



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8

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Ref: 8-MO

12 April 2006

Mr. Art Compton, Director
Planning, Prevention and Assistance Division
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Re: TMDL Approvals
Bitterroot Headwaters TPA

Dear Mr. Compton:

We have completed our review of the total maximum daily loads (TMDLs) as submitted by your office for the Bitterroot Headwaters TMDL Planning Area (TPA). The TMDLs are included in the document entitled Water Quality Restoration Plan and Total Maximum Daily Loads for the Bitterroot Headwaters Planning Area transmitted to us for review and approval in correspondence dated November 3, 2005 and signed by you. In accordance with the Clean Water Act (33 U.S.C. 1251 *et. seq.*), we approve all aspects of the TMDLs as developed for the Bitterroot Headwaters TPA. Enclosure 1 to this letter provides a summary of the elements of the TMDLs and Enclosure 2 provides details of our review of the TMDLs.

Based on our review, we feel the separate TMDL elements listed in Enclosure 2 adequately address the pollutants of concern, taking into consideration seasonal variation and a margin of safety. In approving this TMDL, EPA affirms that the TMDLs have been established at a level necessary to attain and maintain the applicable water quality standards and has the necessary components of an approvable TMDL.

EPA has been in contact with the United States Fish and Wildlife Service (FWS) regarding whether and, if so, how the EPA's approval of the Bitterroot Headwaters TPA TMDLs may affect the continued existence of any endangered or threatened species listed under the Endangered Species Act (ESA) or the designated critical habitat of any such species. EPA has not determined that today's approval may have such an affect. Therefore, consistent with the terms of a consent decree in the lawsuit of Friends of the Wild Swan, et al., v. U.S. Environmental Protection Agency, et al., Civil Action No. CV99-87-M-LBE, United States District Court for the District of Montana, Missoula Division, EPA has decided to approve these TMDLs contingent upon the outcome of consultation with the FWS.



Thank you for your submittal. If you have any questions concerning this approval, feel free to contact Ron Steg of my staff at (406) 457-5024.

Sincerely,

Original Signed by Max H. Dodson

Max H. Dodson
Assistant Regional Administrator
Ecosystems Protection and Remediation

Enclosures

cc: Claudia Massman, Attorney
Montana Department of Environmental Quality
P.O. Box 200901
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Dean Yashan
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APPROVED TMDLs
Bitterroot Headwaters Planning Area

17 pollutant TMDLs completed
 5 Determinations made that no pollutant TMDL was needed

Waterbody Name*	TMDL Parameter/ Pollutant	Water Quality Goal/Endpoint	TMDL	WLA LA	Supporting Documentation (not an exhaustive list of supporting documents)
Buck Creek MT76H002_060	Siltation Suspended Solids	% subsurface fines < 2 mm = 11-27%. % subsurface fines < 6 mm = 16-38%. D50=7-64 mm. Clinger Richness \geq 14.	Sum of the allocations to the known human-caused sediment sources. This equates to a 50% reduction in total load.	WLA = 0 LA = 68% reduction in loading from roads, and a 75% reduction in loading from human-caused bank erosion. PLUS a performance-based allocation to future sources and additional study to identify other potentially significant sources	“Water Quality Restoration Plan and Total Maximum Daily Loads for the Bitterroot Headwaters Planning Area” MT DEQ (October 2005)
Ditch Creek MT76H003_060	Siltation Suspended Solids	% subsurface fines < 2 mm = 11-27%. % subsurface fines < 6 mm = 16-38%. D50=7-64 mm. Clinger Richness \geq 14.	Sum of the allocations to the known human-caused sediment sources. This equates to a 60% reduction in total load.	WLA = 0 LA = 63% reduction in loading from roads, and a 75% reduction in loading from human-caused bank erosion. PLUS a performance-based allocation to future sources and additional study to identify other potentially significant sources	“
Hughes Creek MT76H003_040	Siltation Suspended Solids	% subsurface fines , 2mm = 14-32% for C4 stream types, 11-27% for B4 stream types. % subsurface fines , 6 mm = 17-49% for C4 stream types, 16-38% for B4 stream types. D50 = 3-47 mm for C4 stream types, 7-64 mm for B4 stream types. Clinger Richness \geq 14.	Sum of the allocations to the known human-caused sediment sources. This equates to a 3% reduction in total load.	WLA = 0 LA = 36% reduction in loading from roads, and a 75% reduction in loading from human-caused bank erosion. PLUS a performance-based allocation to future sources and additional study to identify other potentially significant sources	“

