EPA REGION VIII TMDL REVIEW

TMDL Document Info:

Document Name:	**Echo Reservoir TMDL Water Quality Study**
Submitted by:	**Utah Department of Environmental Quality Division of Water Quality**
Date Received:	**12/15/2009**
Review Date:	**01/20/2009**
Reviewer:	**S. Spence**
Rough Draft / Public Notice / Final Draft?	**Public Notice Draft**
Notes:	

Reviewers Final Recommendation(s) to EPA Administrator (used for final draft review only):

- ☐ Approve
- ☐ Partial Approval
- ☐ Disapprove
- ☒ Insufficient Information

Approval Notes to Administrator:

This document provides a standard format for EPA Region 8 to provide comments to state TMDL programs on TMDL documents submitted to EPA for either formal or informal review. All TMDL documents are evaluated against the minimum submission requirements and TMDL elements identified in the following 8 sections:

1. Problem Description
   1.1. . TMDL Document Submittal Letter
   1.2. Identification of the Waterbody, Impairments, and Study Boundaries
   1.3. Water Quality Standards
2. Water Quality Target
3. Pollutant Source Analysis
4. TMDL Technical Analysis
   4.1. Data Set Description
   4.2. Waste Load Allocations (WLA)
   4.3. Load Allocations (LA)
   4.4. Margin of Safety (MOS)
   4.5. Seasonality and variations in assimilative capacity
5. Public Participation
6. Monitoring Strategy
7. Restoration Strategy
8. Daily Loading Expression

Under Section 303(d) of the Clean Water Act, waterbodies that are not attaining one or more water quality standard (WQS) are considered "impaired." When the cause of the impairment is determined to be a pollutant, a TMDL analysis is required to assess the appropriate maximum allowable pollutant loading rate. A TMDL document consists of a technical analysis conducted to: (1) assess the maximum pollutant loading rate that a waterbody is able to assimilate while maintaining water quality standards; and (2) allocate that assimilative capacity among the known sources of that pollutant**.** A well written TMDL document will describe a path forward that may be used by those who implement the TMDL recommendations to attain and maintain WQS.

Each of the following eight sections describes the factors that EPA Region 8 staff considers when reviewing TMDL documents. Also included in each section is a list of EPA's minimum submission requirements relative to that section, a brief summary of the EPA reviewer's findings, and the reviewer's comments and/or suggestions. Use of the verb "must" in the minimum submission requirements denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation. Use of the term "should" below denotes information that is generally necessary for EPA to determine if a submitted TMDL is approvable.

This review template is intended to ensure compliance with the Clean Water Act and that the reviewed documents are technically sound and the conclusions are technically defensible.

1. Problem Description

A TMDL document needs to provide a clear explanation of the problem it is intended to address. Included in that description should be a definitive portrayal of the physical boundaries to which the TMDL applies, as well as a clear description of the impairments that the TMDL intends to address and the associated pollutant(s) causing those impairments. While the existence of one or more impairment and stressor may be known, it is important that a comprehensive evaluation of the water quality be conducted prior to development of the TMDL to ensure that all water quality problems and associated stressors are identified. Typically, this step is conducted prior to the 303(d) listing of a waterbody through the monitoring and assessment program. The designated uses and water quality criteria for the waterbody should be examined against available data to provide an evaluation of the water quality relative to all applicable water quality standards. If, as part of this exercise, additional WQS problems are discovered and additional stressor pollutants are identified, consideration should be given to concurrently evaluating TMDLs for those additional pollutants. If it is determined that insufficient data is available to make such an evaluation, this should be noted in the TMDL document.

1.1 TMDL Document Submittal Letter

When a TMDL document is submitted to EPA requesting formal comments or a final review and approval, the submittal package should include a letter identifying the document being submitted and the purpose of the submission.

Minimum Submission Requirements.

- ☐ A TMDL submittal letter should be included with each TMDL document submitted to EPA requesting a formal review.
- ☐ The submittal letter should specify whether the TMDL document is being submitted for initial review and comments, public review and comments, or final review and approval.
- ☐ Each TMDL document submitted to EPA for final review and approval should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute**.** The submittal letter should contain such identifying information as the name and location of the waterbody and the pollutant(s) of concern, which matches similar identifying information in the TMDL document for which a review is being requested.

Recommendation:
☐ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information ☒ N/A

Summary: *EPA was notified via e-mail from UDEQ that the Echo Reservoir TMDL document was available for public comment on the UDEQ website. A more formal submittal letter typically accompanies final TMDL submittals from the State and is expected to accompany the submittal of the final Echo Reservoir TMDL document. Hence, there are no concerns regarding the approach to the current submittal of this public draft document.*

Comments: *None*

1.2 Identification of the Waterbody, Impairments, and Study Boundaries

The TMDL document should provide an unambiguous description of the waterbody to which the TMDL is intended to apply and the impairments the TMDL is intended to address. The document should also clearly delineate the physical boundaries of the waterbody and the geographical extent of the watershed area studied. Any additional information needed to tie the TMDL document back to a current 303(d) listing should also be included.

Minimum Submission Requirements:

☒ The TMDL document should clearly identify the pollutant and waterbody segment(s) for which the TMDL is being established. If the TMDL document is submitted to fulfill a TMDL development requirement for a waterbody on the state's current EPA approved 303(d) list, the TMDL document submittal should clearly identify the waterbody and associated impairment(s) as they appear on the State's/Tribe's current EPA approved 303(d) list, including a full waterbody description, assessment unit/waterbody ID, and the priority ranking of the waterbody. This information is necessary to ensure that the administrative record and the national TMDL tracking database properly link the TMDL document to the 303(d) listed waterbody and impairment(s).

