EPA TOTAL MAXIMUM DAILY LOAD (TMDL) REVIEW SUMMARY

TMDL: Update of the TSS Total Maximum Daily Loads for Segments 8, 10, 11 and 12 of the Big Sioux River

ATTAINS TMDL ID: R8-SD-2019-02

LOCATION: Minnehaha County, South Dakota

IMPAIRMENTS/POLLUTANTS: The TMDL document addresses four river segments whose warmwater semipermanent fish life propagation uses are impaired due to high concentrations of TSS.

Waterbody/Pollutants Addressed in this TMDL Action

Assessment Unit ID	Waterbody Description	Pollutants Addressed
SD-BS-R-BIG_SIOUX_08	Big Sioux River (S2, T104N, R49W to I-90)	Total Suspended Solids (TSS)
SD-BS-R-BIG_SIOUX_10	Big Sioux River (I-90 to diversion return)	Total Suspended Solids (TSS)
SD-BS-R-BIG_SIOUX_11	Big Sioux River (Diversion return to Sioux Falls Wastewater Treatment Plant [WWTP])	Total Suspended Solids (TSS)
SD-BS-R-BIG_SIOUX_12	Big Sioux River (Sioux Falls Wastewater Treatment Plant [WWTP] to above Brandon)	Total Suspended Solids (TSS)

BACKGROUND: The South Dakota Department of Environment and Natural Resources (DENR) submitted to EPA the final Total Suspended Solid (TSS) TMDLs for the Big Sioux River segments 8, 10, 11 and 12 with a letter requesting review and approval dated June 21, 2019. This revises TSS TMDLs established for these waterbodies that were approved by EPA on December 6, 2012 (SD DENR. 2012). An update was necessary to account for population and industrial growth occurring in and around the City of Sioux Falls. Given the scope of the updates, DENR solicited public comment on the revised TMDLs and sought re-approval by EPA.

The submittal included:

- Letter requesting EPA's review and approval of the TMDLs
- Final TMDL document
- Original 2012 HSPF modeling report (RESPEC. 2012)
- Updated 2019 HSPF modeling memo (RESPEC. 2019)

APPROVAL RECOMMENDATIONS: Based on the review presented below, the reviewer recommends approval of the final revised Big Sioux River segments 8, 10, 11 and 12 TSS TMDLs. All the required elements of approvable TMDLs have been met.

TMDL Approval Summary	
Number of TMDLs Approved:	4
Number of Causes Addressed by TMDLs:	4

REVIEWERS: Peter Brumm, EPA

The following review summary explains how the TMDL submission meets the statutory and regulatory requirements of TMDLs in accordance with Section 303(d) of the Clean Water Act (CWA), and EPA's implementing regulations in 40 C.F.R. Part 130.

EPA TMDL REVIEW FOR REVISIONS TO THE BIG SIOUX RIVER SEGMENTS 8, 10, 11 AND 12 TSS TMDLS

This TMDL review document includes EPA's guidelines that summarize the currently effective statutory and regulatory requirements relating to TMDLs (CWA Section 303(d) and 40 C.F.R. Part 130). These TMDL review guidelines are not themselves regulations. Any differences between these guidelines and EPA's regulations should be resolved in favor of the regulations themselves. The italicized sections of this document describe the information generally necessary for EPA to determine if a TMDL submittal fulfills the legal requirements for approval. The sections in regular type reflect EPA's analysis of the state's compliance with these requirements. 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.

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

The TMDL submittal must clearly identify (40 C.F.R. §130.7(c)(1)):

- *the waterbody as it appears on the State's/Tribe's 303(d) list;*
- *the pollutant for which the TMDL is being established; and*
- *the priority ranking of the waterbody.*

The TMDL submittal must include (40 C.F.R. §130.7(c)(1); 40 C.F.R. §130.2):

- *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);*
- *facility names and NPDES permit numbers for point sources within the watershed; and*
- *a description of the natural background sources, and the magnitude and location of the sources, where it is possible to separate natural background from nonpoint sources.*

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:

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

Impaired waterbody segments subject to these TMDLs are located in south-eastern South Dakota and are part of the larger Missouri River basin. This TMDL document covers four listed segments of the Big Sioux River (HUC 10170203) including: 1) Big Sioux River from S2, T104N, R49W to I-90 (28.5 miles, SD-BS-R-BIG_SIOUX_08); 2) Big Sioux River from I-90 to the diversion return (15.8 miles, SD-BS-R-BIG_SIOUX_10); 3) Big Sioux River from diversion return to Sioux Falls wastewater treatment plant (WWTP) (4.7 miles, SD-BS-R-BIG_SIOUX_11); and 4) Big Sioux River from Sioux Falls WWTP to above Brandon, SD (4.2 miles, SD-BS-R-BIG_SIOUX_12). Figure 1-1 displays the

project area that shows the general location of the Big Sioux River and major tributaries within the project area, including the impaired segments. These segments have an extensive 303(d) listing and TMDL history:

- 2004 – Segments 8, 9, 10, 11 and 12 first listed for fecal coliform impairments.
- 2008 – EPA approved a fecal coliform TMDL for segment 8 (SD-BS-R-BIG_SIOUX_08, from near Dell Rapids to below Baltic).
- 2010 – DENR re-defined segment boundaries by dissolving segment 9 into segments 8 and 10. Segment 8's description expanded to: S2, T104N, R49W to I-90. Segments 8, 10, 11 and 12 first listed for *E. coli* and TSS impairments.
- 2012 – EPA approved fecal coliform, *E. coli* and TSS TMDLs for segments 8, 10, 11 and 12. This action replaced segment 8's 2008 fecal coliform TMDL.
- 2019 – DENR submitted revised *E. coli* and TSS TMDLs for segments 8, 10, 11 and 12. Once approved, this action will replace the 2012 TMDLs.

None of these impairments were included on South Dakota's 2018 303(d) List nor were they given a priority ranking for TMDL development because they were assigned Integrated Reporting Category 4a – Water impaired but has an approved TMDL. Prior to initial TMDL development they were considered high priorities. This information is contained in Section 1.0 (Introduction) and Section 1.2 (Clean Water Act Section 303(d) Listing Information).

Table 1-1 characterizes land uses draining into impaired segments and Section 3.2 discusses nonpoint sources of TSS such as surface runoff, bed and bank erosion, cropland erosion, and construction erosion. The pie charts in Figures 3-3, 3-4, 3-5 and 3-6 summarize Hydrological Simulation Program - FORTRAN (HSPF) model results and show the relative contribution from existing TSS sources categorized as local or upstream Municipal Separate Storm Sewer System (MS4), Big Sioux boundary conditions, Skunk Creek, Slip-up Creek, local bed and bank erosion, and upstream bed and bank erosion.

Point sources are identified by facility name and permit number in Table 3-1. Additionally, Figure 3-1 shows the location of point sources within the project area including the MS4 boundary.

Assessment: EPA concludes that the DENR adequately identified the impaired waterbodies, the pollutant of concern, the priority ranking, the identification, location and magnitude of the pollutant sources, and the important assumptions and information used to develop the TMDLs.

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

The TMDL submittal must include:

- *a description of the applicable State/Tribal water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy (40 C.F.R. §130.7(c)(1)); and*
- *a numeric water quality target for each TMDL. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal (40 C.F.R. §130.2(i)).*

EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

Section 2.0 (Water Quality Standards and Total Maximum Daily Load Targets) describes the water quality standards applicable to the impaired segments with citations to applicable South Dakota regulations. Segments 8, 10, 11, and 12 of the Big Sioux River are designated for the following beneficial uses:

- warmwater semipermanent fish life propagation,
- immersion recreation,
- limited contact recreation,
- irrigation,
- fish and wildlife propagation, recreation, and stock watering.

In addition, segments 8 and 10 are assigned a domestic water supply beneficial use. TSS is preventing the warmwater semipermanent fish life propagation uses from being supported on all four segments.

Numeric TSS criteria associated with these uses are applied as water quality targets for the TMDL. Table 2-1 displays the numeric TSS criteria for the warmwater semipermanent fish life propagation use which is comprised of a 30-day average criterion and a daily maximum criterion. These criteria are applicable year-round. TMDLs were primarily developed using the 30-day average criterion of 90 mg/L, however, TMDLs based on the daily maximum criterion of 158 mg/L were also included in Appendix A.

Assessment: EPA concludes that the DENR adequately described the applicable water quality standards and numeric water quality target for these TMDLs.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

The TMDL submittal must include the loading capacity for each waterbody and pollutant of concern. 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 TMDL submittal must:

- *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;*
- *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; and*
- *include a description and summary of the water quality data used for the TMDL analysis.*

EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation (40 C.F.R. §130.2).

