Watershed Restoration Plan (WRP) for the Teton River Watershed

Deep Creek 319 grant #209062
EPA Watershed Planning Elements
September 20, 2010

Under the 1987 amendments to the U.S. EPA's Clean Water Act, Section 319 provides funding to states to mitigate nonpoint source pollution. As a recipient of a 319 grant (Deep Creek #209062), the Teton River Watershed Group (TRWG) must produce a Watershed Restoration Plan (WRP) for the Teton River that includes nine minimum elements. The nine elements are numbered below, along with a description of how they are addressed in existing documents.

The primary sources of information used to satisfy the requirements of each element include:

- National Resources Conservation Service Aerial Assessment, December 1998
- Water Quality Management Plan and TMDLs, Teton River Watershed, September 2003
- Teton River Watershed Group Work Plan, April 2010

The Teton WRP is a "living" document, with a planning cycle of 5 years.

EPA's Nine Elements

1) **Identification of causes of impairment and pollutant sources** or groups of similar sources that need to be controlled to achieve needed load reductions. Generally the causes of impairment include: nutrients, sediment, salinity, selenium, and thermal modification. Sources include: irrigated and dry-land agriculture; grazing; and stream bank erosion.

Where to Find the Data

Teton River Watershed TMDL

- Table 3-2, page 29, lists waterbodies, probable causes, and sources of impairments and pollutants.
- Figure 4-4, page 73, figure 4-5, page 74, and Table 4-8, page 86, list salinity source seep locations and load estimates needing remediation.
- Section 4.2.1, pages 88-89 identifies the sources of selenium.
- Section 4.3.1, pages 93-101 identifies the sources of sediment.
- Section 4.4.1, pages 110-111 identifies the sources of thermal modification.
- Section 4.5.1, pages 112-115 identifies the sources of nutrients.

National Resources Conservation Service (NRCS) Aerial Assessment

- Identifies waterbodies and estimates stream lengths and locations of the areas needing remediation. See “General Description” for specific impairment causes and sources.

2) **An estimate of the load reductions** expected from management measures. Load reductions largely are dependent on the aerial extent of the various management measures. For salinity, expected load reductions range from 8 – 34% depending on the waterbody. For selenium, the expected load reduction is 67% in Priest Butte Lakes. For sediment, load reductions expected range from 10% to 90%, depending on the area and management measure. Nutrient load reductions of 10 – 60% can be expected with appropriately applied sediment reduction measures. Adequate thermal reduction loads are expected with appropriately applied sediment reduction measures.

Where to Find the Data

Teton River Watershed TMDL

- Section 4.1, page 69, addresses salinity loads and management measures.
- Section 4.2, page 88, addresses selenium loads and management measures.
- Section 4.3, page 92, addresses sediment loads and management measures.
- Section 4.4, page 109, addresses thermal modification and management measures.
- Section 4.5 page 112, addresses nutrient loads and management measures.

Teton River Watershed Group Work Plan

- Under the “Water Quality” section, Goal #1 is to “improve water quality in the Teton River and tributaries to meet goals established in the TMDL.” Specific tasks identify projects to help implement management measures:
  - Task 7, page 22, addresses stream projects to reduce sediment.
  - Task 8, page 22, addresses saline seeps from the Teton Ridge to reduce salinity.
  - Task 9, page 22, addresses saline seeps from the Priest Butte area to reduce salinity.
  - Tasks 10 and 11, pages 22 and 23, respectively, address community wastewater from Dutton and Choteau to reduce nutrients.

3) **A description of the nonpoint source management measures** that will need to be implemented to achieve load reductions in Element 2 (above), and a description of the critical areas in which those measures will be needed to implement this plan. Management measures are largely focused on stabilizing stream channels, and irrigation and grazing management improvements. Stable stream channels and healthy riparian vegetation along 80% of the impaired streams is called for, in comparison to the existing conditions described in a 1998 survey. Critical areas

include Muddy Creek, Priest Butte Lakes, lower Deep Creek, and the Teton River below Choteau.

Where to Find the Data

Teton River Watershed TMDL

- Table 5-1, page 122, and Table 5-2, page 124, describe measures to address items in element #2 above.

NRCS Aerial Assessment

- Provides the location of critical stream bank erosion features, loss of adequate riparian cover, and irrigation diversion structures that may need to be addressed in order to prevent sediment, nutrients and other potential pollutants from entering waterways. See report maps for details of specific impairments and their locations.
- TRWG uses the Aerial Assessment to prioritize projects and address items in element #2.

Teton River Watershed Group Work Plan

- To ensure fair/equal distribution of restoration efforts throughout the watershed, TRWG has broken the Teton River into three segments for project evaluation: upper, middle, and lower.
- The project checklist, page 32, is used by the TRWG to evaluate projects brought forth by landowners and agencies. Projects typically use Best Management Practices (BMPs) to resolve most impairments. BMPs may include grazing management, irrigation water management, and riparian vegetation protection. Some projects also include revegetation and bioengineered stream bank work.
- Tasks 1-4, page 21, describe ongoing monitoring and evaluation that the TRWG is using to further identify and delineate critical areas in need of restoration.

4) **Estimate of the amounts of technical and financial assistance needed**, associated costs, and/or the sources and authorities that will be relied upon to implement this plan. Over the next five years, it is anticipated that an annual budget of roughly 100,000 will generally be available to implement the WRP. Historically, funding sources have included: private landowners, NRCS, DEQ, , and DNRC. Technical assistance has been provided by NRCS, U.S. Fish & Wildlife Service, FWP, , USGS, DEQ, and private consultants.

Where to Find the Data*

Teton River Watershed Group Work Plan

- Will use available federal, state, and private resources to address pollution sources identified in the Teton River Watershed TMDL, Section 3, pp. 27-68.
- The "Water Quality" section identifies primary resources needed to address many specific water quality issues. For example:
  - Task 2, page 21: monitoring by USGS, DNRC; grants – cost $50,000
  - Task 7, page 22: landowner stream projects on Teton River; 319 grant – cost $10,000
  - Task 7, page 22: landowner stream projects on Deep Creek; 319 grant – cost $50,000
  - Task 8, page 22: saline seep remediation on Teton Ridge by MSCA, landowners; 319 grant – cost $20,000
  - Task 9, page 22: saline seep remediation on Priest Lake by MSCA, landowners – cost $5,000
  - Task 10, pp. 22-23: City of Choteau Wastewater Treatment Plant upgrades, City of Choteau, and grants – cost $1,000,000
- Each individual grant application or project plan will describe the resources that will be needed to address each water quality impairment cause.