☒ One or more maps should be included in the TMDL document showing the general location of the waterbody and, to the maximum extent practical, any other features necessary and/or relevant to the understanding of the TMDL analysis, including but not limited to: watershed boundaries, locations of major pollutant sources, major tributaries included in the analysis, location of sampling points, location of discharge gauges, land use patterns, and the location of nearby waterbodies used to provide surrogate information or reference conditions. Clear and concise descriptions of all key features and their relationship to the waterbody and water quality data should be provided for all key and/or relevant features not represented on the map

☒ If information is available, the waterbody segment to which the TMDL applies should be identified/geo-referenced using the National Hydrography Dataset (NHD). If the boundaries of the TMDL do not correspond to the Waterbody ID(s) (WBID), Entity_ID information or reach code (RCH_Code) information should be provided. If NHD data is not available for the waterbody, an alternative geographical referencing system that unambiguously identifies the physical boundaries to which the TMDL applies may be substituted.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

Summary: *Echo Reservoir is an impoundment of the Weber River in Summit County Utah. Maps are provided showing the watershed and location of the waterbody. Echo Reservoir was first identified as being impaired in 1996 for its cold water fishery (class 3A) beneficial use. The waterbody is listed on Utah's 2006 303(d) list as partially supporting its class 3A use due to low dissolved oxygen (DO) and high total phosphorus concentrations. The waterbody ID is UT-L-16020101-001.*

Comments: *It would be helpful for the author to provide a summary of the attainment status for other beneficial uses associated with the reservoir and other waterbodies in the watershed. Are there any concerns with nutrient impairments to the streams in the watershed and will this TMDL be protective of those waters' beneficial uses?*

1.3 Water Quality Standards

TMDL documents should provide a complete description of the water quality standards for the waterbodies addressed, including a listing of the designated uses and an indication of whether the uses are being met, not being met, or not assessed. If a designated use was not assessed as part of the TMDL analysis (or not otherwise recently assessed), the documents should provide a reason for the lack of assessment (e.g., sufficient data was not available at this time to assess whether or not this designated use was being met).

Water quality criteria (WQC) are established as a component of water quality standard at levels considered necessary to protect the designated uses assigned to that waterbody. WQC identify quantifiable targets and/or qualitative water quality goals which, if attained and maintained, are intended to ensure that the designated uses for the waterbody are protected. TMDLs result in maintaining and attaining water quality standards by determining the appropriate maximum pollutant loading rate to meet water quality criteria, either directly, or through a surrogate measurable target. The TMDL document should include a description of all applicable water quality criteria for the impaired designated uses and address whether or not the criteria are being attained, not attained, or not evaluated as part of the analysis. If the criteria were not evaluated as part of the analysis, a reason should be cited (e.g. insufficient data were available to determine if this water quality criterion is being attained).

Minimum Submission Requirements:

☒ The TMDL 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 anti-degradation policy. (40 C.F.R. §130.7(c)(1)).

☐ The purpose of a TMDL analysis is to determine the assimilative capacity of the waterbody that corresponds to the existing water quality standards for that waterbody, and to allocate that assimilative capacity between the significant sources. Therefore, <u>all TMDL documents must be written to meet the existing water quality standards</u> for that waterbody (CWA §303(d)(1)(C)). *Note: In some circumstances, the load reductions determined to be necessary by the TMDL analysis may prove to be infeasible and may possibly indicate that the existing water quality standards and/or assessment methodologies may be erroneous. However, the TMDL must still be determined based on existing water quality standards. Adjustments to water quality standards and/or assessment methodologies may be evaluated separately, from the TMDL.*

☒ The TMDL document should describe the relationship between the pollutant of concern and the water quality standard the pollutant load is intended to meet. This information is necessary for EPA to evaluate whether or not attainment of the prescribed pollutant loadings will result in attainment of the water quality standard in question.

☒ If a standard includes multiple criteria for the pollutant of concern, the document should demonstrate that the TMDL value will result in attainment of all related criteria for the pollutant. For example, both acute and chronic values (if present in the WQS) should be addressed in the document, including consideration of magnitude, frequency and duration requirements.

Recommendation:
☐ Approve ☐ Partial Approval ☐ Disapprove ☒ Insufficient Information

<u>Summary:</u>
The submittal provides a table (table 3.1) showing the acute and chronic DO standards that apply to 3A waters. In addition, the pollutant of concern, beneficial use class, and use support status are provided. Utah has indicator values (not standards) for total phosphorus levels in streams and reservoirs. Table 3.1 from the submittal is provided on the following page. Data provided in the submittal demonstrates that the waterbody is phosphorus limited and links the DO impairment to excess primary productivity

related to total phosphorus loading. The submittal demonstrates that the total phosphorus (TP) indicator value of 0.05 mg/L is suitable for beneficial use protection in Echo Reservoir.

Table 3.1. Beneficial use and associated water quality standards for Dissolved Oxygen (DO) and Total Phosphorus (TP) for Echo Reservoir.

Pollutant of concern	Beneficial Use Class	Beneficial Use Support	Standard	Indicator Value
Total phosphorus	3A – Cold water aquatic life	Partial Support	DO(acute) ≥8.0/4.0 mg/L [a] DO(chronic) ≥6.5 mg/l Temperature ≤20 °C	TP (streams) ≤ 0.05 mg/l TP (reservoirs) ≤ 0.025 mg/l

[a] First number indicates acute DO standard applicable to early-life stage aquatic species, second number is applicable to adult-life stage aquatic species.

Comments:
The submittal must describe all components of the DO standard including the instantaneous minimum, 7-day average, 30-day average, and all early life stage criteria that are applicable to a 3A reservoir. The document should provide justification as to whether early life stage criteria are applicable. The submittal uses on the acute 4.0 mg/L DO value as the target and does not address the other components of the DO standard. The TMDL must be developed to ensure attainment of both the acute and chronic DO standard.

2. Water Quality Targets

TMDL analyses establish numeric targets that are used to determine whether water quality standards are being achieved. Quantified water quality targets or endpoints should be provided to evaluate each listed pollutant/water body combination addressed by the TMDL, and should 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 water quality target. For pollutants with narrative standards, the narrative standard should 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 a variety of targets representing water column sediment such as TSS, embeddeness, stream morphology, up-slope conditions and a measure of biota).

Minimum Submission Requirements:

☐ The TMDL should identify a numeric water quality target(s) for each waterbody pollutant combination. The TMDL target is a quantitative value used to measure whether or not the applicable water quality standard is attained. *Generally, the pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical (e.g., chromium) contained in the water quality standard. Occasionally, the pollutant of concern is different from the parameter that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorus and the numeric water quality target is expressed as a numerical DO criterion). In such cases, the TMDL should explain the linkage between the pollutant(s) of concern, and express the quantitative relationship between the TMDL target and pollutant of concern. In all cases, TMDL targets must represent the attainment of current water quality standards.*

☐ When a numeric TMDL target is established to ensure the attainment of a narrative water quality criterion, the numeric target, the methodology used to determine the numeric target, and the link between the pollutant of concern and the narrative water quality criterion should all be described in the TMDL document. Any additional information supporting the numeric target and linkage should also be included in the document.

