

EPA REGION VIII TMDL REVIEW FORM

Document Name:	Belle Fourche River Watershed – Phase I Assessment Final Report and TMDLs
Submitted by:	Gene Stueven, SD DENR
Date Received:	January 24, 2005
Review Date:	January 26, 2005
Reviewer:	Vern Berry, EPA
Formal or Informal Review?	Formal – Final Approval

This document provides a standard format for EPA Region 8 to provide comments to the South Dakota Department of Environment and Natural Resources on TMDL documents provided to the EPA for either official formal or informal review. All TMDL documents are measured against the following 12 review criteria:

1. Water Quality Impairment Status
2. Water Quality Standards
3. Water Quality Targets
4. Significant Sources
5. Technical Analysis
6. Margin of Safety and Seasonality
7. Total Maximum Daily Load
8. Allocation
9. Public Participation
10. Monitoring Strategy
11. Restoration Strategy
12. Endangered Species Act Compliance

Each of the 12 review criteria are described below to provide the rational for the review, followed by EPA's comments. This review is intended to ensure compliance with the Clean Water Act and also to ensure that the reviewed documents are technically sound and the conclusions are technically defensible.

1. Water Quality Impairment Status

Criterion Description – Water Quality Impairment Status

TMDL documents must include a description of the listed water quality impairments. While the 303(d) list identifies probable causes and sources of water quality impairments, the information contained in the 303(d) list is generally not sufficiently detailed to provide the reader with an adequate understanding of the impairments. TMDL documents should include a thorough description/summary of all available water quality data such that the water quality impairments are clearly defined and linked to the impaired beneficial uses and/or appropriate water quality standards.

- Satisfies Criterion
- Satisfies Criterion. Questions or comments provided below should be considered.
- Partially satisfies criterion. Questions or comments provided below need to be addressed.
- Criterion not satisfied. Questions or comments provided below need to be addressed.
- Not a required element in this case. Comments or questions provided for informational purposes.

SUMMARY – The Belle Fourche River is a natural stream that originates in Wyoming, drains parts of Butte, Lawrence and Meade Counties in South Dakota, and flows to the Cheyenne River in Meade County and ultimately to the Missouri River. The Belle Fourche River watershed is approximately 2,100,000 acres (3,300 sq. miles) in size in South Dakota and approximately 2,400,000 acres (3,700 sq. miles) in Wyoming. Approximately 84% of the landuse in the watershed is rangeland and 10% is agricultural.

The Belle Fourche River is identified in the 1998, 2002 and the 2004 South Dakota 303(d) Waterbody Lists as impaired due to elevated TSS concentrations. The 2004 listing includes five (5) segments of the main stem River as impaired for TSS, and all of these waters are identified as high priority for TMDL development. The five (5) Belle Fourche River segments included in this approval are:

- From the Wyoming border to near Fruitdale
- From near Fruitdale to Whitewood Creek
- From Whitewood Creek to Willow Creek
- From Willow Creek to Alkali Creek
- From Alkali Creek to the mouth

The 2004 listing also includes the Belle Fourche River as impaired by fecal coliform bacteria from the Wyoming border to near Fruitdale, SD (i.e., 1 segment). The bacteria listing will be addressed in a future TMDL report.

Horse Creek was listed in the 1998 impaired waterbody list for total dissolved solids (TDS), which was later determined to be a listing error. The Horse Creek listing was corrected in the 2002 report and instead listed for conductivity. The 2004 Integrated Report also lists Horse Creek as impaired by conductivity. During the assessment, approximately 10% of the samples collected from Horse Creek exceeded the water quality standard for TSS. For this reason, a TMDL was developed for Horse Creek for both TSS and conductivity. This TMDL approval includes the TSS impairment for Horse Creek; the conductivity impairment will be addressed in a separate document.

2. Water Quality Standards

Criterion Description – Water Quality Standards

The TMDL document must include a description of all applicable water quality standards for all affected jurisdictions. TMDLs result in maintaining and attaining water quality standards. Water quality standards are the basis from which TMDLs are established and the TMDL targets are derived, including the numeric, narrative, use classification, and antidegradation components of the standards.

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SUMMARY – The TMDLs address the Belle Fourche River and Horse Creek segments that are impaired by total suspended solids (TSS). The South Dakota Department of Environment and Natural Resources has applicable numeric standards for TSS that may be applied to these river segments. The numeric standard being implemented in these TMDLs is: $TSS \leq 158$ mg/L daily maximum, which is based on the warmwater permanent fish life propagation classification for the Belle Fourche River segments, and the warmwater semi-permanent fish life classification for the Horse Creek segment. Other applicable water quality standards are included on pages 21 and 22 of the assessment report.