The full water quality dataset should be made available as an appendix to the TMDL or as a separate electronic file. Other datasets used (e.g., land use, flow), if not included within the TMDL submittal, should be referenced by source and year. The TMDL analysis should make use of all readily available data for the waterbody unless the TMDL writer determines that the data are not relevant or appropriate.

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). Most TMDLs should be expressed as daily loads (USEPA. 2006a, USEPA. 2007a). If the TMDL is expressed in terms other than a daily load (e.g., annual load), the submittal should explain why it is appropriate to express the TMDL in the unit of measurement chosen.

The TMDL submittal must describe the critical conditions and related physical conditions in the waterbody as part of the analysis of loading capacity (40 C.F.R. §130.7(c)(1)). The critical condition can be thought of as the "worst case" scenario of environmental conditions (e.g., stream flow, temperature, loads) in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. TMDLs should define the applicable critical conditions and describe the approach used to estimate both point and nonpoint source loads under such critical conditions.

DENR relied on two methods to establish the loading capacity for each impaired segment: the Hydrological Simulation Program - FORTRAN (HSPF) model and the load duration curve approach. HSPF is a computer model that simulates hydrologic processes on the land surface and subsurface as well as the associated in-stream water quality. TSS monitoring data collected primarily by DENR, the U.S. Geological Survey (USGS) and the City of Sioux Fall, plus continuous flow recorded by the USGS, were used to calibrate the model as described in the original HSPF modeling report (RESPEC. 2012). The model was updated for the 2019 TMDL revisions with new meteorological data, land cover information, and diversion representations among other updates as explained in the 2019 modeling memo (RESPEC. 2019). DENR used the model to link sources of TSS to existing water quality and to evaluate TMDL implementation options through various scenario runs. Additionally, HSPF-generated flows and predicted TSS concentrations from the updated model were used to characterize existing loading conditions and establish the load duration curves used to define the loading capacity for each segment.

A load duration curve is a graphic representation of pollutant loads across flow regimes and the approach helps correlate water quality to flow conditions and provides insight into the variability of source contributions. EPA has provided guidance on the use of duration curves for TMDL development (USEPA. 2007b) and the practice is well established. Using this approach, DENR developed TMDLs at five different flow zones (i.e., high, moist, midrange, dry, low) for each segment as listed in Tables 5-2, 5-3, 5-4 and 5-5. Load duration curves, and the loading capacities based on the curves, are shown visually in Figures 4-1, 4-2, 4-3 and 4-4. While loading capacities are defined for multiple flow conditions, critical conditions exist in terms of the greatest observed exceedances during the high flow zone. DENR attributes the higher TSS concentrations during these conditions to streambed resuspension and decreased bank stability.

Assessment: EPA concludes that the loading capacity was calculated using an acceptable approach, used water quality targets consistent with numeric water quality criteria, and has been appropriately set at a level necessary to attain and maintain the applicable water quality standards. The pollutant loads have been expressed as daily loads. The critical conditions were described and factored into the calculations and were based on a reasonable approach to establish the relationship between the target and pollutant sources.

4. Load Allocation

The TMDL submittal must include load allocations (LAs). EPA regulations define LAs as the portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution and to natural background sources. Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. §130.2(g)). Where possible, separate LAs should be provided for natural background and for nonpoint sources.

In the rare instance that a TMDL concludes that there are no nonpoint sources or natural background for a pollutant, the load allocation must be expressed as zero and the TMDL should include a discussion of the reasoning behind this decision.

As described in Section 5.4 (Load Allocation), DENR established LAs for each river segment as the allowable load remaining after the WLA and explicit MOS have been accounted for (i.e., LA = TMDL – WLA – MOS). Tables 5-2, 5-3, 5-4 and 5-5 present LAs across five flow zones. These composite LAs represent all nonpoint source contributions, both human and natural, as one allocation, however, individual nonpoint source categories were characterized in greater depth in Section 3.0 (Significant Sources).

Assessment: EPA concludes that the LAs provided in the TMDL are reasonable and will result in attainment of the water quality standards.

5. Wasteload Allocations

The TMDL submittal must include wasteload allocations (WLAs). EPA regulations define WLAs as the portion of a receiving water's loading capacity that is allocated to existing and future point sources (40 C.F.R. §130.2(h)). If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero. If the TMDL recommends a zero WLA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero WLA implies an allocation only to nonpoint sources and natural background will result in attainment of the applicable water quality standards, and all point sources have no measurable contribution.

