



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8
999 18TH STREET - SUITE 500
DENVER, CO 80202-2466

MAR 23 1999

RECEIVED

MAR 26 1999

D.E.Q.

Ref: 8EPR-EP

Van Jamison, Division Administrator
Planning, Prevention and Assistance Division
Montana Department of Environmental Quality
1520 East Sixth Avenue
P.O. Box 200901
Helena, Montana 59620-0901

Re: TMDL Approvals
Teton River

Dear Mr. Jamison:

We have completed our review of the total maximum daily load (TMDL) as submitted by your office for the waterbody listed in the enclosure to this letter. In accordance with the Clean Water Act (33 U.S.C. 1251 et. seq.), we approve all aspects of the TMDL as developed for the water quality limited waterbody as described in Section 303(d)(1). We acknowledge that this particular TMDL for the Teton River is based primarily on a voluntary and incentive-based approach to implementation.

Based on our review, we feel the separate TMDL elements listed in the enclosed checklist and review summary adequately address the pollutant of concern, taking into consideration seasonal variation and a margin of safety.

Thank you for your submittal. If you have any questions concerning this approval, feel free to contact Bruce Zander of my staff at 303/312-6846.

Sincerely,

Max H. Dodson
Assistant Regional Administrator
Office of Ecosystems Protection and
Remediation

Enclosures

cc: John Wardell, MOO



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APPROVED TMDLS

| Waterbody Name* | TMDL Parameter/ Pollutant | Water Quality Goal/Endpoint | TMDL | Section 303(d)1 or Section 303(d)3 TMDL | Supporting Documentation |
|--|------------------------------|---|--|---|---|
| Teton River* (HUC 10030205 MT4100017) | salinity | specific conductance of 1000 μ mhos/cm (at 25°C) total dissolved solids (TDS) of 700 mg/l (TMDL endpoints measured at Teton River at State Highway 221 Bridge) | $TMDL = Q_{down} C_{down} + Q_{PB} C_{PB}$ where: Q_{down} = flow in Teton River below Priest Butte outlet C_{down} = TMDL endpoint (i.e. 1000 μ mhos/cm or 700 mg/l TDS) Q_{up} = upstream flow in Teton River C_{up} = upstream concentration of either specific conductivity or TDS Q_{PB} = flow in Priest Butte outlet C_{PB} = concentration of either specific conductivity or TDS in Priest Butte outlet <i>The TMDL can be expressed in terms of mass (load) per day when calculating the TMDL based on TDS.</i> | §303(d)(1) | See list of supporting documentation in State TMDL submittal. |

* An asterisk indicates the waterbody has been included on the State's Section 303(d) list of waterbodies in need of TMDLS.

■ TMDL Checklist ■
EPA Region VIII

| State/Tribe: Montana | | |
|---|----------------------------|---|
| Waterbody Name: Teton River | | |
| Point Source-control TMDL: Nonpoint Source-control TMDL: X (check one or both) | | |
| Date Received: February 1, 1999 Date Review completed: March 5, 1999 | | |
| Review Criteria (All criteria must be met for approval.) | Approved (check if yes) | Comments |
| ■ TMDLs result in maintaining and attaining water quality standards | X | The waterbody classification uses which are addressed by this TMDL are aquatic life, stockwater, and irrigation. |
| ■ TMDLs have a quantified target or endpoint | X | The most limiting numeric criteria associated with the waterbody uses are associated with protection of aquatic life. The quantified targets/endpoints used in this TMDL are 1,000 $\mu\text{mhos/cm}$ @ 25° C and 700 mg/l total dissolved solids (TDS). |
| ■ TMDLs include a quantified pollutant reduction target, but this target can be expressed in any appropriate manner | X | The TMDL is expressed in terms of a variable number, dependent upon the upstream conditions in the Teton River and the flow in the Priest Butte Lake outlet. The combined mass loading from the upstream and the PBL outlet represent the TMDL. |
| ■ TMDLs must consider all significant sources of the stressor of concern | X | Significant sources include salinity from natural seeps as well as irrigation return flows. |
| ■ TMDLs are supported by an appropriate level of technical analysis | X | Both extensive monitoring of the Freezout/Priest Butte watershed as well as water quality/quantity modeling have provided insights to the source/causes of salinity in the watershed. |
| ■ TMDLs must contain a margin of safety and consider seasonality | X | An appropriate margin of safety is included by managing water quality on a real-time basis and performing ongoing monitoring to assure water quality goals are achieved. Seasonality was adequately considered by designing the TMDL to respond to seasonal changes in the Teton River and evaluating the season patterns of flow/salinity loadings. |
| ■ TMDLs apportion loads or responsibility for taking actions | X | The simple allocation scheme for this TMDL includes a load allocation of background salinity loading in the Teton River and a load allocation to the Priest Butte Lake discharge. The allocation to the Lake discharge is modified on a real-time basis in such a manner that the blend between the upstream flow in Teton River and the Priest Butte discharge will achieve water quality goals. |
| ■ TMDLs involve some level of public involvement or review | X | Public review and participation in the salinity issue in Teton River has been extensive through the years. The salinity TMDL for the Teton River was ultimately presented in a public meeting for review in January 1999. |