3. Water Quality Targets

Criterion Description – Water Quality Targets

Quantified targets or endpoints must be provided to address each listed pollutant/water body combination. Target values must represent achievement of applicable water quality standards and support of associated beneficial uses. For pollutants with numeric water quality standards, the numeric criteria are generally used as the TMDL target. For pollutants with narrative standards, the narrative standard must be translated into a measurable value. At a minimum, one target is required for each pollutant/water body combination. It is generally desirable, however, to include several targets that represent achievement of the standard and support of beneficial uses (e.g., for a sediment impairment issue it may be appropriate to include targets representing water column sediment such as TSS, embeddeness, stream morphology, up-slope conditions and a measure of biota).

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SUMMARY – Water quality targets for these TMDLs are based on the numeric water quality standards for TSS. The TMDL documents include a TSS target of ≤ 158 mg/L, based on the warmwater permanent fish life beneficial use classification of the Belle Fourche segments, and warmwater semi-permanent fish life classification of Horse Creek. Reduction targets (expressed as percentages) are also specified in the TMDL summaries, and are based on the mean TSS values derived from the data collected during the period of assessment for each of the listed segments.

4. Significant Sources

Criterion Description – Significant Sources

TMDLs must consider all significant sources of the stressor of concern. All sources or causes of the stressor must be identified or accounted for in some manner. The detail provided in the source assessment step drives the rigor of the allocation step. In other words, it is only possible to specifically allocate quantifiable loads or load reductions to each significant source when the relative load contribution from each source has been estimated. Ideally, therefore, the pollutant load from each significant source should be quantified. This can be accomplished using site-specific monitoring data, modeling, or application of other assessment techniques. If insufficient time or resources are available to accomplish this step, a phased/adaptive management approach can be employed so long as the approach is clearly defined in the document.

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SUMMARY – According to the 2004 South Dakota Integrated Report (IR), the five (5) impaired segments of the Belle Fourche River from the Wyoming border to its mouth at the confluence with the Cheyenne River, failed to support its assigned uses due to high TSS. Horse Creek is listed in the 2004 IR as impaired for conductivity. However, during the course of the assessment, Horse Creek was determined to also be impaired for sediment. The TMDLs for these waterbodies state that agricultural activities are deemed a likely source of occasional TSS impairment, as well as poor grazing practices and a natural source that originates from erosion of exposed shale beds upstream of the city of Belle Fourche. The watershed assessment identifies hydrologic alteration, irrigation practices, and riparian degradation as the primary sources of increased TSS concentrations.

Several municipalities are located within the Belle Fourche River watershed including Belle Fourche, Central City, Deadwood, Fruitdale, Lead, Newell, Nisland, Spearfish, Sturgis, Vale, and Whitewood. The following municipalities within the Belle Fourche River watershed have point-source discharge permits for treated wastewater: Lead/Deadwood Sanitary District (Lead, Deadwood, and Central City), Nisland, Newell, Spearfish, and Whitewood. All other municipalities have non-discharge wastewater treatment facilities. Additional permitted point sources occur in watershed and have wasteload allocations (WLAs) included in the TMDL. These point sources are not significant sources of sediment to the watershed, however, the TMDL includes WLAs for all of the permitted point sources at their current loading levels.

5. Technical Analysis

Criterion Description – Technical Analysis

*TMDLs must be supported by an appropriate level of technical analysis. It applies to **all** of the components of a TMDL document. It is vitally important that the technical basis for **all** conclusions be articulated in a manner that is easily understandable and readily apparent to the reader. Of particular importance, the cause and effect relationship between the pollutant and impairment and between the selected targets, sources, TMDLs, and allocations needs to be supported by an appropriate level of technical analysis.*

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SUMMARY – The technical analysis addresses the needed TSS reductions to achieve the desired water quality in each impaired river segment. The TMDL specifies a 55% reduction in average annual TSS loads to each of the five (5) Belle Fourche River segments, and a 41% reduction in the Horse Creek segment. The Hydrologic Simulation Program-Fortran (HSPF) was used to simulate the hydraulic processes of the Belle Fourche River/Horse Creek watershed, estimate TSS loads within the watersheds, and identify the potential sources of TSS.

