, flows southwest into Blockhouse Creek near Dickeyville, Wisconsin. Blockhouse Creek then flows into the Little Platte River. Snowden Branch has a drainage basin of approximately 17 square miles.

Topography and Land Use: Land use in the basin is mainly agricultural, dominated by cash cropping (corn and soybean), and pasturing. In many locations, heavy pasturing and cropping practices adjacent to stream banks are causing sediment runoff to the stream. The upper third of the stream flows through rolling hills and is predominantly used for row cropping. The lower two thirds of the stream lie in lowland valleys and are used for pasturing (TMDL submittal, page 2).

Pollutant of concern: The pollutant of concern is sediment.

Pollutant sources: WDNR states that there are no point sources located on or discharging to Snowden Branch (TMDL submittal, page 3). Nonpoint sources identified in the TMDL submittal as contributing to the impairment include streambank erosion and run-off from agricultural activities related to cash crop operations. According to WDNR, over the past 20 years the watershed has undergone a shift in agricultural cropping practices from small dairy farms to cash crop operations (corn and soy). This has resulted in a reduction of forage crops and strip cropping which helped stabilize farmed hillsides along Snowden Branch, leading to increased sediment loads to Snowden Branch (TMDL submittal, page 4).

Fine sediment covers the stream substrate and fills in pools, reducing the suitable habitat for fish and macroinvertebrate communities. Filling-in of pools reduces the amount of available cover for juvenile and adult fish. Sedimentation of riffle areas reduces the reproductive success of fish by reducing the exposed gravel substrate necessary for appropriate spawning conditions.

Sedimentation also increases turbidity, reducing light penetration necessary for photosynthesis in aquatic plants. Increased turbidity also reduces the feeding efficiency of visual predators and filter feeders, and lowers the respiratory capacity of aquatic invertebrates by clogging their gill surfaces (TMDL submittal, page 4).

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 Problem Statement Section of the TMDL submittal describes designated uses and numeric criteria applicable to this watershed.

Use Designation and Sedimentation Standard: WDNR identified the narrative standard set forth at Section NR 102.04 (1) intro and (a) of the Wisconsin Administrative Code (WAC) as the applicable standard for excessive sedimentation. 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 considers sedimentation to be an objectionable deposit. The goal of the Snowden Branch TMDL is to reduce sediment loads to a level sufficient to meet the narrative water quality standard (WQS) and the stream’s designated uses. The designated uses applicable to the impaired segment of Snowden Branch are set forth at Section NR 102.04(3) intro, (a), (b) and (c) of the WAC. The designated uses for the impaired segment of Snowden Branch are as follows (TMDL submittal, page 2):

Existing use: Snowden Branch currently supports warm water forage fish communities (WWFF).

Potential use: Snowden Branch is not supporting its potential use as a cold water community.

Codified use: Snowden Branch is not supporting its codified use as a warm water sport fish communities (WWSF) community.

Targets: WDNR established a numeric water quality target of 24,000 tons/year or 65.7 tons/day of sediment (see Table 3 of the TMDL submittal) for the impaired segment of Snowden Branch in order to meet the narrative WQS and support the corresponding designated uses identified above. Based on a UW-Platteville study, WDNR estimated that 52,000 tons of sediment erodes into Snowden Branch annually. This estimate is based on field work and soil erosion data collection efforts completed by UW-Platteville in 2004. The estimate was derived from the USDA universal soil loss equation (USLE) model. The numeric daily target of 65.7 tons/day established by WDNR was generated by updating the typical agricultural conditions modeled previously using USLE with the updated watershed scale RUSLE 2 model. The model provides targets based on implementation of conservation practices necessary to meet the narrative 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

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:

The total loading capacity of sediment for Snowden Branch is 65.7 tons/day, equivalent to the numeric daily sediment target identified in Section 2 above. The numeric daily target established by WDNR was generated by updating the typical agricultural conditions modeled previously using USLE with the updated watershed scale RUSLE 2 model. The TMDL for Snowden Branch is summarized in the table below:

Impaired Stream Segment Name	Existing Conditions (Tons/Day)	% Load Reduction	WLA (Tons/Day)	LA (Tons/Day)	TMDL (Tons/Day)
Snowden Branch	142.4	54%	0	65.7	65.7

WDNR used the RUSLE2 model for estimating the sediment loading for the impaired waterbody segment of Snowden Branch. RUSLE2 is a model that predicts long-term, average-annual erosion by water, and can be used for a broad range of farming, conservation, mining, construction, and forestry sites. RUSLE2 was developed primarily to guide conservation planning, inventory erosion rates and estimate sediment delivery. Target values generated by RUSLE2 are supported by accepted scientific knowledge and technical judgment, and are consistent with sound principles of conservation planning (TMDL submittal, page 7). The major inputs to the RUSLE2 model included information on land use, cropping practices, soil, slope, and climate data.

WDNR has determined that, based on the modeling, a target (loading capacity) of 65.7 tons/day will result in meeting the narrative water quality standard for Snowden Branch. The RUSLE2 model was designed to meet a tolerable soil loss goal of 5 tons/day/acre of sediment to Snowden Branch. This goal was developed with the use of previous USLE modeling by Grant County.