*Note: While costs have been calculated for some specific projects, there are others for which costs remain undetermined. It is estimated that the final "bill" for fixing all impairments will run well into the millions of dollars. The restoration effort will require technical and/or financial support from federal, state and local agencies, local landowners, professional engineers, vegetation specialists, construction contractors, private corporations, nonprofit groups, community and watershed group leaders, and a variety of other sources. These needs have been, and will continue to be, a primary focus of the TRWG.

5) **An information and education component** used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing nonpoint source management measures. Education and Outreach is accomplished in large part through the website, watershed group meetings, an annual watershed meeting, and, very significantly, by one-on-one outreach to land owners by the watershed coordinator.

Where to Find the Data

Teton River Watershed TMDL

- Section 5.0, page 121, lists TRWG as the primary party responsible for implementing TMDL strategies. TRWG will also take on the responsibility of being the primary source of outreach and education efforts. Entities such as the Teton Conservation District, Chouteau County Conservation District, USFWS, NRCS, state and local government agencies, local school districts, and private citizens will also undoubtedly play an important role.

Teton River Watershed Group Work Plan

- The "General Work Plan" section identifies various tasks tied to public outreach and education:
    - Task 1, page 9: TRWG annual meeting to keep public informed
    - Task 2, page 9: monthly board meetings for direction
    - Task 3, page 9: watershed tour of past projects
    - Task 4, page 9: semi-annual newsletter to keep public informed
    - Task 5, pp. 9-10: Web site to keep public informed
    - Task 6, page 10: display board to show public results of past projects
    - Task 7, page 10: education workshops given by TRWG, MSU Extension, and others about tools to improve water quality

6) **Schedule for implementing the nonpoint source management measures** identified in this plan that is reasonably expeditious. This WRP is designed to cover a five-year period. An annual work plan is developed that provides for implementation of specific management measures identified in the WRP.

Where to Find the Data

Teton River Watershed Group Work Plan

- The five-year plan tracks projects aimed at meeting TMDL targets listed in the Teton River Watershed TMDL, Section 4, pp. 69-120.
- The overall goal is to meet all TMDL targets within 20 years. This is the approximate amount of time needed for BMPs to meet goals. In many cases, TRWG has established specific goals for meeting specific TMDL targets (see table below). TRWG will track interim measures of progress (identified in Element 7 of the Teton WRP) to ensure that work remains on track to meet the 20-year targets.

Impairment	TMDL Waterbody	Target	Measured @	Meeting TMDL Targets							
Salinity	Teton River	<1,000 uS/cm	USGS Loma		2012						
Salinity	Priest Butte lake	<6,200 uS/cm	Hwy 221 bridge					2015			
Selenium	Priest Butte lake	57.30 lbs/yr	In Priest Butte					2015			
Sediment	Teton River - upper	22 mi healthy	N-S to Deep		2012						
Sediment	Teton River – middle	50 mi healthy	Deep to Muddy			2013					
Sediment	Teton River – lower	75 mi healthy	Muddy to mouth				2014				
Sediment	Muddy Creek	65 mi healthy	All 81 miles					2015			
Sediment	Deep Creek	7 mi healthy	9 impaired miles	2011							
Sediment	Willow Creek	15 mi healthy	19 impaired miles		2012						
Sediment	Teton Spring Creek	11 mi healthy	14 impaired miles			2013					
Thermal	For all reaches	TMDL pg 111	All waterbodies							2020	
Nutrient	Deep Creek	650 ug/L Total N	Hwy 287 bridge		2012						
Nutrient	Spring Creek	650 ug/L Total N	Near mouth					2015			

7) **A description of interim measurable milestones** for determining whether nonpoint source management measures or other control actions are being implemented. The interim milestones are the completion of implementation activities called for in the annual work plan.

Where to Find the Data

Teton River Watershed Group Work Plan

- Appendix 2 outlines the decision-making process TRWG will use to evaluate and select nonpoint source management measures (aka projects).
- Objective 2, under Goal 1 of the "Water Quality Work Plan" section identifies nonpoint source management measures and control actions TRWG is or soon will be engaging in. Tasks within Objective 2 identify the specific timelines for completion of management measures, and the frequency of progress reviews.
- The "Teton River Watershed Group Project Summary" section contains a running list of projects implemented to date. The list is maintained by the TRWG Coordinator, and is updated periodically as revisions are made to the Work Plan.
- TRWG will use five-year cycles for evaluating trends in nonpoint source management measure implementation. If negative trends are noticed (i.e. if fewer and fewer projects are making it all the way to completion), the potential reasons will be evaluated, and corrective measures will be taken accordingly.

8) **A set of criteria that can be used to determine whether loading reductions are being achieved over time** and substantial progress is being made toward attaining water quality standards. The criteria include: stable stream channel geometry; healthy riparian vegetation, minimum stream flows, selenium standards and state nutrient criteria. It is expected that DEQ will be responsible for conducting the sampling necessary to determine whether or not load reductions and TMDL targets, and water quality standards are being met.

Where to Find the Data

TRWG will develop a Quality Assurance Project Plan (QAPP) to guide data collection efforts throughout the Teton River watershed. Under the QAPP, TRWG will create Sampling and Analysis Plans (SAPs) to guide efforts to answer the following three questions:

1. Are specific projects and practices effectively meeting their original, long-term goals (e.g. did they perform as planned, are they still functioning, what kind of repairs have been necessary, are there other techniques that might have worked better, etc)?
2. Are conditions related to water quality improving over time (i.e. trend analysis)?