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. In some cases, WLAs may cover more than one discharger (e.g., if the source is contained within a general permit).

Table 3-1 identifies the six permitted point sources located within the drainage area of the four river segments. These are the Dell Rapids Wastewater Treatment Plant (WWTP), the Baltic WWTP and L.G. Everist in segment 8; the Sioux Falls Municipal Separate Storm Sewer System (MS4) in segments 10 and 11; Smithfield Foods (previously the John Morrell & Company) in segment 11 and the Sioux Falls WWTP in segment 12. Multiple Concentrated Animal Feeding Operations (CAFOs) also exist within the drainage area but no portion of the loading capacity was assigned to them because the CAFOs are designed to be zero discharge facilities except during rare storm events. Construction and industrial stormwater activities were evaluated but not assigned WLAs after DENR determined the area impacted by these activities make up less than 1.5% of the total project area.

DENR established non-stormwater WLAs using TSS concentrations more stringent than South Dakota's warmwater semipermanent fish life propagation criteria because technology-based effluent limits (45 or 135 mg/L) are more protective than the applicable water quality-based effluent limits and already effective in permits. Table 5-1 displays the individual non-stormwater WLAs and Tables 5-2, 5-3, 5-4 and 5-5 present all the WLAs, including the MS4, across the five flow zones.

Additionally, a future industrial growth WLA was established for each segment based on a flow rate of 10 million gallons per day to account for projected loading from new or expanded industries. DENR's proposed process for tracking and assigning this reserve capacity in the future is outlined on page 23. When DENR permits a new point source, the permit's statement of basis will detail how much of the future growth WLA will be assigned to the new point source and how much of the WLA remains unassigned. This process includes an opportunity for public comments and will provide a means to track the WLA and avoid situations of overallocation. Expanding the total WLA to include a future growth WLA component was the primary reason DENR chose to revise the 2012 TMDLs in accordance with EPA recommendations (USEPA. 2012).

Assessment: EPA concludes that the WLAs provided in the TMDL are reasonable, will result in the attainment of the water quality standards and will not cause localized impairments. The TMDL accounts for all current and future point sources contributing loads to impaired segments, upstream segments and tributaries in the watershed.

6. Margin of Safety

*The TMDL submittal must include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load allocations, wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). The MOS may be **implicit** or **explicit**.*

*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.*

The Big Sioux River TMDLs include explicit MOSs for each segment derived as 10% of the loading capacity (i.e., TMDL). The explicit MOSs are included in Tables 5-2, 5-3, 5-4 and 5-5 and vary by flow zone.

Assessment: EPA concludes that the TMDL incorporates an adequate explicit margin of safety.

7. Seasonal Variation

The TMDL submittal must be established with consideration of seasonal variations. The method chosen for including seasonal variations in the TMDL must be described (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

DENR relied on two primary methods to account for seasonal variation in these TMDLs: the HSPF model and the load duration curve approach. These methods reviewed conditions throughout many years and across various influencing factors such as temperature, precipitation and flow. The monthly variability of the monitoring dataset was also reviewed in Section 6.0 (Seasonality). TSS concentrations are generally highest during June and July when short-duration, high-intensity rainstorms are common.

Localized summer storms can cause significant runoff, increased flows, and increased TSS concentrations for a relatively short period of time.

Assessment: EPA concludes that seasonal variations were adequately described and considered to ensure the TMDL allocations will be protective of the applicable water quality standards throughout any given year.

8. Reasonable Assurances

When a TMDL is developed for waters impaired by both point and nonpoint sources, EPA guidance (USEPA. 1991) and court decisions say that the TMDL must 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 the applicable water quality standards (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

EPA guidance (USEPA. 1997) 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.

As verified through the TMDL analysis, segments 8, 10, 11 and 12 of the Big Sioux River are impaired by both point and nonpoint sources of TSS therefore reasonable assurances must be provided. DENR has done so in Section 9.3 (Reasonable Assurance).

The City of Sioux Falls led the development of the Draft Central Big Sioux River Watershed Water Quality Master Plan (City of Sioux Falls. 2013) to guide implementation efforts after the 2012 TMDLs were written. It addresses all nine key elements of a watershed plan as described by EPA's CWA Section 319 guidance (USEPA. 2008b). Within this plan, a watershed-scale, decision-support framework based on cost optimization was developed to support government and local planning agencies as they considered watershed-scale investments to improve water quality. This decision-support framework assisted in developing a more detailed TMDL implementation plan, identifying management practices to achieve pollutant reductions under the MS4 stormwater permit, and developing a phased BMP installation plan that is optimized for both cost and water quality effectiveness.