Waterbody Name*	TMDL Parameter/ Pollutant	Water Quality Goal/Endpoint	TMDL	WLA LA	Supporting Documentation (not an exhaustive list of supporting documents)
	Thermal Modification	In-stream temperature target of 15 degrees C. Supplemental indicator of 78% effective shade.	Sum of the allocations to the known human-caused sediment sources. This equates to a 50% reduction in thermal loading from the known anthropogenic sources and further equates to 375 btu/ft ² /day.	WLA=0 LA=100% reduction in shade loss from fire and timber harvest. PLUS A performance-based allocation to future sources and phased allocation study to address roads, impervious surfaces and mining.	“
Nez Perce Fork Bitterroot River MT76H003_020	Thermal Modification	In-stream temperature targets of 12 (upper reach) and 15 (lower reach) degrees C. Supplemental indicator of 45% effective shade.	Sum of the allocations to the known human-caused thermal sources. This equates to a 11% reduction in thermal loading from the known anthropogenic sources and further equates to 949 btu/ft ² /day.	WLA=0 LA= 100% reduction in shade loss from timber harvest. PLUS A performance-based allocation to future sources and phased allocation study to address roads, impervious surfaces and mining.	“
Overwhich Creek MT76H003_050	Thermal Modification	In-stream temperature targets of 12 (upper reach) and 15 (lower reach) degrees C. Supplemental indicator of 45% effective shade.	Sum of the allocations to the known human-caused thermal sources. This equates to a 46% reduction in thermal loading from the known anthropogenic sources and further equates to 456 btu/ft ² /day.	WLA=0 LA=100% reduction in shade loss from fire. PLUS A performance-based allocation to future sources and phased allocation study to address roads, impervious surfaces and mining.	“
	Lead (Metals)	Justification for no need of a lead TMDL. Numeric criteria for lead currently met.			

Waterbody Name*	TMDL Parameter/ Pollutant	Water Quality Goal/Endpoint	TMDL	WLA LA	Supporting Documentation (not an exhaustive list of supporting documents)
West Fork Bitterroot River MT76H003_010	Siltation	% subsurface fines , 2mm = 6-20% for C4 stream type. % subsurface fines , 6 mm = 17-49% for C4 stream type. D50 = 3-47 mm for C4 stream type. Clinger Richness \geq 14.	Sum of the allocations to the known human-caused sediment sources. This equates to a 5% reduction in total load.	WLA=0 LA=A 57% reduction in sediment loading from forest roads and a 75% reduction in sediment from eroding stream banks. PLUS a performance-based allocation to future sources and additional study to identify other potentially significant sources	“
	Thermal Modification	In-stream temperature targets of 12 (upper reach) and 15 (lower reach) degrees C. Supplemental indicator of 45% effective shade.	Phased allocation to address roads and mining. Currently these sources are potentially irretrievable commitment of resources.	WLA=0 LA = Phased	
	Noxious Aquatic Plants	Justification for no need of a nutrient TMDL. Narrative criteria for nutrients currently met.			
Moose Creek MT76H002_040	Siltation Nutrients	Justification for no need of a siltation and nutrient TMDL. Narrative criteria for siltation and nutrients are currently met.			“
Reimel Creek MT76H002_020	Siltation Suspended Solids	% subsurface fines , 2mm = 14-32% for C4 stream types, 11-27% for B4 stream types. % subsurface fines , 6 mm = 17-49% for C4 stream types, 16-38% for B4 stream types. D50 = 3-47 mm for C4 stream types, 7-64 mm for B4 stream types. Clinger Richness \geq 14.	Sum of the allocations to the known human-caused sediment sources. This equates to a 1% reduction in total load.	WLA = 0 LA = 65% reduction in loading from roads. PLUS a performance-based allocation to future sources and additional study to identify other potentially significant sources	“
Gilbert Creek MT76H002_080	Siltation Suspended Solids	% subsurface fines , 2mm = 11-27% for B4 stream types. % subsurface fines , 6 mm = 16-38% for B4 stream types. D50 = 7-64 mm for B4 stream types. Clinger Richness \geq 14.	Sum of the allocations to the known human-caused sediment sources. This equates to a 2% reduction in total load.	WLA = 0 LA = 63% reduction in loading from roads, and a 75% reduction in loading from human-caused bank erosion. PLUS a performance-based allocation to	“