3. Are there additional pollution/pollutant sources that have not been identified, and, if so, where are they?

TRWG will generally rely on simple, low-cost, monitoring methods to answer the three questions. These may include: photo-points, green-line surveys, vegetation and erosion mapping, land use surveys, visual estimates, and perhaps some grab-samples. By focusing on these and other similar methods, TRWG hopes to capitalize on the skills and availability of local volunteers. TRWG acknowledges that these methods will likely not provide definitive, quantitative answers to questions like "Are load reductions being achieved?", and "Are water quality standards being met?". However, these methods should be able to demonstrate whether or not it is likely that substantial progress is being made towards achieving load reductions and meeting water quality standards. DEQ will be relied upon to do the monitoring necessary to say whether or not load reductions are being achieved, TMDL targets are being met, standards are being met, all beneficial uses are being supported, and de-listing can occur.

9) **A monitoring component to evaluate the effectiveness of the implementation** efforts over time, measured against the criteria established under item 8 immediately above. The TRWG will promote a multi-agency (and volunteer) coordinated monitoring effort to evaluate implementation efforts.

Where to Find the Data

As described under item 8 above, TRWG intends to use low-cost, low-tech data collection to determine whether or not progress is being made towards achieving TMDL targets and meeting water quality standards. Project-level monitoring will help shed light on whether or not implementation efforts are having a localized impact on water quality. By engaging in periodic source identification efforts, TRWG hopes to be able to maintain gains made towards reaching water quality standards by identifying and addressing new sources that start up in the watershed, and by identifying any heretofore unknown sources that could be preventing attainment of water quality standards. It will be left up to DEQ, and perhaps other agencies, to quantitatively determine the extent to which implementation efforts have been effective in achieving targets and standards over time.

TETON RIVER WATERSHED GROUP

WORKPLAN

Upper Teton

Lower Teton

From The Rocky Mountain Front to the lower reaches near Loma, the Teton River Watershed Group works to find consensus to address natural resource issues.

Produced
Teton River Watershed Group
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TETON RIVER WATERSHED GROUP
Information

MISSION STATEMENT - The Teton River Watershed Group is a collaborative, locally directed group of interested individuals, organizations, and agencies dedicated to monitoring, improving and maintaining the quality of the natural resources within the Teton River Basin.

HISTORY - Formed in 1994, the Teton River Watershed Group is the key to local involvement to resolve natural resource issues, which include weeds, water quality and water quantity. The TRWG used focus meetings and surveys to establish initial direction and primary tasks. In 1996 the TRWG officially formed as a 501 © (3) nonprofit organization to access additional funds to work on natural resource projects.

STRUCTURE - The Teton River Watershed board is comprised of the officers of president, vice-president, secretary and treasurer as well as individuals that have a vested interest in the watershed. The board must include members from the Chouteau County Conservation District; Teton Conservation District; Chouteau County Weed District and Teton County Weed District.

Other federal, state, and local agencies and groups participating are the U.S. Fish & Wildlife Service (USF&WS), U.S. Bureau of Land Management (BLM), U.S. Forest Service (USFS), Montana Department of Environmental Quality (DEQ), Montana Department of Natural Resources and Conservation (DNRC), Montana Fish, Wildlife and Parks (MFWP), MSU Extension Service, Chouteau County, Teton County, The Nature Conservancy and many individual landowners.

PROCESSES: The TRWG board will meet monthly on the second Tuesday of each month in Great Falls, Montana. This is considered a central location for all participants. The TRWG will hold an annual meeting second Tuesday in January in Dutton, Montana. The annual meeting is to update the general public of special interest items and on past accomplishments. After the annual meeting, the TRWG board will conduct a TRWG board annual meeting where the election of officers will take place.

MAJOR ISSUES - The project objectives as laid out by local groups (in no particular order) are to:

1) Control the noxious weed problem in the basin
2) Improve the water availability in the Teton River for all uses
3) Improve the overall water quality of the Teton River

WORKPLAN INFORMATION:
The TRWG past work plans were written and executed in 1996 and 2006. The ideas and tasks identified in each workplan were acquired from public meetings in Fort Benton and Choteau and from monthly TRWG board meetings.

The TRWG workplans will be broken into three primary categories: noxious weeds, water quality and water quantity. The workplan will use monitoring, education and on-the-ground tasks as a means to achieve the overall goals of improving the health of the Teton River Watershed.

Due to limited resources and ability to get people to find common ground, the TRWG is not working on issues that address water rights, wildlife, endangered species, or oil and gas exploration.