Recommendation:
☐ Approve ☐ Partial Approval ☐ Disapprove ☒ Insufficient Information

Summary: *The TMDL submittal document lists the following targets/endpoints for East Canyon Creek and Reservoir that are based on the discussion of the standards provided in section 1.3.*

Water Quality Targets/Endpoints	Trophic Status and Algae • Shift away from blue-green algal dominance. • TSI values for Chlorophyll A not to exceed 50 (mesotrophic). Dissolved Oxygen • 4 mg/L dissolved oxygen in at least 50% of the water column. Phosphorus • Mean total phosphorus concentration in reservoir of 0.025 mg/L • Mean total phosphorus concentration in tributary waters of 0.05 mg/L

Comments: *The submittal uses the acute 4.0 mg/L DO value as the target and does not address the other components of the DO standard. The TMDL must be developed to ensure attainment of both the acute and chronic DO standards. The ability of the TMDL to achieve attainment of all applicable acute and chronic DO standards must be demonstrated in the submittal document.*

3. Pollutant Source Analysis

A TMDL analysis is conducted when a pollutant load is known or suspected to be exceeding the loading capacity of the waterbody. Logically then, a TMDL analysis should consider all sources of the pollutant of concern in some manner. The detail provided in the source assessment step drives the rigor of the pollutant load allocation. In other words, it is only possible to specifically allocate quantifiable loads or load reductions to each significant source (or source category) when the relative load contribution from each source has been estimated. Therefore, the pollutant load from each significant source (or source category) should be identified and quantified to the maximum practical extent. This may 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 may be appropriate. The approach should be clearly defined in the document.

Minimum Submission Requirements:

☐ The TMDL should include an identification of all potentially significant point and nonpoint sources of the pollutant of concern, including the geographical location of the source(s) and the quantity of the loading, e.g., lbs/per day. This information is necessary for EPA to evaluate the WLA, LA and MOS components of the TMDL.

☒ The level of detail provided in the source assessment should be commensurate with the nature of the watershed and the nature of the pollutant being studied. Where it is possible to separate natural background from nonpoint sources, the TMDL should include a description of both the natural background loads and the nonpoint source loads.

☒	Natural background loads should not be assumed to be the difference between the sum of known and quantified anthropogenic sources and the existing *in situ* loads (e.g. measured in stream) unless it can be demonstrated that all significant anthropogenic sources of the pollutant of concern have been identified, characterized, and properly quantified.
☒	The sampling data relied upon to discover, characterize, and quantify the pollutant sources should be included in the document (e.g. a data appendix) along with a description of how the data were analyzed to characterize and quantify the pollutant sources. A discussion of the known deficiencies and/or gaps in the data set and their potential implications should also be included.

Recommendation:
☐ Approve ☐ Partial Approval ☐ Disapprove ☒ Insufficient Information

Summary:
The submittal provides a detailed source assessment for phosphorus loading into the watershed. Identified sources of TP to the reservoir include the bulleted items listed below. The loading estimates for point sources are based on water quality data and flow measurements. Estimates of loading from nonpoint sources are based on literature values and calculations.

- *Wastewater Treatment Plant and Other Point sources - Loading from point sources was determined from effluent data and discharge volumes.*
    - *Kamas Lagoons – This is the wastewater treatment plat for the town of Kamas. The facility is not currently regulated for nutrients.*
    - *Snyderville Basin Silver Creek Water Reclamation Facility. This plant serves Park City and has a 1.5 MGD capacity and is not currently regulated for nutrients.*
    - *Oakley WWTP – This is a microfiltration filtration facility. Currently, it is not regulated for nutrients.*
    - *Coalville WWTP – The facility serves the town of Coalville and had a 0.4 MGD capacity. The facility is not regulated for nutrients and during low water year events discharges into Chalk Creek but during high water events, it discharges directly to Echo Reservoir.*
    - *Fish Hatchery Point Source – A discharge permit exists for this facility; but, it is not currently regulated for nutrients.*
- *Animal feeding operations – Direct loading of waste into the watershed along with runoff of land applied animal waste was estimated. Eighteen animal feeding operations are located in the watershed. Ten of these facilities contribute to the nutrient load in the watershed. Little is know about these facilities and their locations. The submittal states that there is considerable uncertainty associated with the estimates of loading from land applied animal waste. The assumptions used in the estimation of this load are provided on page 50. A mass balance approach based on Bicknell et al (1993) was used in load estimations.*
- *Grazing – The number of grazing animals on private lands were observed during two field events and total numbers of animals and locations were estimated. US Forest Service grazing allotments were used to estimate the number of animals on public lands. Assumptions used in estimating this load are provided on page 55. Load estimates were based on the proximity of the animals to water with application of conversion factors (provided in the Agricultural Waste Management Handbook, NRCS 1992) to convert the number of animals to TP production rates. The amount of land area effected and an estimated delivery ratio of TP to the waterways was used to estimate loading.*
- *Septic Systems – The assumptions used in estimating the load to the watershed from septic systems are provided on page 61.*
- *Diffuse Loads from Runoff – This category includes fertilizer runoff and nutrients associated with erosion. Loads were estimated based on literature values for loading based on land use categories.*

- *Internal Reservoir loading – Loading estimates were based on phosphorus release rate data for nearby reservoirs and assuming that the sediment surface area is equal to the reservoir water surface area at any given time. A bathymetric model was used to determine average monthly surface area for Echo Reservoir from 1984 – 2004.*
- *Natural Background – This includes nutrient loading that occurs from natural or undisturbed conditions. To estimate this load, a review of water quality data collected in areas with minimal anthropogenic influence water conducted. These measurements were used to provide an estimate of natural background concentrations in the watershed.*

A loading source summary is provided on page 73 and an excerpt is provided on the following page.

Table 4.26. Summary of annual total watershed loads in the Echo Reservoir TMDL study area by source category.

Source	Annual Total Phosphorus Load (kg)
Animal Feeding Operations	
Direct Stream Loading	1,495
Land Applied Animal Waste	5,542
Grazing	
Public Lands	196
Private Lands	8,803
Onsite Wastewater Treatment Systems	380
Point Sources	6,450
Diffuse Loads from Runoff	26,724
Internal Reservoir Loading	1,701
Total of all Sources	**51,290**

Table 4.27. Summary of annual total watershed loads by subwatershed.