Section 9.1 (Recent Implementation) summarizes the quantity, location and costs of all installed BMPs known to DENR at this time. These activities are grouped into categories of agricultural waste systems, bank stabilization, cropland BMPs, grazing management and riparian restoration/protection, and city BMPs. For example, over $2.5 million dollars have been spent on grazing management and riparian restoration/protection BMPs in the project area; over $139 thousand of that came from EPA CWA Section 319 grants. Reductions necessary to meet LAs are expected to occur through the continued implementation of BMPs as described in existing planning documents (City of Sioux Falls. 2013) and local partnerships that support voluntary actions to address nonpoint sources.

WLAs were established based on facilities meeting technology-based effluent limits which are more stringent than South Dakota's TSS water quality criteria. Existing NPDES permit requirements are sufficient to be consistent with WLAs in the TMDL. Concerning MS4 controls, five stormwater BMPs

have been installed since 2012 and Table 9-8 lists the planned location and date of future stormwater BMPs extending out till 2026.

Lastly, DENR compared the potential reductions realized under various HSPF modeling scenarios to the total TMDL reductions in order to demonstrate that the reductions called for are possible. This comparison is summarized in Table 9-9.

Assessment: EPA considered the reasonable assurances contained in the TMDL submittal and concludes that they are adequate to meet the load reductions.

9. Monitoring Plan

The TMDL submittal should include a monitoring plan for all:

- *Phased TMDLs; and*
- *TMDLs with both WLA(s) and LA(s) where reasonable assurances are provided.*

Under certain circumstances, a phased TMDL should be developed when there is significant uncertainty associated with the selection of appropriate numeric targets, estimates of source loadings, assimilative capacity, allocations or when limited existing data are relied upon to develop a TMDL. EPA guidance (USEPA. 2006b) recommends that a phased TMDL submittal, or a separate document (e.g., implementation plan), include a monitoring plan, an explanation of how the supplemental data will be used to address any uncertainties that may exist when the phased TMDL is prepared and a scheduled timeframe for revision of the TMDL.

For TMDLs that need to provide reasonable assurances, the monitoring plan should describe the additional data to be collected to determine if the load reductions included in the TMDL are occurring and leading to attainment of water quality standards.

EPA guidance (USEPA. 1991, USEPA. 2008a) recommends post-implementation monitoring for all TMDLs to determine the success of the implementation efforts. Monitoring plans are not a required part of the TMDL and are not approved by EPA but may be necessary to support the decision rationale for approval of the TMDL.

DENR recently initiated a rotating basin approach to revisit established ambient water quality monitoring stations on a regular basis. With help from local DENR partners, like the East Dakota Water Development District, the Big Sioux River Basin will experience a comprehensive monitoring campaign in 2019. One aspect of this larger strategy involves collecting additional TSS samples from stations on segments 8, 10, 11, and 12 of the Big Sioux River. This information, and data collected in future years, will help gage the success of restoration efforts and provide insight into what actions still need to occur.

Assessment: Monitoring plans are not a required element of EPA's TMDL review and decision-making process. The TMDLs submitted by DENR include a monitoring strategy (Section 8.0) written to encourage future monitoring to measure progress toward attainment of water quality standards. The rotating basin approach is not mentioned in the TMDL, but EPA was aware of the effort and thought it noteworthy to mention. EPA is taking no action on the monitoring strategy included in the TMDL submittal.

10. Implementation

EPA policy (USEPA. 1997) 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. The 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.

EPA encourages States/Tribes to include restoration recommendations (e.g., framework) in all TMDLs for stakeholder and public use to guide future implementation planning. This could include identification of a range of potential management measures and practices that might be feasible for addressing the main loading sources in the watershed (see USEPA. 2008b, Chapter 10). Implementation plans are not a required part of the TMDL and are not approved by EPA but may be necessary to support the decision rationale for approval of the TMDL.