TETON RIVER WATERSHED
Basic Facts

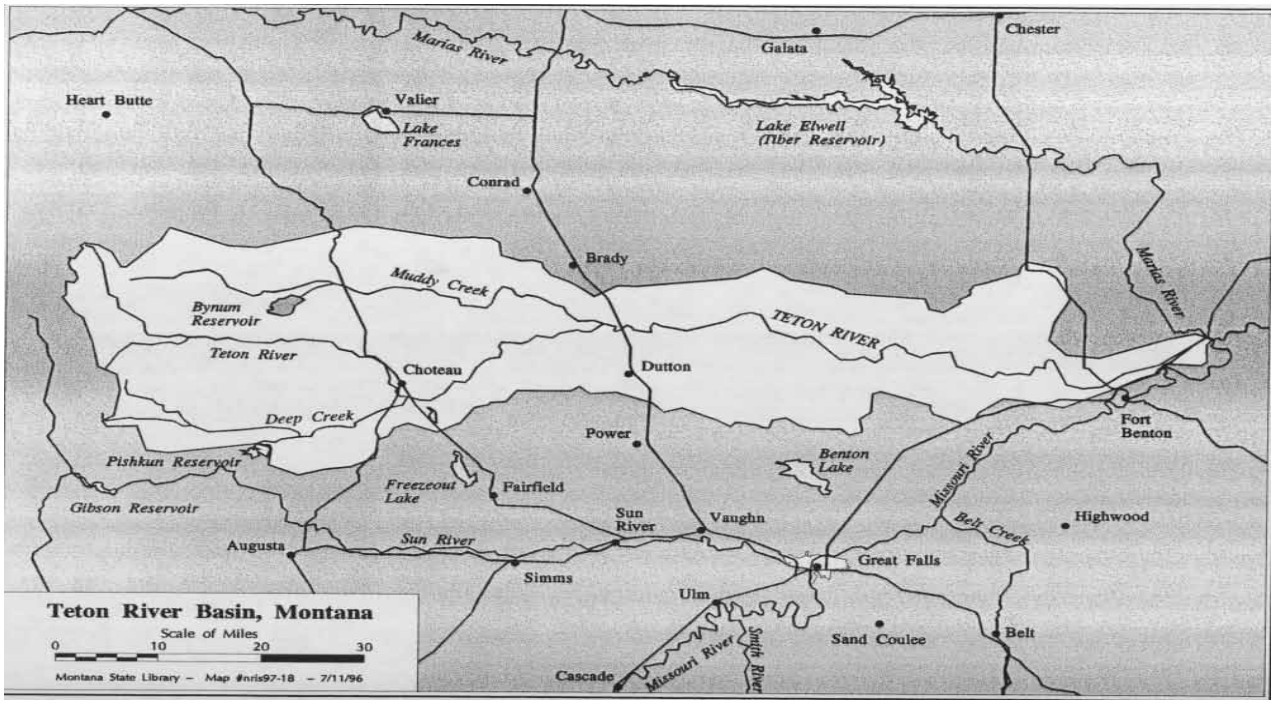
Teton River Watershed is located east of the continental divide and south of Glacier National Park. It covers an area of 1,308 square miles (**837,000 acres**), with approximately 289 square miles (**185,000 acres**) in western Chouteau County; 1,000 square miles (**640,000 acres**) in northern Teton County and 19 square miles (12,000 acres) in southern Pondera County (approximate figures only).

The Teton River starts in the Rocky Mountain Front and meanders out of the mountains through rolling grass-covered foothills and farmland to its confluence with the Marias River at Loma which flows on to the Missouri River. As it makes this trip it also passes through the community of Choteau. The major tributaries of the Teton River are Muddy Creek, Deep Creek and McDonald Creek. The basin is about 196 miles long and 1-2 miles wide.

Ownership and land patterns are (estimates only)*(in acres)*:

US Forest Service	112,640
MT State Lands	75,520
US BLM	14,720
Urban	8,370
Private property	625,750

LAND USE	TOTAL ACRES	PERCENT OF WATERSHED
Rangeland	340,000	43.0
Cropland	296,300	35.5
Forested	96,000	11.0
Hayland/pastureland	100,000	12.0
Farmsteads	1,700	.2
Urban	1,700	.2
Transportation	1,300	.15
Total	837,000	



TETON RIVER WATERSHED GROUP
History

The Teton Conservation District with the help from agencies and an informal landowner group in the fall of 1993 formed the Teton River Basin Resource Group. The group started meeting regularly and conducted a survey of landowners on the upper Teton River in the spring of 1994. The survey indicated that weeds, water quality, bank erosion and water availability were the key issues. In October 1994 several downstream Teton River landowners from Chouteau County attended a basin meeting and were included in the group thereafter.

In November 1994 the group met with FWP, DEQ, US F&W, and MSCA to discuss one of the major concerns of many irrigators along the Teton River – salinity in the Teton River from Freezout and Priest Lake. All in attendance agreed to work together to find solutions reducing salinity from Freezout and Priest Lake into the Teton River.

In January 1995 a resource questionnaire was sent to 110 landowners along the entire Teton River with a 70% return rate prioritizing key issues and concerns. In March 1995, follow-up focus group meetings were conducted in Choteau and Fort Benton to prioritize issues and goals. The first watershed mission statement agreed upon was "The Teton River Watershed Project is a locally-driven, nonprofit planning group of interested individuals, organizations and agencies dedicated to defining, addressing, promoting, protecting, improving and maintaining the quality of the resources within the Teton River Basin". The word "education" was recently inserted in the mission statement. At each of the focus meetings, the majority of landowners requested everyone with an interest in the Teton Watershed in Chouteau and Teton Counties start working together primarily on water quality, water quantity and noxious weed issues. Chouteau and Teton Conservation Districts would lead the watershed effort with help from area landowners, agencies, and interested groups. The project objectives as laid out by focus group participants (in no particular order) were to: 1) Control the noxious weed problem in the basin; 2) Improve the water availability in the Teton River for all uses; and 3) Improve the overall water quality of the Teton River. In December 1995 the first workplan was put together using the above general objectives as the key areas to work on.

In 1996 the first annual Teton Watershed meeting was held in Dutton highlighting project results and updates on issues of concern, which has now become an annual event. The first major watershed projects started with noxious weeds. These projects included mapping noxious weed locations and the collection and distribution of over 150,000 Leafy Spurge beetles collected from the lower Teton River. This has also become an annual event and is now called the "Buzzi Breen" bug collection day in honor of the person who pushed for more biological control in the Teton Watershed. In December 1996 the Teton CD was awarded a $33,000 grant to hire a part-time coordinator and for stream projects.

In June 1997 the TRWG and CDs hired a part-time coordinator contracted by the Teton CD to help write grants and assist with projects. The TRWG with help from Teton and Chouteau CDs once again held town meetings in Fort Benton and Choteau to establish a long-term/5-year watershed plan for the watershed effort. The first major stream project was started in 1997 and completed in 1998 on the Teton River to prevent the Teton from moving over to McDonald Creek which would have bypassed several irrigation diversions. This same year NRCS put together a tour and workshop for the CDs to inspect current river conditions and project ideas that the TRWG could help with. The first need identified was a more detailed assessment of the Teton River. Since then, additional tours AND workshops have taken place that review accomplished projects and fulfill requested training such as IWM, GPS, water quality monitoring, and weed spraying.