Teton River TMDL Review

US EPA; Region VIII

March 17, 1999

Waterbody

Teton River (HUC 10030205 MT4100017) (This waterbody is included on Montana's 1998 Clean Water Act Section 303(d) list of waters in need of TMDLs)

Pollutant of Concern

Salinity

Date Submitted to EPA

Correspondence dated January 27, 1999 and received by EPA February 1, 1999

Date Review Completed

March 5, 1999

Supporting Information

(This is not intended to be an exhaustive listing of documents and information which EPA relied upon to base its approval of the Teton River salinity TMDL. Rather, the following are primary documents submitted by the State with the TMDL to EPA to aid in the review and approval of the Teton River TMDL.)

1984. Document entitled "Water Quality Monitoring to Evaluate the Effectiveness of the Freezout Lake Management Plan"; Gary Ingman, Montana Department of Health and Environmental Sciences. (January 17, 1984)

1984. Letter from Larry Brown, Department of Health and Environmental Sciences to Don Childress, Freezout Lake Wildlife Management Area regarding guidelines for monthly water releases from Priest Butte Lake into the Teton River. (January 17, 1984)

1997. Report entitled "Physical, Chemical, and Biological Data Associated with Irrigation Drainage in the Freezout Lake Area, West-Central Montana, 1994-1995" by E. Kendy (USGS), B. Olsen (USFWS); U.S. Geological Survey Open-File Report 97-349 (August 1997)

1997. Report entitled "Water Management Plan for Freezout Lake Wildlife Management Area Fairfield, Montana" by PRC Environmental management, Inc. for Montana Fish, Wildlife, and Parks (February 1997)

1997. Report entitled "Detailed Study of Selenium in Soil, Water, Bottom Sediment and Iota in the Sun River Irrigation Project, Freezout Lake Wildlife management AREA, and Benton Lake National Wildlife Refuge, West-Central Montana-1990-92" by D. Nimick, J. Lambing (USGS) and D. Palawski, J. Malloy (USFWS); U.S. Geological Survey Water-Resources Investigations Report 95-4170 (May 1996)

1998. Document "Guidelines for Interpretation of the Biological Effects of Selected Constituents in Biota, Water, and Sediment" by U.S. Department of Interior/U.S. Bureau of Reclamation; National Irrigation Water Quality Program Information Report No. 3 (November 1998)

Introduction

The waterbody addressed in this TMDL is the Teton River which is found in the Lower Missouri Basin and flows through Teton and Chouteau Counties in the northwest sector of Montana. The water quality issue addressed by this TMDL relates to the high salinity concentrations in the Teton River caused by the water flowing from the Freezout and Priest Butte Lakes. The watershed above the outlet of Priest Butte Lake includes irrigated and dryland agriculture, a wildlife management Area, and livestock grazing. About 80% of the watershed above Priest Butte Lake is privately owned with the remaining in federal and state ownership.

The solution to the high salinity excursions in the Teton River is to regulate the rate of flow from the Freezout and Priest Butte Lake complex such that the mix between the Teton River upstream from the Priest Butte Lake outlet and the flow from the outlet, itself, meets ambient water quality goals. Since the acceptable loading of salinity into the Teton River is variable, depending upon the upstream flow and quality in the Teton River, the TMDL is also considered to be variable. The TMDL for salinity in the Teton River is achieved by real-time management of the Priest Butte Lake outlet.