WDNR does not identify a critical condition for this TMDL, since excessive sedimentation occurs year round (TMDL submittal, page 5).

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 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.

Comments:

The load allocation (LA) for the impaired segment of Snowden Branch is the same as the total loading capacity, 65.7 tons/day, as there are no point sources discharging sediment into the streams (WLA=0) and the margin of safety (MOS) is implicit (TMDL Submittal, page 5). Nonpoint sources (NPS) identified in the TMDL report as contributing to the impairments in Snowden Branch include the run-off from agricultural activities and streambank erosion.

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 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.

Comments:

WDNR did not identify point sources discharging sediments to Snowden Branch, and set the waste load allocation at 0 tons/day.

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 not accounting during modeling for additional reductions in sediment delivery due to deposition and infiltration loss in the drainage system. The numeric target set by WDNR for this TMDL represents the worst case scenario in which all sediment eroding from agricultural fields is delivered to the receiving waterbody. During modeling, WDNR used conservative assumptions to justify the implicit margin of safety. These include: use of a higher than actual and more conservative erosion potential; overestimation of the percentage of soybean fields and the use of conventional tillage practices which produce the most erosion; and simulations did not account for additional controls of sediment created through riparian vegetative buffers implemented under the Conservation Reserve Enhancement Program (CREP) and efforts to stabilize stream banks.

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:

Sediment enters Snowden Branch through rainfall and snowmelt runoff events throughout the year. However, most sediment enters Snowden Branch due to episodic events (storms) rather than seasonal events. This temporal variation in sediment loads has been accounted for in the RUSLE2 modeling through the use of average annual conditions. In addition, the best management practices (BMPs) selected to achieve the load allocation are designed to function for the 10-year or 25-year, 24-hour design storms, in order to address these episodic events (TMDL submittal, page 9). These BMPs include grassed waterways, diversions, and terraces.

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 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.

Comments:

To reduce the sediment load into Snowden Branch, WDNR recommends the implementation or maintenance of the following practices:

- Establishment of riparian buffers on cropland through voluntary farm assistance programs such as the Conservation Reserve Enhancement Program (CREP), and the Conservation Reserve Program (CRP) which takes highly erodible land out of agricultural use.
- Implementation of runoff management practices including terraces, diversions and contour strips through the use of the Environmental Quality Incentive Program (EQIP). Through this program, landowners get a 75% reimbursement for the installation of runoff management practices.
- Installation of practices to reduce runoff pollution, through targeted runoff management (TRM) grants administered by WDNR and the Grant County Land and Water Conservation Department. The TRM program is a competitive grant program that provides financial assistance to control polluted runoff from both rural and urban sites. Grant County received a TRM grant in 2005 to install practices including grade stabilization structures, waterway systems, cattle crossings, and stream bank riprap. The current grant expires December 31, 2006. According to WDNR, approval of this TMDL will allow Grant County to receive additional grant funds to implement a targeted conservation approach.
- Enforcement of Section NR 151 of the Wisconsin Administrative Code (WAC) which pertains to agricultural and urban runoff. WDNR and local governments can only enforce performance standards contained in NR 151 when government cost sharing is made available to a landowner for installation of BMPs (WDNR correspondence, 8/31/2006).
- Enforcement of Sections NR 243 and NR 216 of the WAC which regulate large livestock operations and construction of agricultural buildings that disturb one or more acres of land (WDNR correspondence, 8/31/2006).

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 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.

Comments:

WDNR intends to monitor Snowden Branch based on the progress of implementation of the TMDL, including sites where implementation of TRM grant projects are underway or completed. In addition the stream will be monitored on a 5 to 6 year interval as part of WDNR baseline monitoring program to note trends in overall stream quality (TMDL submittal, page 10). Monitoring will include Index of Biotic Integrity (IBI), the Hilsenhoff Biotic Index (HBI), the current habitat assessment tool, and sampling of water quality parameters.

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 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.

Comments:

The submitted TMDL report does not contain a formal implementation plan, since it is not required as a condition for TMDL approval under the current U.S. EPA regulations. However, WDNR has identified ongoing activities which have been identified under the reasonable assurance section.

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:

The public comment period for the Snowden Branch TMDL report was from July 25, 2006 through August 25, 2006. On July 25, 2006 a news release for the public notice of the TMDL report was sent to various entities including: newspapers, television stations, radio stations, interest groups, and interested individuals. The news release indicated the public comment period and how to obtain copies of the public notice and draft TMDL report. In addition, copies of the TMDL report were available upon request and on WDNR's website: http://www.dnr.wi.gov/org/water/wm/wqs/303d/Draft_TMDLs.html. 1 WDNR did not receive comments from the public during the comment period.

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 Snowden Branch sediment TMDL on September 1, 2006, accompanied by a submittal letter dated August 31, 2006. The submittal letter states that this is the final TMDL submittal for Snowden Branch.

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 Snowden Branch satisfies all of the elements of an approvable TMDL. This document addresses **1** TMDL for **1** waterbody segment and **2** impairments from the 2004 Wisconsin 303(d) list.

WBIC	TMDL_ID	Impaired Stream Segment Name	Pollutant/Impairments
944600	441	Snowden Branch	Sediment & Degraded Habitat

EPA's approval of this TMDL does not extend to those waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.