In 1998 the Montana Water Quality agency requested assistance in monitoring the Teton River and its tributaries in an effort to remove them from the state impaired list. The CDs had the TRWG coordinator help DEQ with this monitoring from 1998 – 2002 on Teton River, Deep Creek, McDonald Creek, Spring Creek, and Muddy Creek. Some water quality improvements were noted from this monitoring. In 1998, the TRWG with help from the two CDs started a newsletter and volunteer water quality-monitoring program. Two top-notch meters were bought for volunteers to monitor in the upper and lower Teton River. The CD administrators worked with the coordinator to write articles on current events going on in each county. The newsletter also included articles from "old-timers" telling their story of how they remembered the Teton River. The next major stream project started in 1998 and completed in 1999 was the removal of old cars from the Teton River near Choteau. An aerial assessment of the Teton River and its tributaries was also accomplished by NRCS. This was followed up by ground surveys on the upper Teton of all diversions in 1999.

In 1999, members of the watershed group decided there was a need to become a formal non-profit organization to be able to pursue funds that the CDs were unable to obtain. The group then changed its name officially to the Teton River Watershed Group (TRWG). A grant was awarded to restore the Teton River above and below the Chester Bridge near Fort Benton. The TRWG also obtained funding to develop and distribute a Teton Watershed brochure. In 1999 the Teton CD

also started a Muddy Creek/Burton Bench water quality and quantity study bringing in the Montana Bureau of Mines and Geology to do the work.

In 2000 a DNRC 223 grant was acquired by the Teton CD to research saline seep on the Teton Ridge by Montana Salinity Control Association. In 2000 the TRWG helped both Teton and Chouteau County Weed Districts write and receive noxious weed grants to cost-share chemicals. The weed districts with the help from TRWG continued to pursue cost-share grants from 2000 to 2008. A major irrigation diversion modification was started in 2000 and completed in 2001. Funds and resources for the project were pulled in from the irrigation company, FWP, landowner, and volunteers. A major erosion project was also started on the lower Teton River with help from NRCS, landowner and volunteers. The lower Teton River project unfortunately took over 7 years to complete due to disagreements between agencies on how to accomplish. Starting in 2000 to present the TRWG has helped each year with a stream project on both the upper and lower Teton River.

In 2001 DEQ briefed the CDs and the TRWG on the requirement to develop a "TMDL"/Water Quality Plan for the Teton River AND they requested assistance. It was agreed to help out to ensure landowner views were heard. Over the next two years the TRWG and the CDs worked on a TMDL plan.

In 2002 the TRWG found the funds to assist the Farmers Irrigation Company work on their diversion in a similar fashion to the Eurika diversion. After several months of work getting permits, formal landowner permission, and contractor bids the project was dropped due to contracting issues. Another stream project was accomplished in its place on the upper Teton River. A University of Montana student accomplished living with Wildlife/grizzly study.

In 2003, a large display board was bought to show more information about watershed projects. The display highlighted weed pulls, bug collections and stream projects. The TRWG was briefed that the TMDL process had changed and that the state would complete the product on its own. September 2003 DEQ's TMDL was completed with lots of concerns by landowners.

In 2004 a two-year workplan was put together for a short-term direction for new projects since most projects in the original workplan had been completed or abandoned. The plan continued with the basics of controlling noxious weeds, water quality improvement projects and water quantity education programs.

In 2006 and 2007 the TRWG again hosted town meetings in Fort Benton and Choteau to hear from landowners what should be the priorities dealt with over the next five years. A new workplan was developed from these town meetings and other inputs.

In 2006 and 2007, MSCA was hired to start monitoring saline seep in the Priest Lake area. This was considered another major contributor of salinity into the Teton River.

In 2008, after almost ten years of requests, a Teton River water budget was started by DNRC. MSCA moved their saline seep monitoring over to an area just east of Choteau that had large saline seep problems. The project intent was to acquire facts about water gains and losses in each key reach of the Teton River and its tributaries.

The TRWG annually continues to find funding for noxious weed projects, stream projects, USGS gauge stations, and education programs.

TETON RIVER WATERSHED GROUP
Past Projects Summary

Since TRWG's formation the CDs, landowners and agencies have tackled many projects. These accomplishments are not just by the TRWG but also through teamwork. Below is a list of project accomplishments in the Teton Watershed by these many entities:

GENERAL ITEMS:

1. 1995 to present, monthly watershed meetings in Great Falls to discuss projects, issues and funding,
2. 1996 to present, annual meetings held in Dutton to educate landowners and interested people on important current issues,
3. 1997 to present, tours reviewing watershed project accomplishments,
4. 1998 to present, watershed newsletter when funding is available, conservation district administrators helping write to inform and educate people on key issues within the basin,
5. 1999, educational watershed model bought as a tool for schools. Currently kept at Boone & Crockett,
6. 1999, brochure printed and distributed to highlight teamwork and watershed projects,
7. 2000, watershed display put together to highlight projects and teamwork,
8. Each year, education forums by watershed partners on noxious weeds, water quality, and water quantity.

RESOURCE ASSESSMENTS:

1. 1995, Dave Rosgen on upper Teton River sponsored by Teton CD supported by Bynum water users and TRWG
2. 1996, Noxious weed mapping project primarily along the Teton River with landowners highlighting their weed infestation locations on topo maps
3. 1997, NRCS tour of Teton River to identify overall needs
4. 1998, Aerial stream assessment by NRCS on the entire Teton River, Muddy Creek and Deep Creek,
5. 1998, Upper Teton River diversion stream assessment by Watershed Consulting to identify and prioritize irrigation diversion improvement needs,
6. 1998 – 2001, Muddy Creek/Burton Bench watershed ground/surface water quality and quantity study to identify cause and effects of problems in the area,
7. 2000, Teton Ridge saline seep study by Montana Salinity Control Association, the major water quality problem within the basin,
8. 2002, Living with Wildlife study by Uof M student,
9. 2006 and 2007, Saline seep study around Priest Lake and reviewed again with landowners in 2008 on options and opportunities
10. 2008 and 2009, Saline seep study east of Choteau on best options to reduce saline seeps
11. 2008 to current, Watershed water budget study started and is still in progress by DNRC. They installed seven gauges and utilized the existing three USGS gauges to help document inflows and outflows in the Teton Watershed.