Waterbody Name*	TMDL Parameter/ Pollutant	Water Quality Goal/Endpoint	TMDL	WLA LA	Supporting Documentation (not an exhaustive list of supporting documents)
				future sources and additional study to identify other potentially significant sources	
Laird Creek MT76H0002_070	Siltation Suspended Solids	% subsurface fines , 2mm = 11-27% for B4 stream types. % subsurface fines , 6 mm = 16-38% for B4 stream types. D50 = 7-64 mm for B4 stream types. Clinger Richness \geq 14.	Sum of the allocations to the known human-caused sediment sources. This equates to a 2% reduction in total load.	WLA = 0 LA = 63% reduction in loading from roads, and a 75% reduction in loading from human-caused bank erosion. PLUS a performance-based allocation to future sources and additional study to identify other potentially significant sources	“
East Fork Bitterroot River MT76H002_010	Siltation	% subsurface fines, 2mm = 14-32% for C4 channel types, 6-20% for C3 channel types, 5-19% for B3 channel types. % subsurface fines, 6mm = 17-49% for C4 channel types, 8-24% for C3 channel types, and 7-25% for B3 channel types. D50 = 3-47mm for C4 channel types, 71-89mm for C3 channel types, and 64-256mm for B3 channel types. Clinger Richness > 14.	Sum of the allocations to the known human-caused sediment sources. This equates to a 2% reduction in total load.	WLA = 0 LA = 42% reduction in loading from roads, and a 75% reduction in loading from human-caused bank erosion. PLUS a performance-based allocation to future sources and additional study to identify other potentially significant sources	“
	Thermal Modification	In-stream temperature targets of 12 (upper reach) and 15 (lower reach) degrees C. Supplemental indicator of 55% effective shade.	Sum of the allocations to the known human-caused thermal sources. This equates to a 35% reduction in thermal loading from the known anthropogenic sources and further equates to 770 btu/ft ² /day.	WLA=0 LA= 100% reduction in shade loss from timber harvest. PLUS A performance-based allocation to future sources and phased allocation study to address roads, impervious surfaces and mining.	
Meadow Creek MT76H002_030	Other Habitat Alterations	Non-pollutant Impairment. No TMDL required.			“
Deer Creek MT76H003_030	Other Habitat Alterations	Non-pollutant Impairment. No TMDL required.			“
Martin Creek MT76H002_050	Flow Alterations	Non-pollutant Impairment. No TMDL required.			“
	Thermal Modifications				

EPA REGION VIII MONTANA OFFICE TMDL REVIEW FORM

Document Name:	Water Quality Restoration Plan and Total Maximum Daily Loads for the Bitterroot Headwaters Planning Area
Submitted by:	MTDEQ
Date Received:	November 3, 2005
Review Date:	March 2, 2006
Reviewer:	Ron Steg
Formal or Informal Review?	FORMAL

This document provides a standard format for the EPA Montana Office to provide comments to the Montana Department of Environmental Quality 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. Total Maximum Daily Load
6. Allocation
7. Margin of Safety and Seasonality
8. Monitoring Strategy
9. Restoration Strategy
10. Public Participation
11. Endangered Species Act Compliance
12. Technical Analysis

Each of the 12 review criteria are described below to provide the rationale for the review, followed by EPA's summary and comments/questions. **Comments/questions that need to be addressed are presented in bold.** 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 with stipulations provided below that must be addressed.
- 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.

Fourteen water quality limited segments (WQLS) in the Bitterroot Headwaters TPA appeared on Montana's 1996 and/or 2004 303(d) lists. A summary of the 303(d) list status through 2004 and the current water quality impairment status is provided in the table below.

Final Impairment Status of the Listed Streams in the Bitterroot Headwaters TPA.