Further, in the context of this TMDL, there are land management practices and structural controls that have been identified for the Freezout and Priest Butte Lakes watershed that minimize the amount of salinity that makes it into the Freezout/Priest Butte Lake complex, thus making it possible to achieve the in-river salinity goals as identified for the Teton River.

TMDL Review Elements

The following elements were used as review criteria in evaluating the sufficiency of the State submittal as a TMDL under the Clean Water Act. For a submittal to be approved as a TMDL, the following elements need to be addressed in some manner relevant to the water quality issue. For the Teton River the cause of the water quality concern falls under the category of nonpoint source pollution in contrast with water quality concerns related to point source discharges of pollutants. It has been determined by EPA that the development of TMDLs to address nonpoint sources is appropriate (see US EPA, 1997¹).

- Stream Classification and Standards
- Water Quality Standards Target
- TMDL
- Significant Sources
- Technical Analysis
- Margin of Safety & Seasonality
- Allocation
- Public Participation

¹ US EPA, 1997. Memorandum entitled "Nonpoint Sources and Section 303(d) Listing Requirements" from Geoffrey H. Grubbs, Director, Assessment and Watershed Protection Division to FACA Workgroup on Section 303(d) Listing Criteria (May 23, 1997).

Since the most significant loading associated with salinity coming from the Freezout/Priest Butte watershed into the Teton River is traced back to nonpoint sources, the TMDL for the Teton River is made up of a "load allocation" attributed to nonpoint sources and natural background. "Load allocations" are defined in EPA's regulation as best estimates of the acceptable loading which may range from reasonable accurate estimates to gross allotments (see 40 C.F.R. 130.2). There is a point source discharger in the watershed (the Town of Fairfield's municipal treatment lagoon covered by MPDES permit MT-G580000). Although the loading (if any) of salinity from this facility is included in the TMDL, it not considered to be a significant contributor to the high salinity concentrations in the Teton River.

Teton River TMDL Review

■ Stream Classification and Standards

The overall purpose of TMDLs is to attain and maintain water quality standards established by a state or tribe. A particular TMDL will address issues related to waterbody use impairments or threats due to a specific pollutant or a number of pollutants.

The State of Montana has classified the Teton River as B-2 which means it is suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply (ARM 17.30.624). Although salinity, the pollutant of concern in this TMDL, particularly affects the uses of aquatic life, stockwater, and irrigation, the most sensitive and limiting use is aquatic life. Therefore, the TMDL is based on protecting that most sensitive use of aquatic life.

■ Water Quality Standards Target

A TMDL should have a target which is quantifiable, relates to achieving the water quality standard, and can be used as a measure of success for restoration and protection efforts.

The target defined in this TMDL is simply the ambient conductivity goal of 1,000 $\mu\text{mhos/cm}$ @ 25° C and a total dissolved solids (TDS) goal of 700 mg/l.

■ TMDL

A TMDL should be expressed in a manner that relates to the pollutant of concern and is linked to achieving the water quality standards target. In the case of the Teton River, the management of discharge flows as well as application of best management practices within the watershed will achieve the water quality targets.

A TMDL can be expressed in many different ways as appropriate to the pollution problem, the water quality standards target, the type of control practices needed to achieve the goals of the TMDL, the type of data and information available to support the TMDL, and other factors. The TMDL for the Teton River is variable since the discharge flow from the Freezout/Priest Butte watershed that is a source of salinity will be moderated over time to achieve the in-river salinity

endpoints, the TMDL itself will be variable. The TMDL can be represented mathematically by the following:

$$\text{TMDL} = Q_{\text{down}} C_{\text{down}} = Q_{\text{up}} C_{\text{up}} + Q_{\text{PB}} C_{\text{PB}}$$

where:

Q_{down} = flow in Teton River below Priest Butte outlet

C_{down} = TMDL endpoint (i.e. 1000 $\mu\text{mhos/cm}$ or 700 mg/l TDS)

Q_{up} = upstream flow in Teton River

C_{up} = upstream concentration of either specific conductivity or TDS

Q_{PB} = flow in Priest Butte outlet

C_{PB} = concentration of either specific conductivity or TDS in Priest Butte outlet

There are no significant point sources of pollutants that are of concern in this TMDL, therefore the "wasteload allocation" component of the TMDL is considered a zero value. The TMDL is considered wholly included in the "load allocation" component of the TMDL and the minor point source discharge is also included in the load allocation term.