NOXIOUS WEEDS

1. 1996, Buzzi Breen bug collection day started by TRWG. Collection continues to be supported by MANY groups now,
2. 1996, weed mapping started and continues on by the Teton County Weed District, The Nature Conservancy, Forest Service and landowners for noxious weeds and control measures in the Teton Watershed. Each entity has their own GIS mapping system however; TNC is working on a private lands map that will forecast future weed growth areas,
3. 1998, TRWG Newsletter was started with updates on proper chemical use, biological control, mapping and other useful tools,
4. 2000, weed grants written by TRWG and sponsored by the weed districts in both counties to help cost-share chemicals. This cost-share continued until 2008,
5. 2004, Teton Spray Day was started by area landowners and continues to be key weed control in the area,
6. 2006, Teton Canyon Weed pull on the upper Teton River started. Annually event helps educate people about noxious weeds,
7. 2008 GPS mapping training was accomplished by the Teton County Extension Service.

WATER QUALITY

1. 1997 to present, stream stabilization projects at 18 sites *on* 29,080 feet of bank,

2. 2000 to present, irrigation diversion improvements at five upper Teton River sites,
3. 2000 to present, riparian corridor management improvements over 51 miles,
4. 2000, USGS reinstalled at upper and lower Teton River. USGS continues to maintain three water quality and quantity tracking sites on the Teton River. The TRWG wrote grants to fund the gauges and the Teton Conservation District was the contracting agency with USGS. The water quality data is located on the USGS web site,
5. 2000 volunteers started water quality-monitoring program at approximately 10 sites; Five upper and five lower on Teton River,
6. Priest and Freezout Lake flow and salinity monitoring into the Teton River by FWP.
7. 2009, new gauge installation at hwy 221 started. The funding is available, site is selected, just need good weather conditions and equipment to finish the project,

WATER QUANTITY

1. USGS continues to maintain the three gauges on the Teton River. These are the same sites that USGS gathers water quality data.
2. Adjudication updates in newsletters and annual meetings,
3. Agrimet station installed north of Choteau to help with irrigation water management. Station was acquired from a site no longer needed in the Sun drainage,
4. Irrigation Water Management on private lands is continuing by private landowners with help from NRCS.

*** General Teton River Watershed Group ***
workplan section

NOTE: The following tasks are for general TRWG work items that also have relevance to all other work sections

Task 1: TRWG annual meeting in Dutton, MT to update general public on topics of watershed interest
Timeline – Second Tuesday of January
Responsible Party – TRWG coordinator with help from TRWG Board
Additional Resources – State and federal agencies that may address the annual topic
Proposed Product: Informed general public on topics of special interest
Past Accomplishment highlights – Annual meeting minutes from 1996 to current located at the TRWG coordinator's office.
2009 - TRWG annual meeting on January 13, 2009 in Dutton with 55 people attending. Topics included tribute to Ray Habel, noxious weeds update, water quality update, saline seep update, and main topic of water rights.
NEXT – January 5, 2010 in Dutton. Tentative topics include update on adjudication, noxious weeds, web site, water quality and water quantity-monitoring updates. Meeting date changed to 1st Tuesday to prevent conflicting with state weed meeting. Requires scheduling of room and food.

Task 2: TRWG monthly board meetings in Great Falls, MT to conduct TRWG business including paying bills, grants status and projects updates.
Timeline – Second Tuesday of each month unless notified of change
Responsible Party – TRWG coordinator with help from TRWG Board president
Additional Resources – Any person or group with pertinent information for that month
Proposed Product: TRWG board oversight of funds and review on topics of special interest
Past Accomplishment highlights – Monthly board meeting minutes from 1995 to current located at the TRWG coordinator's office.
2009 - TRWG monthly board meetings conducted on February 10, March 10, April 14, June 9, and July 14. No May meeting – lack of quorum. No August meeting because of farmers in field. September 15th as part of TRWG tour.
NEXT - October 13; November 10; and December 8.

Task 3: Watershed tour open to public to review past watershed projects and items of interest to the TRWG
Timeline – Tour timeframe and location set at beginning of each year
Responsible Party – TRWG coordinator with help from TRWG Board
Additional Resources – State and federal agencies that may address projects
Proposed Product: TRWG board and interested citizens better understanding past projects
Past Accomplishment highlights – 2003 tour cancelled because of bad weather; 2006 tour on upper watershed; and 2008 tour on middle watershed
2009 – Tour was on September 15th on lower Teton River. See Teton tour handout at TRWG coordinator office
NEXT – 2010 tour being considered earlier in year to coincide with range and weed tour on upper Teton River

Task 4: TRWG newsletter highlighting topics of interest. Consistent topics will include noxious weeds and past stream projects
Timeline – Two times per year normally in spring and fall
Responsible Party – TRWG coordinator with help from TRWG Board
Additional Resources – State and federal agencies that may address timely topics
Proposed Product: Informed general public on topics of interest in the watershed
Past Accomplishment highlights – TRWG newsletters from 1998 to current located at the TRWG coordinator's office
2009 – No spring TRWG newsletter due to lack of funding
NEXT – Fall 2009 TRWG newsletter due out October 2009. Partners are submitting articles now.

Task 5: TRWG Web site to keep interested individuals informed about the TRWG and a single site for past newsletters, past meeting minutes, past studies, water quality information, and gauge locations
Timeline – Completed base web site by December 2009
Responsible Party – TRWG coordinator with help from TRWG Board
Additional Resources – Citizens along with state and federal agencies that may have useful information
Proposed Product: Current and usable TRWG web site
Past Accomplishment highlights – TRWG has used Montana Watershed Coordination Council web site for basic information located at http://mwcc.montana.edu/groups/details.asp?groupID=28
2009 – TRWG coordinator with suggestions from TRWG board has researched possible web hosting sites and information the web site should include.
NEXT – TRWG coordinator trying to find web host; then will get information onto that web site. Site demonstration suggested for 2010 annual meeting

Task 6: TRWG display board for special events to keep individuals informed about the TRWG
Timeline – TRWG January annual meeting; Teton County fair in June; others at identified by board
Responsible Party – TRWG coordinator with help from TRWG Board
Additional Resources – Citizens along with state and federal agencies that may have useful information
Proposed Product: TRWG display board with current watershed information and pictures
Past Accomplishment highlights – TRWG display has been shown at many public events since 2000
2009 – TRWG January annual meeting; Teton County fair June 25-27
NEXT – None scheduled at this time