TMDLs were calculated for Horse Creek and each of the five (5) listed segments of the Belle Fourche River. FLUX, a program developed by the US Army Corps of Engineers, was used to estimate the current TSS load at the water quality monitoring sites. This information was used to derive export coefficients for sediment, in order to target areas with excessive loads of sediment, within each listed segment.

6. Margin of Safety and Seasonality

Criterion Description – Margin of Safety/Seasonality

A margin of safety (MOS) is a required component of the TMDL that accounts for the uncertainty about the relationship between the pollutant loads and the quality of the receiving water body (303(d)(1)(c)). The MOS can be implicitly expressed by incorporating a margin of safety into conservative assumptions used to develop the TMDL. In other cases, the MOS can be built in as a separate component of the TMDL (in this case, quantitatively, a $TMDL = WLA + LA + MOS$). In all cases, specific documentation describing the rationale for the MOS is required.

Seasonal considerations, such as critical flow periods (high flow, low flow), also need to be considered when establishing TMDLs, targets, and allocations.

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SUMMARY – Appropriate implicit margins of safety are included through conservative assumptions in the derivation of the targets and in the modeling. Additionally, more BMPs were specified than are necessary to meet the targets, and ongoing monitoring has been proposed to assure water quality goals are achieved. Ten percent explicit margins of safety are also included by reserving a portion of the TSS loading capacity for each TMDL.

Seasonality was adequately considered by evaluating the cumulative impacts of the various seasons on water quality and by proposing BMPs that can be tailored to seasonal needs. The monthly hydrologic contributions from each segment for the 1998-2003 listing period were calculated by the FLUX program in kg/year. These monthly loads were grouped together by season as follows:

- Winter – December, January, February
- Spring – March, April, May
- Summer – June, July, August
- Fall – September, October, November

A majority of the annual TSS load occurs during the spring and summer months. Approximately 40% of the Belle Fourche load occurs during the spring for most sites. Approximately 70% of the Horse Creek load occurs during the summer months. The variation in monthly loads is attributed to seasonal variation in hydrologic contributions.

7. TMDL

Criterion Description – Total Maximum Daily Load

TMDLs include a quantified pollutant reduction target. According to EPA regulations (see 40 CFR 130.2(i)). TMDLs can be expressed as mass per unit of time, toxicity, % load reduction, or other measure. TMDLs must address, either singly or in combination, each listed pollutant/water body combination.

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SUMMARY – TMDLs were calculated for Horse Creek and each of the five (5) listed segments of the Belle Fourche River. The TMDLs recommend a 55% reduction in average annual TSS loads to each of the five (5) Belle Fourche River segments and a 41% reduction in load to the Horse Creek segment. The TMDL loads and reductions are based on the “measured load” which are derived from the flow and concentration data collected during the period of the assessment. The annual loading will vary from year-to-year; therefore, these TMDLs are considered a long term average percent reduction in TSS loading.

8. Allocation

Criterion Description – Allocation

TMDLs apportion responsibility for taking actions or allocate the available assimilative capacity among the various point, nonpoint, and natural pollutant sources. Allocations may be expressed in a variety of ways such as by individual discharger, by tributary watershed, by source or land use category, by land parcel, or other appropriate scale or dividing of responsibility. A performance based allocation approach, where a detailed strategy is articulated for the application of BMPs, may also be appropriate for nonpoint sources.

In cases where there is substantial uncertainty regarding the linkage between the proposed allocations and achievement of water quality standards, it may be necessary to employ a phased or adaptive management approach (e.g., establish a monitoring plan to determine if the proposed allocations are, in fact, leading to the desired water quality improvements).

Allocating load reductions to specific sources is generally the most contentious and politically sensitive component of the TMDL process. It is also the step in the process where management direction is provided to actually achieve the desired load reductions. In many ways, it is a prioritization of restoration activities that need to occur to restore water quality. For these reasons, every effort should be made to be as detailed as possible and also, to base all conclusions on the best available scientific principles.

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SUMMARY – These TMDLs address the need to achieve further reductions in sediment to attain water quality goals in Belle Fourche River and Horse Creek watersheds. The Belle Fourche TMDLs include both load allocations and wasteload allocations attributed to nonpoint sources and point sources respectively as specified in the TMDLs. The Horse Creek TMDL only has a load allocation because there are no point sources in the Horse Creek segment. The nonpoint source allocations and the specified reductions of TSS concentrations can be achieved through the implementation of BMPs including irrigation scheduling, efficient irrigation application and transport, reuse of runoff/tail-water, riparian zone rehabilitation, and grazing management.