	Annual Total Phosphorus Loading to Streams (kg/yr)								
Subwatershed	**Direct Stream Loading from Animal Feeding Operations**	**Land Applied Animal Wastes**	**Public Land Grazing**	**Private Land Grazing**	**Onsite WWTS**	**Point Sources**	**Diffuse Loads from Runoff**	**Internal Reservoir Loading**	**Total of all Sources**
Upper Weber River	417	891	111	970	92	475	4,683		7,639
Beaver Creek	165	1,376	85	2,298	81	1,756	5,739		11,500
Weber River Below Beaver Creek	599	1,291	0	450	33	0	2,274		4,647
Wanship Reservoir	0	2	0	0	15	0	821		838
Weber River Below Wanship Reservoir	0	37	0	72	36	0	261		406
Silver Creek	66	516	0	10	65	4,070	2,450		7,177
Weber River Below Silver Creek	0	389	0	1,468	34	0	2,782		4,673
Chalk Creek	248	962	0	3,535	24	149	6,541		11,458
Echo Reservoir	0	78	0	0	0	0	1,173	1,701	2,952
Total of all Subwatersheds	**1,495**	**5,542**	**196**	**8,803**	**380**	**6,450**	**26,724**	**1,701**	**51,290**

Table 4.2 on page 48 provides a summary of the annual load entering Echo Reservoir based upon water quality and stream flow data.

Table 4.2. Annual total phosphorus (TP) loads calculated at selected monitoring locations in the Echo Reservoir Watershed using streamflow and water quality monitoring data. Bold values are used to calculate total load to Echo Reservoir.

Station	Station Name	TP Load (kg/yr)
Stream Stations		
492626	Huff Creek Above Confluence with Chalk Creek	1,275
492628	Chalk Creek at Utah/Wyoming State Line	1,181
492629	Chalk Creek above Confluence with the South Fork	3,636
492635	**Chalk Creek at US 189 Crossing**	**10,544**
492636	South Fork Chalk Creek 1 Mile Above Chalk Creek	4,006
492640	**Weber River Above Echo Reservoir**	**13,657**
492675	Silver Creek at Wanship Above Confluence with the Weber River	4,945
492695	Silver Creek at City Park Above Prospector Square	177
492701	Weber River Below Wanship Reservoir	7,162
492725	Weber River Above Wanship Reservoir	7,550
492830	Beaver Creek Above Crooked Creek	4,552
492853	Beaver Creek Above Weber-Provo Canal	409
492901	Beaver Creek above Kamas Fish Hatchery	549
492920	Weber River above Weber-Provo Diversion	4,513
492949	Smith and Morehouse Creek above Confluence with the Weber River	522
Point Sources		
492632	**Coalville WWTP**	**149**
492679	Silver Creek WWTP	4,070
492802	Oakley Lagoons	475
492850	Kamas Lagoons	1,322
492900	Kamas Fish Hatchery Effluent	434
Total		**24,350**

The submittal document states that the loads shown in tables 4.26 and 4.27 are calculated at the source and do not represent the load that is ultimately delivered to the reservoir. The document refers the reader to the linkage analysis provided in Section 4.4 of the submittal. The following is the introduction of the linkage analysis section that is provided to explain how the total estimated load from all sources (based upon assumptions and calculations for all sources expect the point sources) of 51,290 kg/yr relates to the actual load of 24,350 kg/yr measured at the inlet to the reservoir (based upon water quality and stream flow data).

4.4 Linkage Analysis

A critical component of the TMDL process is to determine the cause-and-effect relationship between pollutant sources and the desired water quality target. In a review of scientific literature, Carpenter et al. (1998), has shown that non-point sources of phosphorus have lead to eutrophic conditions for many lakes and reservoirs across the U.S. One consequence of eutrophication is oxygen depletion caused by decomposition of algae and aquatic plants. They also document that a reduction in nutrients will eventually lead to the reversal of eutrophication and attainment of designated beneficial uses. Nurnberg (1995, 1995a, 1996, 1997), developed a model that quantified duration (days) and extent of lake oxygen depletion, referred to as an anoxic factor (AF). This model showed that AF is positively correlated with average annual total phosphorus concentrations. Nurnberg (1996) developed several regression models that show nutrients (P and N) control all trophic state indicators related to oxygen and phytoplankton in lakes and reservoirs. The morphometry of Echo Reservoir, such as mean depth and surface area, fall within the range of lakes used by Nurnberg (1996). As a result, the empirical nutrient-oxygen relationships provided by Nurnberg (1996) are applicable to Echo Reservoir.

Another critical component in this analysis is that calculated watershed loads must be linked to measured loads at the inlet to Echo Reservoir. Information contained in Table 4.27 provides calculated watershed loads for each significant source of total phosphorus in the study area. The total phosphorus load that Echo Reservoir can assimilate (permissible loading) and still support dissolved oxygen concentrations will be determined and then be allocated between the different pollutant source categories in the watershed. Calculation of allowable loads and load allocations are in Chapter 5 of this report.

Phosphorus loads from each source were linked to measured loads at three locations including Chalk Creek, the Weber River below Wanship Reservoir (including Silver Creek), and the Weber River above Wanship Reservoir. The linkage was established by assuming that the percent contribution from each pollutant source category to the total watershed load (all sources) comprised the same percent contribution at the watershed outlet.

Monthly values for each pollutant source were determined to assess the seasonal distribution of watershed outlet loads. The monthly distribution of loads from septic tanks were assumed to be equal throughout the year and calculated by dividing the annual load by 12. Monthly loads from land applied manure were determined based on the assumptions and method previously described in section 4.3.1.2.

Monthly loads from AFOs, diffuse runoff, and grazing on public and private lands were determined using the HYSEP baseflow separation procedure (Sloto and Crouse 1996) on the 1903-2003 streamflow record for USGS Gage 10128500 (Weber River at Oakley). This method partitions streamflow volume by month into base-flow and surface-flow components. The base-flow portion of stream discharge is from groundwater contributions while the surface-flow portion is from rain or snowmelt (Table 4.28). Annual phosphorus loads from each source was then multiplied by the proportion of surface flow to determine the monthly distribution of loads.