Task 7: Educational workshops to keep watershed participants well educated on tools to help work on natural resource issues. Will be part of other workplan sections. This task is listed for those workshops that do not fit under other workplan sections.
Timeline – Will be part of other workplan sections.
Responsible Party – TRWG coordinator primarily led by County Extension agents
Additional Resources – Citizens along with state and federal agencies that may have useful information
Proposed Product: Well educated watershed participants
Past Accomplishment highlights – TRWG workshops
2009 – See list under other workplan sections
NEXT – None scheduled at this time

*** NOXIOUS WEEDS ***
workplan section

BACKGROUND DATA: When the TRWG was formed in 1996, one of its key work areas that everyone could agree on was control of noxious weeds. Since those starting days, the TRWG has continued to support control of noxious weeds through teamwork and well-rounded weed control programs.

The primary noxious weed species to be addressed by this watershed project include: Spotted Knapweed, Leafy Spurge, Canada Thistle, Dalmation Toadflax Sulfur Cinquefoil, and Houndstongue.

The Teton River Watershed (TRW) like most of Montana, has undergone a steady advancement of noxious weed species, particularly spotted knapweed and leafy spurge. While broad reaches of Montana have suffered tremendous economic and habitat loss due to noxious weeds, the TRW weed containment problem is still cost-effective and physically manageable in most areas. However, quickly accelerating weed problems have emerged along the riparian corridors, roadways and access points to public lands. In an ever-growing number of cases, weeds are now spreading from the corridors to adjacent private and public lands. Both formal and informal weed-control initiatives on the TRW will continue to center around drainages, since landowners tend to organize themselves that way. Further, while drainages are a perfect conduit for weed seed spread, control methods are more complex in drainages because chemical and vehicle use is more restricted, and therefore increased labor and creativity must be exerted. The TRWG partners have substantially increased weed control on irrigated lands and now needs to step up the rangeland weed control. Finally, by expanding Weed Management Areas (WMA) by sub drainage, we expect to increase interest in cooperative efforts across a broad area of the TRW. The Deep Creek and upper Muddy Creek drainages have very few noxious weeds and will be managed as weed free areas.

To date, the TRWG has actively assisted with: 1) starting a biological bug collection in 1996; 2) starting the first Weed Whacker Rodeo in 2005; 3) distributed over one million bugs for Leafy Spurge; 4) help write noxious weed grants that have brought in $100,000 in additional funds to the watershed to fight noxious weeds; 5) mapped of major weed infestations; and 6) actively participates with the Rocky Mountain Front Weed Roundtable.

Participants include Teton County Weed District; Teton County Extension Service; Chouteau County Weed District; Chouteau County Conservation District; U.S. Fish & Wildlife Service; U.S. Forest Service; U.S. Bureau of Land Management; U.S. Natural Resource Conservation Service; Montana Department of Natural Resources and Conservation; Montana Fish, Wildlife & Parks; The Nature Conservancy; and private landowners.

This team will address the worst problems while looking at best options on how to continue the on-going problems of noxious weeds. Opportunities should arise to share resources and consolidate both landowner outreach and information dissemination. The higher visibility and promotion provided by the intern will also present an incentive for more people to join in with their private and public neighbors on weed control. This project will be an excellent opportunity to convene new information and to educate more people on weed management. Taking a team approach in the entire watershed with government agencies and area landowners involved will ensure a better use of limited resources. Through the diverse approach of prevention, management, inventory and public awareness/education, this project will help implement the Montana Weed Management Plan on private and public lands.

☐ **Goal 1:** Prevent, contain, and control ALL existing noxious weeds within the ENTIRE 837,000 acres in the Teton Watershed.

☐ **Objective 1**: Using a collaborative and integrated weed management approach to prevent spread, contain and control of Leafy Spurge, Spotted Knapweed, Russian Knapweed, and Canadian Thistle in The Teton Watershed over the next ten years.

☐ **Task 1**: Map locations of existing sites of Leafy Spurge, Spotted Knapweed, Russian Knapweed, and Canadian Thistle
☐ **Timeline** – May – October field map work; winter months incorporate into last years map
☐ **Responsible Party** – Teton and Chouteau County Weed Districts; FS on FS lands
☐ **Additional Resources** - Weed districts hold primary mapping data with support from Forest Service, RMF Weed RT partners and Chouteau area DNRC
☐ **Proposed Product:** GIS map of weed infestations at Teton and Chouteau County Weed Districts
☐ **Past Accomplishment highlights –** NRCS, Teton Weed District and Chouteau Weed District in 1996 mapped in GIS and on topo maps noxious weeds along the entire Teton River. Since then, Teton and Chouteau weed districts have continued to map noxious weeds as found in the entire watershed. GIS maps are located in each county weed district office
☐ **2009 –** Continue to map with scheduled projects listed below
☐ **NEXT –** Once field season completed, compile data into GIS

☐ **Task 2**: Establish type of treatment plan for each location of existing sites of Leafy Spurge, Spotted Knapweed, Russian Knapweed, and Canadian Thistle
☐ **Timeline** – Winter months incorporate changes into last years plan
☐ **Responsible Party** – Teton and Chouteau County Weed Districts; FS on FS lands
☐ **Additional Resources** - RMF Weed RT partners and Chouteau area DNRC
☐ **Proposed Product:** Active weed plan to address all current known patches of noxious weeds
☐ **Past Accomplishment highlights –** Each county has weed plans addressing specific areas
☐ **2009 –** Compiling weed data to edit weed plans
☐ **NEXT –** Each county will incorporate new data into existing weed plans