Waterbody	Listed Cause of Impairment ¹	1996 303(d) List	2004 303(d) List	Impaired Yes/No/Undetermined	TMDL Required	TMDL Developed
Buck Creek	Other Habitat Alterations	X		YES	NO	NO
	Siltation	X		YES	YES	YES
	Suspended Solids	X		YES	YES	YES
Ditch Creek	Other Habitat Alterations	X		YES	NO	NO
	Siltation	X		YES	YES	YES
	Suspended Solids	X		YES	YES	YES
Deer Creek	Other Habitat Alterations	X		NO	NO	NO
Hughes Creek	Other Habitat Alterations	X	X	YES	NO	NO
	Siltation	X		YES	YES	YES
	Suspended Solids	X		YES	YES	YES
	Thermal Modifications	X		YES	YES	YES
Overwhich Creek	Thermal Modifications	X		YES	YES	YES
	Flow Alterations	X		NO	NO	NO
	Lead		X	NO	NO	NO
Nez Perce Fork	Thermal Modifications	X		YES	YES	YES
West Fork Bitterroot River	Other Habitat Alterations	X	X	YES	NO	NO
	Siltation		X	YES	YES	YES
	Thermal Modifications	X		YES	YES	YES
	Noxious Aquatic Plants	X		NO	NO	NO
	Flow Alteration	X		NO	NO	NO
Moose Creek	Siltation	X	X	NO	NO	NO
	Nutrients		X	NO	NO	NO
Martin Creek	Thermal Modifications	X		NO	NO	NO

	Flow Alterations	X		NO	NO	NO
Meadow Creek	Other Habitat Alterations	X		NO	NO	NO
Reimel Creek	Other Habitat Alterations	X		YES	NO	NO
	Siltation	X		YES	YES	YES
	Suspended Solids	X		YES	YES	YES
Gilbert/Laird Creeks	Other Habitat Alterations	X	X	YES	NO	NO
	Siltation	X	X	YES	YES	YES
	Suspended Solids	X		YES	YES	YES
East Fork Bitterroot River	Other Habitat Alterations	X		YES	NO	NO
	Siltation	X		YES	YES	YES
	Flow Alterations	X		Undetermined	NO	NO
	Thermal Modifications			YES ³	NO	YES

All told, 16 water body-pollutant combinations appearing on the 1996 303(d) list were addressed in this document. A 17th water body pollutant combination (East Fork Bitterroot River/Thermal Modification) was identified during the TMDL process and addressed through preparation of a TMDL. Details regarding the TMDL elements for each of these are presented in Enclosure 1.

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 TMDL's are established and the TMDL targets are derived, including the numeric, narrative, use classification, and antidegradation components of the standards.

- Satisfies Criterion
- Satisfies Criterion with stipulations provided below that must be addressed.
- 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.

The applicable water quality standards are adequately summarized in Section 3.2.

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).

- Satisfies Criterion
- Satisfies Criterion with stipulations provided below that must be addressed.
- 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.

The targets are summarized in Enclosure 1. With the exception one of the sediment targets (i.e., clinger richness), they appear to be appropriate. While clinger richness was commonly used by MTDEQ and EPA in Montana at the time this TMDL document was prepared, it has subsequently been determined that it may not provide an accurate linkage between the aquatic life beneficial use and sediment. MTDEQ has recently developed new methods for interpreting macroinvertebrate data. These methods should be used in future TMDL documents.

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.

- Satisfies Criterion
- Satisfies Criterion with stipulations provided below that must be addressed.
- 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.

The two primary pollutants addressed in this document include temperature and sediment. While Overwhich Creek was originally listed for lead and the West Fork Bitterroot River was listed for “noxious aquatic plants”, justification has been provided, documenting that these no longer constitute water quality standards violations. Comments pertaining to the source assessment for temperature and sediment are provided below.

Temperature

The primary sources of anthropogenic thermal modification include reduced shade resulting from historic timber harvest, mining, and road building. Flow alteration associated with irrigation was cited as a potential source for the East Fork Bitterroot River. Temperature sources were identified through air photo interpretation followed by ground-truthing in representative areas. The SHADOW model was used to quantify the thermal affects associated with the identified sources.