Comments:

The linkage analysis section states that the annual phosphorus load from ***each*** *source was multiplied by the proportion of surface flow to determine the monthly distribution of loads. Was this approach applied to the point sources; and if so, what is the rationale? Wastewater treatment plant point source discharges are not necessarily linked to surface flow conditions. In addition, we have a question as to whether or not there are any MS4 storm water permits for this watershed that should be included in the allocations especially associated with Park City.*

It is not clear how the calculated load to the watershed of 51,290 kg/yr results in a load at the inlet of Echo Reservoir that is only 24,350 kg/yr. The author is asked to clearly explain the relationship between the estimated loads entering the watershed at their source and the final load at the reservoir. Numerous tables including but not limited to tables 4.30, 4.31, 4.2, and 5.12 present the nonpoint source loads at the

source and relate these to loads delivered to the reservoir. It would be very helpful to more clearly explain the process used for this conversion.

4. TMDL Technical Analysis

TMDL determinations should be supported by a robust data set and an appropriate level of technical analysis**.** This 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.

A TMDL analysis determines the maximum pollutant loading rate that may be allowed to a waterbody without violating water quality standards. The TMDL analysis should demonstrate an understanding of the relationship between the rate of pollutant loading into the waterbody and the resultant water quality impacts. This stressor → response relationship between the pollutant and impairment and between the selected targets, sources, TMDLs, and load allocations needs to be clearly articulated and supported by an appropriate level of technical analysis. Every effort should be made to be as detailed as possible, and to base all conclusions on the best available scientific principles.

The pollutant loading allocation is at the heart of the TMDL analysis. TMDLs apportion responsibility for taking actions by allocating 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 division of responsibility.

The pollutant loading allocation that will result in achievement of the water quality target is expressed in the form of the standard TMDL equation:

$$TMDL = \sum LAs + \sum WLAs + MOS$$

Where:

TMDL = Total Pollutant Loading Capacity of the waterbody

LAs = Pollutant Load Allocations

WLAs = Pollutant Wasteload Allocations

MOS = The portion of the Load Capacity allocated to the Margin of safety.

Minimum Submission Requirements:

☐ A TMDL must identify the loading capacity of a waterbody for the applicable pollutant, taking into consideration temporal variations in that capacity. 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 total loading capacity of the waterbody should be clearly demonstrated to equate back to the pollutant load allocations through a balanced TMDL equation. In instances where numerous LA, WLA and seasonal TMDL capacities make expression in the form of an equation cumbersome, a table may be substituted as long as it is clear that the total TMDL capacity equates to the sum of the allocations.

☒ The TMDL document should describe the methodology and technical analysis used to establish and quantify 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.

☒ It is necessary for EPA staff to be aware of any assumptions used in the technical analysis to understand and evaluate the methodology used to derive the TMDL value and associated loading allocations. Therefore, the TMDL document should contain a description of any important assumptions (including the basis for those assumptions) made in developing the TMDL, including but not limited to:

(1) the spatial extent of the watershed in which the impaired waterbody is located and the spatial extent of the TMDL technical analysis;
(2) the distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) a presentation of relevant information affecting the characterization of the pollutant of concern and its allocation to sources such as population characteristics, wildlife resources, industrial activities etc…;
(4) present and future growth trends, if taken into consideration in determining the TMDL and preparing the TMDL document (e.g., the TMDL could include the design capacity of an existing or planned wastewater treatment facility);
(5) an explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable. Surrogate measures are parameters such as percent fines and turbidity for sediment impairments; chlorophyll *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

☒ The TMDL document should contain documentation supporting the TMDL analysis, including an inventory of the data set used, a description of the methodology used to analyze the data, a discussion of strengths and weaknesses in the analytical process, and the results from any water quality modeling used. This information is necessary for EPA to review the loading capacity determination, and the associated load, wasteload, and margin of safety allocations.

☐ TMDLs must take critical conditions (e.g., steam flow, loading, and water quality parameters, seasonality, etc…) into account as part of the analysis of loading capacity (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable critical conditions and describe the approach used to determine both point and nonpoint source loadings under such critical conditions. In particular, the document should discuss the approach used to compute and allocate nonpoint source loadings, e.g., meteorological conditions and land use distribution.

☐ Where both nonpoint sources and NPDES permitted point sources are included in the TMDL loading allocation, and attainment of the TMDL target depends on reductions in the nonpoint source loads, the TMDL document must include a demonstration that nonpoint source loading reductions needed to implement the load allocations are actually practicable [40 CFR 130.2(i) and 122.44(d)].

Recommendation:
☐ Approve ☐ Partial Approval ☐ Disapprove ☒ Insufficient Information

Summary:
In-stream pollutant loads were calculated based on water quality and flow monitoring data at locations where both flow and water quality values were available. Annual loads were calculated at several locations throughout the watershed. Where USGS stream flow gages existed, their data were used in place of instantaneous flow measurements. Flow monitoring records for the WWTP facilities were used to calculate loads from these facilities. Average monthly concentrations were calculated from DWQ sampling data at each location. The period of record was 1992 through 2003. Modeling was performed (model developed by Utah State University's Water Research Laboratory) to determine acceptable TP loading necessary to achieve the TMDL targets.

Load allocations were determined as described in section 3.0 of this document. Two tables summarizing the allocation of loads and the TMDL are provided in the submittal as shown on the following page.

Table 5.11. Allocation of total phosphorus loads for the Echo Reservoir TMDL. Wasteload allocation and Load allocation shown in this table represent loads to the Echo Reservoir inlet. Load allocations assigned to the point of discharge are included in Table 5.12.

Category	Allocation (kg/yr)
Existing Load to Echo Reservoir	24,350
Permissible Load to Echo Reservoir	22,997
Explicit Margin of Safety (10%)	2,300
TMDL Target Load for Echo Reservoir	20,697
Wasteload allocation	4,810
Load allocation	15,887

Table 5.12. Allocation of Source Loads. Based on the TMDL assessment, the allocations shown below will result in meeting the TMDL Target Load of 20,697 kg/yr to Echo Reservoir.