■ Significant Sources

A TMDL should identify the sources and causes related to the pollutant of concern. All significant sources should be considered in establishing the TMDL and developing control practices.

The significant sources of salinity identified in the Freezout/Priest Butte watershed include natural seeps and irrigation return flows that enter the Wildlife Management Area return via groundwater seepage and surface canals. Also, salinity concentrations in Freezout and Priest Butte Lakes are increased via evaporation.

■ Technical Analysis

A TMDL should be supported by an appropriate level of technical analysis. The appropriate level of analysis is often dependent upon the complexity of the water quality problem, the certainty needed prior to embarking on control measures, and the data and information available to support TMDL development.

This TMDL has relied on both monitoring and modeling to provide develop and understanding of source, transport, and fate of TDS within the watershed. The Montana Fish, Wildlife, and Parks sponsored the application of a water balance/water quality model to evaluate the relative TDS contribution from various sources and activities within the watershed as well as evaluate the potential management options relative to flow and quality. There have been numerous efforts to monitor the water flows and water quality constituent sources throughout the watershed as well as the loadings introduced into the Teton River.

■ Margin of Safety and Seasonality

The Clean Water Act requires that each TMDL take into consideration a margin of safety to address uncertainty within the TMDL as well as consider seasonality.

. Margin of safety is a part of the Teton River TMDL because:

- there will be real-time monitoring of the salinity loading into the Teton River as well as real-time management of loadings into the Teton River for the purpose of assuring that water quality goals in the Teton River are being maintained; and
- the flow from the Priest Butte outlet structure can be closed if there are any anticipated problems with maintaining water quality standards in the Teton River.

. Seasonality is considered in the TMDL because:

- the seasonal patterns in flow and loading associated with the irrigation activities throughout the watershed were evaluated and irrigation control practices were designed taking those seasonal patterns into account and;
- the TMDL is variable, reflecting the seasonal patterns in upstream flow and quality in the Teton River.

■ Allocation

Individual allocations of loads or management practices should be developed to address the sources and causes that need to be controlled to achieve the TMDL. This allocation can be done by pollutant source category, on a subwatershed level.

Since there is only one source of salinity of significance that needs to be controlled to achieve ambient water goals (i.e., outlet flow from Priest Butte Lake), the allocation in this TMDL is straightforward:

- . allocation of a salinity load to the upstream sources in the Teton River (which require no control to achieve the TMDL) and;
- . allocation of a salinity load to the Priest Butte Lake outlet (which does require control to achieve the TMDL); sources that contribute to the Priest Butte outlet loading have been identified in detail in the State submittal to EPA.

The management alternatives that could be used to control salinity within the watershed above the Freezout/Priest Butte complex include a large number of activities. The most prominent include:

- . augmentation of existing flows with high quality irrigation water;
- . illumination of the low quality water associated with the Yeager seep;
- . reduction of low quality inflow by modifying irrigation practices;
- . pre-release of low quality water in the spring of the year;
- . perform structural improvements on water control structures;

. acquisition of 787 acres of irrigated agricultural land in Freezout Basin as a source of fresh water.

■ Public Involvement

The public should be informed of the TMDL efforts and be given an opportunity to be involved and to review the TMDL and its recommendations.

A focal point for education and information dissemination has been the local Teton River Basin Resource Group. Numerous entities have been involved in the process of assessing water quality within the watershed and developing solutions. These entities included the Greenfields Irrigation District, the US Bureau of Land Management, the Montana Department of Agriculture, the Montana Fish, Wildlife, and Parks, the local counties, the City of Fairfield, the Montana Department of Environmental Quality, the US Geological Survey, and the US Fish and Wildlife

The TMDL was presented in public meeting on January 12, 1999 conducted in Dutton, Montana. Further, a responsiveness summary was written to address questions that came out of that meeting.

TMDL Implementation

The various components of the Teton River salinity TMDL have either been put in place or additional funding is being sought for implementation. Many funds have been expended to implement structural controls related to water quality. Also, the Montana Fish, Wildlife, and Parks plays an important role in managing the flows within the Freezout complex to control salinity.

Several Clean Water Act Section 319 grants have been secured that will contribute to the objectives of this TMDL.

To date, current management of the Freezout/Priest Butte system has resulted in reducing water quality problems associated with salinity in the Teton River. It is anticipated that application of further management practices and completion of structural controls will improve the ability to implement this TMDL.