Based on permit limits and system design flow rates, point source discharge facilities in the Belle Fourche River watershed can discharge approximately 265 tons/year of TSS. However, the calculated actual TSS load from these facilities is considerably less at approximately 38.6 tons/year. Individual point source estimates for the WLA were calculated using system design flow rates and effluent limit concentrations for each permitted facility.

9. Public Participation

Criterion Description – Public Participation

The fundamental requirement for public participation is that all stakeholders have an opportunity to be part of the process. Notifications or solicitations for comments regarding the TMDL should clearly identify the product as a TMDL and the fact that it will be submitted to EPA for review. When the final TMDL is submitted to EPA for review, a copy of the comments received by the state should be also submitted to EPA..

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SUMMARY – The State’s submittal includes a summary of the public participation process that has occurred which describes the ways the public has been given an opportunity to be involved in the TMDL development process. In particular, efforts were taken to educate the public education, and solicit feedback during development of the TMDLs. This included local newspaper articles, general public meetings, technical group meetings, and Belle Fourche River Watershed Partnership meetings. The general public meetings provided an opportunity to present assessment results and to receive input from the stakeholders. The comments/findings from these public meetings have been taken into consideration in development of the TMDLs. The State also posted the draft TMDLs on the internet for review and comment, and solicited comments using public notice announcements in newspapers.

10. Monitoring Strategy

Criterion Description – Monitoring Strategy

TMDLs may have significant uncertainty associated with selection of appropriate numeric targets and estimates of source loadings and assimilative capacity. In these cases, a phased TMDL approach may be necessary. For Phased TMDLs, it is EPA’s expectation that a monitoring plan will be included as a component of the TMDL documents to articulate the means by which the TMDL will be evaluated in the field, and to provide supplemental data in the future to address any uncertainties that may exist when the document is prepared.

At a minimum, the monitoring strategy should:

- *Articulate the monitoring hypothesis and explain how the monitoring plan will test it.*
- *Address the relationships between the monitoring plan and the various components of the TMDL (targets, sources, allocations, etc.).*
- *Explain any assumptions used.*
- *Describe monitoring methods.*
- *Define monitoring locations and frequencies, and list the responsible parties.*

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SUMMARY – The TMDLs describe the State’s plans for follow-up monitoring. Monitoring will be necessary to determine whether or not the proposed implementation actions have had an impact on water quality in the Belle Fourche watershed. At a minimum, quarterly monitoring will continue for the following SD DENR ambient monitoring sites:

- WQM 130 (BF2)
- WQM 83 (BF4)
- WQM 81 (BF5)
- WQM 21 (BF7)
- WQM 76 (BF11)

Horse Creek monitoring will be conducted a minimum of once per year at the following site (in addition to the daily flow and monthly data collected by USGS):

- USGS 06436760 (HC4)

Monitoring and evaluation efforts will be targeted toward the effectiveness of implemented BMP’s.

11. Restoration Strategy

Criterion Description – Restoration Strategy

At a minimum, sufficient information should be provided in the TMDL document to demonstrate that if the TMDL were implemented, water quality standards would be attained or maintained. Adding additional detail regarding the proposed approach for the restoration of water quality is not currently a regulatory requirement, but is considered a value added component of a TMDL document.

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SUMMARY – The Belle Fourche River Watershed Partnership was awarded a 319 implementation grant to support a one-year project. The goals of this project are to begin initial implementation of BMPs in the watershed to reduce TSS, develop a 10-year watershed strategic implementation plan to guide the long-term process to reduce TSS in a cost effective manner, and conduct public education and outreach to stakeholders within the Belle Fourche watershed to assist in developing the 10-year strategic implementation plan.

12. Endangered Species Act Compliance

Criterion Description – Endangered Species Act Compliance

EPA's approval of a TMDL may constitute an action subject to the provisions of Section 7 of the Endangered Species Act ("ESA"). EPA will consult, as appropriate, with the US Fish and Wildlife Service (USFWS) to determine if there is an effect on listed endangered and threatened species pertaining to EPA's approval of the TMDL. The responsibility to consult with the USFWS lies with EPA and is not a requirement under the Clean Water Act for approving TMDLs. States are encouraged, however, to participate with FWS and EPA in the consultation process and, most importantly, to document in its TMDLs the potential effects (adverse or beneficial) the TMDL may have on listed as well as candidate and proposed species under the ESA.

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SUMMARY – EPA has received ESA Section 7 concurrence from the FWS for these TMDLs.

13. Miscellaneous Comments/Questions