	Source Load (kg/yr)	Source Load Allocation per TMDL (kg/yr) *	Percent Reduction (%)
Point Sources			
Coalville WWTP	446	823	0
Silver Creek WRF	15,305	5,733	62
Oakley WWTP	1,631	798	51
Kamas WWTP	3,583	1,656	54
Kamas FH	675	805	0
Total Point Source	**21,640**	**9,815**	**55**
Non-point Sources			
Chalk Creek			
AFOs	245	78	68
Land applied manure	949	247	74
Public land grazing	0	0	0
Private land grazing	3,518	2,568	27
Septic Systems	41	41	0
Diffuse Runoff	6,798	5,302	22
Weber River below Wanship			
AFOs	61	5	91
Land applied manure	866	268	69
Public land grazing	0	0	0
Private land grazing	1,487	1,323	11
Septic Systems	371	371	0
Diffuse Runoff	6,280	4,898	22
Weber River above Wanship			
AFOs	1,101	286	74
Land applied manure	3,318	829	75
Public land grazing	196	196	0
Private land grazing	3,643	2,914	20
Septic Systems	680	680	0
Diffuse Runoff	13,899	10,702	23
Total Nonpoint Source	**43,453**	**30,708**	**29**
Grand Total	**65,093**	**40,523**	**38**

*Source loads describe the phosphorus load that is delivered to receiving water bodies above Echo Reservoir. They do not account for phosphorus loss as loads are transferred through the watershed to Echo Reservoir. Source loads are typically greater than Echo Reservoir loads. The method used to convert Source loads to Echo Reservoir loads is described above in Section 4.4 Linkage Analysis.

Comments:

The TMDL in table 5.11 should be represented as the following equation:
TMDL = Loading Capacity = ΣWLA + ΣLA + MOS.

The TMDL presented in table 5.11 follows the equation:
TMDL = Loading Capacity – MOS = ΣWLA + ΣLA. The TMDL should be corrected to be equal to the "permissible load to Echo Reservoir."

The target used for TMDL development includes only the acute portion of the DO standard. This likely has lead to an overestimate of the TP TMDL value. The ability of the TMDL to achieve the chronic portion of the DO standards must be demonstrated.

Again, it is not clear how the information provided in table 5.12 may be translated to determine the appropriateness of the TMDL, WLA, LA, and MOS shown in table 5.11. This needs to be better clarified in the final submittal.

The existing load presented in table 5.11 reflects current conditions. The source loads identified in table 5.12 along with required reductions are for future loads projected for the year 2025. Hence, the reductions reflected in table 5.12 showing that point source loading will be reduced by 55% reflects reductions only in a projected uncontrolled 2025 loading rate. We have summarized what we believe to be the current loads for each source (to the best of our ability based on our understanding of the data presented in the document on pages 49, 54, 60, 61, 65, and 66). This is similar to information provided in the implementation plan's table 2. However, instead of determining the percent reductions necessary to achieve the TMDL allocations based on the future loading estimates, we evaluated the percent reductions necessary to achieve the TMDL allocations based upon the current loading. Based on our calculations as shown in the table provided on the next page, there are no required reductions in current loading from any point source and all five point sources as well as septic loadings will be allowed to increase (see the items in red in the following table). Achievement of the TMDL will be dependent upon future reductions in nonpoint source loading.

UDEQ is asked to review this information, correct our understanding if this has been misinterpreted, and consider the implications in the TMDL allocation scheme if this assessment is essentially correct. Will point source dischargers be allowed to increase their loads with reductions taken from only nonpoint sources (based on current loading conditions)? If so, this should be clearly discussed in the document so that the public and other reviewers may understand the implications of the TMDL allocations.

Allocations of the TMDL Based Upon Current Loading

Source type	Current Source Load (kg/yr) – Sums from pp. 49, 54, 58, 60, 61, 65, 66 of TMDL document	Source Load Allocations per TMDL (kg/yr) from table 5.12 of the TMDL document	Percent Change from Current Conditions
Point Source			
Coalville WWTP	149	823	452% Increase
Silver Creek WRF	4070	5733	41% Increase
Oakley WWTP	475	798	68% Increase
Kamas WWTP	1322	1656	25% Increase
Kamas FH	434	805	85% Increase
Total Point Source	6450	9815	52% Increase
Non-point source			
Chalk Creek – Includes Chalk Creek and Echo Loads			
AFOs	248	78	69% Decrease
Land Applied Manure	1039	247	76% Decrease
Public Land Grazing	0	0	NA
Private Land Grazing	3535	2568	27% Decrease
Septic Systems	24	41	71% Increase
Diffuse Runoff	7713	5302	31% Decrease
Weber River Below Wanship – Includes Weber below Wanship, Silver Creek, and Weber below Silver Creek loads			
AFOs	66	5	92% Decrease
Land Applied Manure	942	268	72% Decrease
Public Land Grazing	0	0	NA
Private Land Grazing	1550	1323	15% Decrease
Septic Systems	135	371	175% Increase
Diffuse Runoff	5493	4898	11% Decrease
Weber River Above Wanship – Includes Upper Weber, Beaver Creek, Weber Below Beaver , Wanship loads			
AFOs	1181	286	76% Decrease
Land Applied Manure	3560	829	77% Decrease
Public Land Grazing	196.1	196	>1
Private Land Grazing	3718	2914	22% Decrease
Septic Systems	221	680	208% Increase
Diffuse Runoff	13519	10702	21% Decrease
Summary			
Total Point Source	6450	9815	52% Increase
Total Nonpoint Source	**43140.1**	**30708**	**29% Decrease**
Grand Total	**49590.1**	**40523**	**18% Decrease**

In addition, table 5.11 and table 5.12 do not address the internal phosphorus loading source that was identified and assigned a load in the loading analysis. How is internal loading addressed in the TMDL?

Finally, in the implementation plan a table labeled table 1 is provided showing similar information as provided in the previous table that we created. However, the loading information provided in table 1 is not consistent with the future loads shown in table 5.12 provided in the body of the TMDL document. The author is asked to review this table and determine which information is accurate.

4.1 Data Set Description

TMDL documents should include a thorough description and summary of all available water quality data that are relevant to the water quality assessment and TMDL analysis. An inventory of the data used for the TMDL analysis should be provided to document, for the record, the data used in decision making. This also provides the reader with the opportunity to independently review the data. The TMDL analysis should make use of all readily available data for the waterbody under analysis unless the TMDL writer determines that the data are not relevant or appropriate. For relevant data that were known but rejected, an explanation of why the data were not utilized should be provided (e.g., samples exceeded holding times, data collected prior to a specific date were not considered timely, etc…).

Minimum Submission Requirements:

☒ TMDL documents should include a thorough description and summary of all available water quality data that are relevant to the water quality assessment and TMDL analysis such that the water quality impairments are clearly defined and linked to the impaired beneficial uses and appropriate water quality criteria.