Sediment

The primary sources of sediment considered in this analysis included natural background loading, timber harvest, fire, roads, sediment from unstable/eroding banks, and traction sand applied to highways. A modeling approach using a modification of Disturbed WEPP was applied for estimates of sediment loading from natural background, timber harvest and fires. The FroSAM model was applied to estimate road sediment loads. Sediment loads from unstable banks were estimated based on air photo analysis, on-the-ground field surveys and application of BEHI. Loading from traction sand was estimated based on application rate information obtained from the Montana Department of Transportation, assumptions about delivery based on best professional judgment, and simple calculations. In summary, the source assessment for the waters in the Bitterroot Headwaters TPA appears to be very thorough and the methods applied appear appropriate.

5. TMDL

Criterion Description – Total Maximum Daily Load

TMDLs include a quantified pollutant reduction target. According to EPA reg (see 40 C.F.R. 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.

- Satisfies Criterion
- Satisfies Criterion with stipulations provided below that must be addressed.
- 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.

A total of 13 TMDLs have been prepared. Sediment TMDLs have been prepared for Buck Creek, Ditch Creek, Hughes Creek, West Fork Bitterroot River, Reimel Creek, Gilbert Creek, Laird Creek, and the East Fork Bitterroot River. Temperature TMDLs have been prepared for Hughes Creek, Nez Perce Fork of the Bitterroot River, Overwhich Creek, the West Fork of the Bitterroot River, and the East for Bitterroot River. These TMDLs appear to be appropriate and are described in Enclosure 1.

6. 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 non point 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.

- Satisfies Criterion
- Satisfies Criterion with stipulations provided below that must be addressed.
- 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.

TMDLs, and associated allocations, have been prepared for sediment in Buck Creek, Ditch Creek, Hughes Creek, West Fork Bitterroot River, Reimel Creek, Gilbert Creek, Laird Creek, and the East Fork Bitterroot River and for temperature in Hughes Creek, Nez Perce Fork of the Bitterroot River, Overwhich Creek, the West Fork of the Bitterroot River, and the East for Bitterroot River. The allocations appear to be appropriate/adequate and are described in Enclosure 1.

7. 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.

- Satisfies Criterion
- Satisfies Criterion with stipulations provided below that must be addressed.
- 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.

TMDLs have been prepared for sediment and temperature in a number of water bodies. The margins of safety for each are described below:

Temperature

An uncertainty analysis has been presented for temperature in Section 5.7. This analysis formed the basis for the margin of safety (MOS) presented in Section 5.7.3. The MOS's for the temperature TMDLs is implicit and include the use of conservative assumptions, and a phased adaptive management approach.

Sediment

An uncertainty analysis has been presented for sediment in Section 4.10 and formed the basis for the MOS presented in Section 4.10.3. The MOS for sediment is implicit and focuses on the use of conservative assumptions and adaptive management.

8. Monitoring Strategy

Criterion Description – Monitoring Strategy

Many TMDL's are likely to 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.*

- Satisfies Criterion
- Satisfies Criterion with stipulations provided below that must be addressed.
- 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.

The monitoring plan was developed to meet the following objectives:

1. Document water quality trends associated with future implementation efforts.
2. Monitor progress toward meeting water quality targets.
3. Fill existing data gaps.
4. Implement the adaptive management strategy.
5. Conduct a phased hydrologic study to evaluate the effects of flow alteration.
6. Address uncertainties.

The monitoring strategy appears to be adequate.

9. 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.

- 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.

A water quality restoration strategy has been prepared that prioritizes implementation measures to attain and maintain water quality standards.

10. 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. Public participation should fit the needs of the particular TMDL.

- Satisfies Criterion
- Satisfies Criterion with stipulations provided below that must be addressed.
- 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.

Public involvement activities are described in Section 10.0 and appear to be adequate.

11. 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.

- Satisfies Criterion
- Satisfies Criterion with stipulations provided below that must be addressed.
- 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.

The level of technical analysis appears to be very thorough and adequate for the situation.

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.

- Satisfies Criterion
- Satisfies Criterion with stipulations provided below that must be addressed.
- 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.

EPA will address ESA issues. It should be noted, however, that Section 7.0 of the document includes a review of potential issues that relate to threatened and endangered species in the TPA.