Section 9.0 (Restoration Strategy) summarizes implementation activities that have already occurred, discusses future management scenarios simulated by the HSPF model and outlines DENR's adaptive approach to TMDL implementation. The locations of existing best management practices are shown on a map (Figure 9-1) and quantified by category in term of the number of practices and the money spent to implement them. The HSPF model was used to better understand what additional actions must occur in order to meet water quality standards in each river segment. DENR simulated the following scenarios:

1. Future land use (e.g., agricultural lands converted into residential),
2. Upstream boundary conditions meet local upstream criteria (e.g., Big Sioux River above segment 8 meets 90 mg/L TSS and Skunk Creek meets 150 mg/L TSS),
3. Upstream boundary conditions meet warmwater semipermanent fish life propagation criteria (e.g. Big Sioux River above segment 8 and Skunk Creek both meet 90 mg/L TSS),
4. Loading from agricultural lands above Sioux Falls reduced by 90%,
5. Loading from instream scour on the Big Sioux River and major tributaries within the project area reduced by 50%,
6. Loading from the MS4 reduced by 85%,
7. Combined scenarios 3, 4, 5 and 6.

Simulated load reductions are presented for each scenario and segment in Table 9-9 and compared to the load reductions called for by the TMDL. Scenario 7 is the only scenario shown to consistently meet TMDL reduction goals.

Lastly, DENR commits to an iterative implementation process that makes progress toward achieving water quality goals by using new data and information whenever available to reduce uncertainty and adjust implementation activities accordingly.

Assessment: Although not a required element of the TMDL approval, DENR discussed how information derived from the TMDL analysis process can be used to support implementation of the TMDLs. EPA is taking no action on the implementation portion of the TMDL submittal.

11. Public Participation

EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each State/Tribe must, therefore, provide for public participation consistent with its own continuing planning process and public participation requirements (40 C.F.R. §25.3 and §130.7(c)(1)(ii)).

The final TMDL submittal must describe the State/Tribe's public participation process, including a summary of significant comments and the State/Tribe's responses to those comments (40 C.F.R. §25.3 and §25.8). Inadequate public participation could be a basis for disapproving a TMDL; however, where 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.

Section 7.0 (Public Participation) revisits the public engagement process DENR followed for the original 2012 TMDLs and summarizes what occurred for the revisions. DENR held a public meeting at the City of Sioux Falls Environmental Office on November 26, 2018. Subsequently, a draft of the updated TMDL report was made available for download and public review on DENR's website from May 16 to June 17, 2019. The public review period was announced in several area newspapers published on May 13 including the Sioux Falls Argus Leader, the Madison Daily Leader, and the Moody County Enterprise. DENR received no public comments on the revised TMDLs.

Assessment: EPA has reviewed the state's public participation process and concludes that the state involved the public during the development of the TMDLs and provided adequate opportunities for the public to comment on the draft report.

12. Submittal Letter

The final TMDL submittal must 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 (40 C.F.R. §130.7(d)(1)). The final submittal letter should contain such identifying information as the waterbody name, location, assessment unit number and the pollutant(s) of concern.

A transmittal letter with the appropriate information was included with the final TMDL report submission from DENR, dated June 21, 2019, and signed by Paul Lorenzen, Environmental Scientist Manager 1, Water Protection Program. Two technical reports further documenting how the HSPF model was applied to this project were also shared as attachments (RESPEC. 2012, RESPEC. 2019).

Assessment: EPA concludes that the state's submittal package clearly and unambiguously requested EPA to act on the TMDLs in accordance with the Clean Water Act and the submittal contained all necessary supporting information.

References

RESPEC. 2012. *Sioux Falls Total Maximum Daily Load Model Application, Development, Calibration, and Validation.* Topical Report RSI-2272. Prepared for SD DENR by RESPEC Consulting & Services, Rapid City, SD.

RESPEC. 2019. *External Memorandum: Sioux Falls 2018 Total Maximum Daily Load Update, Changes to HSPF Model Application and Total Maximum Daily Load Documents.* Prepared for SD DENR by RESPEC Consulting & Services, Rapid City, SD.

SD DENR. 2012. *Total Suspended Solids Total Maximum Daily Load for the Big Sioux River, Minnehaha County South Dakota.* Topical Report RSI-2182. Prepared for SD DENR by RESPEC Consulting & Services, Rapid City, SD.

USEPA. 1991. *Guidance for water quality-based decisions: The TMDL process.* EPA 440-4-91-001. Office of Water, Assessment and Watershed Protection Division and Office of Wetlands, Oceans, and Watersheds, U.S. Environmental Protection Agency, Washington, DC.

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