☒ The TMDL document submitted should be accompanied by the data set utilized during the TMDL analysis. If possible, it is preferred that the data set be provided in an electronic format and referenced in the document. If electronic submission of the data is not possible, the data set may be included as an appendix to the document.

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

Summary: *The data used in the TMDL analysis is provided as an appendix to the submittal document.*

Comments: *None*

4.2 Waste Load Allocations (WLA):

Waste Load Allocations represent point source pollutant loads to the waterbody. Point source loads are typically better understood and more easily monitored and quantified than nonpoint source loads. Whenever practical, each point source should be given a separate waste load allocation. All NPDES permitted dischargers that discharge the pollutant under analysis directly to the waterbody should be identified and given separate waste load allocations. The finalized WLAs are required to be incorporated into future NPDES permit renewals.

Minimum Submission Requirements:

☐ EPA regulations require that a TMDL include WLAs for all significant and/or NPDES permitted point sources of the pollutant. TMDLs must identify the portion of the loading capacity allocated to individual existing and/or future point source(s) (40 C.F.R. §130.2(h), 40 C.F.R. §130.2(i)). In some cases, WLAs may cover more than one discharger, e.g., if the source is contained within a general permit. If no allocations are to be made to point sources, then the TMDL should include a value of zero for the WLA.

☒ All NPDES permitted dischargers given WLA as part of the TMDL should be identified in the TMDL, including the specific NPDES permit numbers, their geographical locations, and their associated waste load allocations.

Recommendation:
☐ Approve ☐ Partial Approval ☐ Disapprove ☒ Insufficient Information

Summary: *Tables 5.11 and 5.12 show the WLAs presented as part of the TMDL analysis. These tables are provided in section 4 of this document.*

Comments*: Again, it is not clear how the allocation of loads at the point source relate to the overall WLA for this TMDL. The total point source load shown and allocations provided to the 5 permitted facilities is 9,815 kg/yr (table 5.12) while the total WLA at the reservoir is 4,810 kg/yr (table 5.11). It is necessary that the WLAs for each facility be clearly identified and the values should sum to equal the total WLA for the TMDL. It is expected that the point source WLAs will be implemented through NPDES permits. Hence, the permit numbers for each facility should be clearly identified in the document.*

4.3 Load Allocations (LA):

Load allocations include the nonpoint source, natural, and background loads. These types of loads are typically more difficult to quantify than point source loads, and may include a significant degree of uncertainty. Often it is necessary to group these loads into larger categories and estimate the loading rates based on limited monitoring data and/or modeling results. The background load represents a composite of all upstream pollutant loads into the waterbody. In addition to the upstream nonpoint and upstream natural load, the background load often includes upstream point source loads that are not given specific waste load allocations in this particular TMDL analysis. In instances where nonpoint source loading rates are particularly difficult to quantify, a performance-based allocation approach, in which a detailed monitoring plan and adaptive management strategy are employed for the application of BMPs, may be appropriate.

Minimum Submission Requirements:

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

☒ Load allocations assigned to natural background loads should not be assumed to be the difference between the sum of known and quantified anthropogenic sources and the existing *in situ* loads (e.g., measured in stream) unless it can be demonstrated that all significant anthropogenic sources of the pollutant of concern have been identified and given proper load or waste load allocations.

Recommendation:
☐ Approve ☐ Partial Approval ☐ Disapprove ☒ Insufficient Information

Summary: *A description of the load determinations for nonpoint sources is provided in section 3 of this document.*

Comments: *The comments provided for section 4.2 apply for LAs as well and must be addressed.*

4.4 Margin of Safety (MOS):

Natural systems are inherently complex. Any mathematical relationship used to quantify the stressor → response relationship between pollutant loading rates and the resultant water quality impacts, no matter how rigorous, will include some level of uncertainty and error. To compensate for this uncertainty and ensure water quality standards will be attained, a margin of safety is required as a component of each TMDL. The MOS may take the form of a explicit load allocation (e.g., 10 lbs/day), or may be implicitly built into the TMDL analysis through the use of conservative assumptions and values for the various factors that determine the TMDL pollutant load → water quality effect relationship. Whether explicit or implicit, the MOS should be supported by an appropriate level of discussion that addresses the level of uncertainty in the various components of the TMDL technical analysis, the assumptions used in that analysis, and the relative effect of those assumptions on the final TMDL. The discussion should demonstrate that the MOS used is sufficient to ensure that the water quality standards would be attained if the TMDL pollutant loading rates are met. 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).

Minimum Submission Requirements:

☒ TMDLs must include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). EPA's 1991 TMDL Guidance explains that the MOS may be implicit (i.e., incorporated into the TMDL through conservative assumptions in the analysis) or explicit (i.e., expressed in the TMDL as loadings set aside for the MOS).

☒ If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS should be identified and described. The document should discuss why the assumptions are considered conservative and the effect of the assumption on the final TMDL value determined.

☒ If the MOS is explicit, the loading set aside for the MOS should be identified. The document should discuss how the explicit MOS chosen is related to the uncertainty and/or potential error in the linkage analysis between the WQS, the TMDL target, and the TMDL loading rate.

☐ If, rather than an explicit or implicit MOS, the TMDL relies upon a phased approach to deal with large and/or unquantifiable uncertainties in the linkage analysis, the document should include a description of the planned phases for the TMDL as well as a monitoring plan and adaptive management strategy.

Recommendation:
☐ Approve ☐ Partial Approval ☐ Disapprove ☒ Insufficient Information

Summary: *The TMDL submittal provides for a 10% MOS.*

Comments: *Because the submittal does not demonstrate that the TMDL will achieve the chronic DO standard and it is unclear how the load at the inlet to the reservoir relates to loads allocated to the sources, it is not clear whether or not a 10% MOS is sufficient to address the uncertainty in the calculation of this TMDL.*

4.5 Seasonality and variations in assimilative capacity:

The TMDL relationship is a factor of both the loading rate of the pollutant to the waterbody and the amount of pollutant the waterbody can assimilate and still attain water quality standards. Water quality standards often vary based on seasonal considerations. Therefore, it is appropriate that the TMDL analysis consider seasonal variations, such as critical flow periods (high flow, low flow), when establishing TMDLs, targets, and allocations.

