Middle Teton River Salinity/TDS/Chlorides TMDL
February 16, 2000

Introduction

The waterbody addressed in this TMDL is the middle reach of the Teton River (MT41O001_020) which is found in the Marias Sub-basin hydrologic unit (HUC 10030205) and flows through Teton County between Choteau and Interstate 15. (See Map 1.) This reach is 29 miles long and extends from the confluence with Deep Creek to the confluence with Muddy Creek. The water quality issues addressed by this TMDL are salinity, total dissolved solids (TDS) and chlorides.

The EPA approved a TMDL for salinity and TDS for the discharge from Freezout/Priest Butte Lake into this reach of the Teton River on March 23, 1999. This TMDL was considered the first phase in the completion of a general TMDL that would address all the major sources of salinity, TDS and chlorides. These sources include the domestic wastewater treatment facilities for the City of Choteau (MPDES Permit: MT-0020052), modification and destabilization of banks, range grazing in riparian areas, flow regulation and dryland cropping practices. The Triangle Packing Plant also has a Montana Point Discharge Elimination System (MPDES) Permit (MT-0029807). However, the plant recently burned and it is uncertain if the facility will be rebuilt.

The major land uses in this reach of the Teton River are livestock grazing and dry-land crop production with some irrigated hay and crop production. The area is also popular for big game and bird hunting. The riparian corridor is considered part of the Rocky Mountain Front grizzly bear recovery area. The majority of the watershed is privately owned with a minor portion in state ownership. (See Map 2.)

The Teton River Watershed Group is made up of landowners, conservation and weed district personnel, educators, interested citizens, and representatives of local, county, state and federal government agencies who live or work in Teton and Chouteau counties. This group coordinates the restoration work on the Teton River by setting goals, obtaining grant funds, overseeing project implementation, and promoting public education and participation. The goals of the group are:

- to improve the quality and quality of water in the Teton and Missouri rivers by controlling bank erosion, improving flows and enhancing riparian vegetation.
- to promote public understanding of the issues affecting the watershed by gathering and evaluating historical information, assessing its present condition using the global positioning and geographic information systems, encouraging volunteer water monitoring, and distributing the information via news releases, signs, brochures and reports.
- to control the spread of weeds by using chemical, mechanical and biological methods.

A primary management goal of Montana Fish, Wildlife and Parks (MFWP) which manages the Freezeout Lake Wildlife Management Area is to maintain the water quality

of the Teton River. The water quality improvement effort has been underway for 15 years.

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 must be addressed in some manner relevant to the water quality issue:

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

For the middle reach of the Teton River, the causes of the water quality impairment fall under the category of point and nonpoint source discharges of pollutants. The TMDL is made up of waste load allocations for point sources which are specified in MPDES permits and load allocations 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 reasonably accurate estimates to gross allotments (see 40 CFR 130.2). It has been determined by EPA that the development of TMDLs to address nonpoint sources is appropriate (US EPA 1997).

Middle Teton River TMDL

The Middle Teton River Salinity/TDS/Chlorides TMDL incorporates the TMDL for salinity and TDS approved by the EPA on March 23, 1999 for the discharge from Freezout/Priest Butte Lake into the Teton River.

- Stream Classification and Standards

  The overall purpose of TMDLs is to obtain and maintain water quality standards established by a state or tribe. A particular TMDL will address the impairment of the beneficial uses of the water by a specific pollutant or a number of pollutants.

  The middle reach of the Teton River is a perennial stream classified as B-2, a cool water fishery (ARM 17.30.610(4)). This reach is 29 miles long and extends from the confluence with Deep Creek to the confluence with Muddy Creek. (See Map 2.) The waterbody number is MT41O001_020 and it is found in the Marias Sub-basin hydrologic unit, HUC 10030205. The beneficial uses of the water that are partially supported are agriculture, aquatic life and cool water fisheries. The

beneficial uses that this reach fully supports are drinking water, recreation and industrial use of the water.

The pollutants addressed in this TMDL are salinity, TDS, and chlorides. Several other causes of pollution also affect aquatic life and the fisheries in this reach of the Teton but they will not be addressed in this TMDL. These causes are: flow and habitat alterations and temperature modifications.

(add info from FO/PB TMDL here)

- 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 water quality target is to maintain levels of total dissolved solids in the Teton River at less than 700 mg/l (this equates to a specific conductivity ranging between 700 to 1,000 micromhos per centimeter at 25 degrees centigrade.)

(add info from FO/PB TMDL here)

- TMDL

A TMDL should be expressed in a manner that relates to the pollutant of concern and is linked to achieving the water quality standard targets. In the case of the middle reach of the Teton River, the restoration projects and the following allocations are expected to achieve the water quality standards.