Minimum Submission Requirements:

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

Recommendation:
☒ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

Summary: *The TMDL submittal demonstrates that median flows represent critical conditions for phosphorus loading and this is the condition used for modeling.*

Comments: *None.*

5. Public Participation

EPA regulations require that the establishment of TMDLs be conducted in a process open to the public, and that the public be afforded an opportunity to participate. To meaningfully participate in the TMDL process it is necessary that stakeholders, including members of the general public, be able to understand the problem and the proposed solution. TMDL documents should include language that explains the issues to the general public in understandable terms, as well as provides additional detailed technical information for the scientific community. Notifications or solicitations for comments regarding the TMDL should be made available to the general public, widely circulated, and 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 approval, a copy of the comments received by the state and the state responses to those comments should be included with the document.

Minimum Submission Requirements:

☒ The TMDL must include a description of the public participation process used during the development of the TMDL (40 C.F.R. §130.7(c)(1)(ii)).

☐ TMDLs submitted to EPA for review and approval should include a summary of significant comments and the State's/Tribe's responses to those comments.

Recommendation:

☐ Approve ☒ Partial Approval ☐ Disapprove ☐ Insufficient Information

Summary: *Opportunities for public participation were provided in the development and for the review of this TMDL submittal.*

Comments: *A summary of significant public comments and UDEQ's response should be provided with the final submittal.*

6. Monitoring Strategy

TMDLs may have significant uncertainty associated with the 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 document to articulate the means by which the TMDL will be evaluated in the field, and to provide for future supplemental data that will address any uncertainties that may exist when the document is prepared.

Minimum Submission Requirements:

- ☐ When a TMDL involves both NPDES permitted point source(s) and nonpoint source(s) allocations, and attainment of the TMDL target depends on reductions in the nonpoint source loads, the TMDL document should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring.
- ☐ Under certain circumstances, a phased TMDL approach may be utilized when limited existing data are relied upon to develop a TMDL, and the State believes that the use of additional data or data based on better analytical techniques would likely increase the accuracy of the TMDL load calculation and merit development of a second phase TMDL. EPA recommends that a phased TMDL document or its implementation plan include a monitoring plan and a scheduled timeframe for revision of the TMDL. These elements would not be an intrinsic part of the TMDL and would not be approved by EPA, but may be necessary to support a rationale for approving the TMDL. http://www.epa.gov/owow/tmdl/tmdl_clarification_letter.pdf

Recommendation:
☐ Approve ☐ Partial Approval ☐ Disapprove ☒ Insufficient Information

Summary: *A monitoring plan is not provided in the TMDL submittal.*

Comments: *For reasonable assurance purposes, a monitoring program to demonstrate that nonpoint source controls are being implemented and effective at producing assimilative capacity will be required.*

7. Restoration Strategy

The overall purpose of the TMDL analysis is to determine what actions are necessary to ensure that the pollutant load in a waterbody does not result in water quality impairment. 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. During the TMDL analytical process, information is often gained that may serve to point restoration efforts in the right direction and help ensure that resources are spent in the most efficient manner possible. For example, watershed models used to analyze the linkage between the pollutant loading rates and resultant water quality impacts might also be used to conduct "what if" scenarios to help direct BMP installations to locations that provide the greatest pollutant reductions. Once a TMDL has been written and approved, it is often the responsibility of other water quality programs to see that it is implemented. The level of quality and detail provided in the restoration strategy will greatly influence the future success in achieving the needed pollutant load reductions.

Minimum Submission Requirements:

☐ EPA is not required to and does not approve TMDL implementation plans. However, in cases where a WLA is dependent upon the achievement of a LA, "reasonable assurance" is required to demonstrate the necessary LA called for in the document is practicable). A discussion of the BMPs (or other load reduction measures) that are to be relied upon to achieve the LA(s), and programs and funding sources that will be relied upon to implement the load reductions called for in the document, may be included in the implementation/restoration section of the TMDL document to support a demonstration of "reasonable assurance".

Recommendation:

☐ Approve ☐ Partial Approval ☒ Disapprove ☐ Insufficient Information

Summary: *An implementation plan is provided with the TMDL document and provides recommendations for possible point and nonpoint source controls to achieve the TMDL allocations based upon the estimated future loading scenario. As discussed in section 4 of this document, the net result of the TMDL allocations is to allow increases in the current point source loadings with load reductions occurring in the nonpoint source allocations.*

Comments: *The TMDL submittal does not provide reasonable assurance that nonpoint source controls will be sufficient nor will be implemented to allow for increased loading for the point sources into this impaired water. Recommendations for possible point source controls are provided. Detailed reduction estimates and plans for implementation are not provided. It is suggested that if additional assimilative capacity is desired for point sources in this watershed that the assimilative capacity be developed through reductions in nonpoint source controls first prior to allowing point source increases*

8. Daily Loading Expression

The goal of a TMDL analysis is to determine what actions are necessary to attain and maintain WQS. The appropriate averaging period that corresponds to this goal will vary depending on the pollutant and the nature of the waterbody under analysis. When selecting an appropriate averaging period for a TMDL analysis, primary concern should be given to the nature of the pollutant in question and the achievement of the underlying WQS. However, recent federal appeals court decisions have pointed out that the title TMDL implies a "daily" loading rate. While the most appropriate averaging period to be used for developing a TMDL analysis may vary according to the pollutant, a daily loading rate can provide a more practical indication of whether or not the overall needed load reductions are being achieved. When limited monitoring resources are available, a daily loading target that takes into account the natural variability of the system can serve as a useful indicator for whether or not the overall load reductions are likely to be met. Therefore, a daily expression of the required pollutant loading rate is a required element in all TMDLs, in addition to any other load averaging periods that may have been used to conduct the TMDL analysis. The level of effort spent to develop the daily load indicator should be based on the overall utility it can provide as an indicator for the total load reductions needed.

Minimum Submission Requirements:

☐ The document should include an expression of the TMDL in terms of a daily load. However, the TMDL may also be expressed in temporal terms other than daily (e.g., an annual or monthly load). If the document expresses the TMDL in additional "non-daily" terms the document should explain why it is appropriate or advantageous to express the TMDL in the additional unit of measurement chosen.

Recommendation:

☐ Approve ☐ Partial Approval ☐ Disapprove ☐ Insufficient Information

Summary: *The TMDL is provided as a yearly load.*

Comments: *The author is asked to include a daily load expression for this TMDL along with their yearly loading expression.*