(add info from FO/PB TMDL here)

- Significant Sources

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

The point sources include the domestic wastewater treatment facilities for the City of Choteau (MPDES Permit: MT-0020052) and the Triangle Packing Plant (MPDES Permit MT-0029807) which is currently out of business due to a fire.

Natural sources are the marine-derived Colorado Shales that comprize the bedrock in this reach of the Teton and the glacial tills that overlay the northern portion of the watershed. Both of these geologic formations contain salts that dissolve into the groundwater which can surface as saline seeps or discharge to

the Teton as base flow. Atmospheric deposition is also a minor source of chlorides.

The nonpoint sources include dryland cropping practices, modification and destabilization of banks, range grazing in riparian areas, and flow regulation. The dryland cropping practice of strip cropping and allowing half the field to remain fallow each year can increase the occurrence of saline seeps and salinized groundwater discharge to the Teton. Similarly, any practice such as road construction or maintenance, that results in highly erodible geologic materials sluffing or being carried into the river will increase concentrations of these pollutants.

- Technical Analysis

An appropriate level of technical analysis should support a TMDL. 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.

An aereal assessment of the Teton corridor evaluated the location and extent of various characteristics of the river including eroding banks, areas of saline deposits, and riparian vegetation. (Hawn etal 1998)

Volunteers measured and evaluated changes in the length of the river channel using aerial photos which documented the effects of severe flooding on the Teton since 1941. See Graph 1.

Photo points were located by volunteer monitors to document changes over time in riparian vegetation and the stream channel. In addition, guaging stations were installed in 1999 and are monitored by USGS. (See Map 3.)

Several studies have assessed the increase in acreage of saline seeps statewide and recommended best management practices for dryland cropping to minimize seep expansion and alternative crops to dry up existing saline seeps. (Miller etal 1980)

- Margin of Safety & Seasonal Variation

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 seasonal variation.

The success of the TMDL will be evaluated through a monitoring plan that involves the USGS, Montana Department of Fish, Wildlife and Parks and monitoring volunteers. The plan includes:

Photodocumentation

-stream banks
-riparian areas

Stream Channel Morphology and Flow
-channel cross-sections to evaluate width/depth ratios
-flow rates

Biological Monitoring
-riparian condition

Chemical Monitoring
-specific conductance
-temperature
-turbidity
-dissolved oxygen

- 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. Map 3 shows the locations of the BMP activities.

City of Choteau (MPDES Permit: MT-0020052) - Monitor and maintain the wastewater discharge to attain an average concentration of less than _____. Report monitoring results to DEQ as specified in the permit.

Department of Fish, Wildlife and Parks – Monitor and maintain the Freezout/Priest Butte discharge to attain an average concentration of less than _____. Supply DEQ with a summary of monitoring data once a year.

Natural Resources Conservation Service – Assist in implementing the *Preliminary Work Plan for Teton Watershed in Chouteau and Teton Counties* (NRCS 1998). Encourage use of buffer strips, re-establishment of riparian vegetation, appropriate dryland cropping practices, and re-establishment of native range with cost-share programs such as EQIP and CRP.

Teton River Watershed Group oversee restoration activities and volunteer monitoring effort, promote public education and participation in achieving the goals of the TMDL, and supply DEQ with a summary of monitoring data once a year.

Grazing operations – implement BMPs to optimize the health of riparian and wetland areas, the utilization of upland range, and the management of animal waste. Assist in volunteer monitoring.

- Public Participation

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

  (add info from FO/PB TMDL here)
  A public notice of availability of the TMDL and opportunity for providing comment was published in _____ on_____.

TMDL Implementation

The coordination between the entities working to improve the water quality of the Teton River has been successful in reducing water quality problems in both the Freezout/Priest Butte system and the Teton River. FWP reports monitoring results to the citizens of Teton and Chouteau counties at the annual meetings of the Teton River Watershed Group.

The FWP spent $435,000 on the most recent round of improvements to assure water quality in the Teton. The Department of Interior=s National Irrigation Water Quality Program contributed $300,000 and the Greenfields Irrigation District provided cost share money. The DEQ has provided $373,370 in grant monies for projects that contribute to improved water quality in the Teton basin.

The recommendations in this TMDL are either being implemented or additional funding is being sought for implementation. FWP staff is altering the flow regime between ponds to manage salinity throughout the Freezout system. They are also conducting maintenance on the pipeline from Priest Butte Lake and have reconfigured the headgate.

The USGS has identified which drains are contributing the largest amount of pollutants to the wildlife management area and this information allows the FWP to monitor and manage the water to reduce pollutant levels. Funds from a 319 grant has allowed the USGS to reactivate or establish four guaging stations to monitor flow on the Teton.

References

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