☐ **Task 3**: TRWG and partners will write grants from MDA, FS, BLM, and others to help control noxious weeds with primary focus on Leafy Spurge, Spotted Knapweed, Russian Knapweed, Canadian Thistle
☐ **Timeline** – annual, depending upon grant due dates; MDA due December
☐ **Responsible Party** - Teton and Chouteau County Weed Districts
☐ **Additional Resources** – RMF Weed RT partners and Chouteau area DNRC
☐ **Proposed Product:** Financial assistance for noxious weeds projects
☐ **Past Accomplishment highlights –** Past successful grant results since 1995 at weed district offices
☐ **2009 –** No grants were submitted since received NWTF grants for past 5 years.
☐ **NEXT –** None in 2009

☐ **Task 4**: Collect and distribute biological controls around Teton Watershed
☐ **Timeline** – June, July and August of each year
☐ **Responsible Party** – Teton and Chouteau County Weed Districts
☐ **Additional Resources** - RMF Weed RT partners, Chouteau area DNRC and volunteers
☐ **Proposed Product:** 100,000 beetles collected and distributed to 30 landowners on 50 sites
☐ **Past Accomplishment highlights –** Since 1996, have collected and distributed approximately 3.6 million bugs to over 720 sites for 100 landowners. See past RMF Weed RT annual report for more details.
☐ **2009 –** July 15th 40 people collected 180,000 bugs and delivered 90 containers to 40 sites
☐ **NEXT –** Map in GIS where bugs distributed

- ☐ **Task 5**: Teton Weed pull and educational program
- ☐ **Timeline** – annually on third Saturday in July
- ☐ **Responsible Party** – Teton Weed District
- ☐ **Additional Resources** - RMF Weed RT partners, FRCEG, MSU Extension and volunteers
- ☐ **Proposed Product:** 50 volunteers pull 1,000 lbs of Spotted Knapweed along upper Teton River road and learn more about weed control
- ☐ **Past Accomplishment highlights -** Started in 2006 averaging 50 volunteers pulling approximately 750 lbs Spotted Knapweed. See RMF Weed RT annual report for more details
- ☐ **2009 –** July 18th 75 volunteers pulled 778 lbs of knapweed
- ☐ **NEXT –** Take lessons learned from 2009 and plan for 2010 weed pull

- ☐ **Task 6**: Conduct a landowner weed spray day along Teton Road
- ☐ **Timeline** – June of each year; third Thursday
- ☐ **Responsible Party** – Teton County Weed District
- ☐ **Additional Resources** - RMF Weed RT partners, landowners, and volunteers
- ☐ **Proposed Product:** 20 people spray roughly 20 miles of roadways along "Teton Road"
- ☐ **Past Accomplishment highlights –** Started in 2003, see RMF Weed report for full details
- ☐ **2009 –** June 17th 20 landowners with Teton Weed district sprayed 20 miles of Teton roadway
- ☐ **NEXT -** Take lessons learned from 2009 and plan for 2010 spray day

- ☐ **Task 7**: Montana Conservation Corps weed pulling and mapping along Teton River
- ☐ **Timeline** – summer of each year
- ☐ **Responsible Party** – Teton County Weed District
- ☐ **Additional Resources** - RMF Weed RT partners and landowners
- ☐ **Proposed Product:** two weeds pulls and 20 acres mapped
- ☐ **Past Accomplishment highlights –** Started in 2003, see RMF Weed report for full details
- ☐ **2009 –** MCC crew pulled weeds along Teton week of June 17 and on July 18th
- ☐ **NEXT -** Take lessons learned from 2009 and plan for 2010

- ☐ **Task 8**: Private landowner weed management plans when funds received from TRWG
- ☐ **Timeline** - accomplish with stream projects
- ☐ **Responsible Party** – Teton and Chouteau County Weed Districts
- ☐ **Additional Resources** - coordinator, landowners, weed districts – will work together to put together weed plan
- ☐ **Proposed Product:** Private landowner weed management plans
- ☐ **Past Accomplishment highlights –** Since 2006, (3) projects with weed management plans
- ☐ **2009 –** No completed action yet
- ☐ **NEXT –** (2) private landowner weed management plans
    - ☐ Weed District follow-up on 3 weed management plans

☐ **Objective 2**: Noxious weed education program that compliments collaborative weed management approach

- ☐ **Task 9**: Semi-annual newsletter will contain noxious weed updates addressing types of control, information on new invaders, and available resources.
- ☐ **Timeline** – quarterly
- ☐ **Responsible Party** – TRWG coordinator
- ☐ **Resources** - Teton and Chouteau County Weed Districts, and weed partners
- ☐ **Proposed Product:** Semi-annual newsletters annually mailed to 3,000 people on weed information
- ☐ **Past Accomplishment highlights –** Past newsletters since 1999 located at coordinator's office
- ☐ **2009 –** No completed action yet
- ☐ **NEXT –** Fall newsletter in-work with weed articles from weed districts

- ☐ **Task 10**: Train 10- 20 landowners how to use a GPS unit and protocol to map ALL noxious weeds

- ☐ **Timeline** – May – October of each year, train landowners until no one else wants training
- ☐ **Responsible Party** – Teton and Chouteau County Weed Districts
- ☐ **Resources** -Weed districts and County Extension
- ☐ **Proposed Product:** Landowners trained to use GPS to map noxious weeds
- ☐ **Past Accomplishment highlights –** 2007, 30 landowners trained to use GPS to map noxious weeds
- ☐ **2009 –** No completed action yet
- ☐ **NEXT** - 10- 20 landowners trained on GPS for mapping noxious weeds

- ☐ **Task 11**: Weed display to be shown at public events
- ☐ **Timeline** – January – December, annually
- ☐ **Responsible Party** – TRWG coordinator
- ☐ **Resources** - upper watershed - Paul W and Mark K; lower watershed - Diane W & Craig F
- ☐ **Proposed Product:** Show at TRWG annual meeting, Choteau fair and Fort Benton fair to reach 2,000 people
- ☐ **Past Accomplishment highlights –** Since 2000, display at TRWG annual meeting, Choteau FFA fair and Fort Benton fair
- ☐ **2009 –** TRWG annual meeting, Choteau FFA fair
- ☐ **NEXT –** None scheduled

- ☐ **Task 12**: Support ongoing noxious weed educational programs including FRCEG and Weed RT
- ☐ **Timeline** – January – December, annually
- ☐ **Responsible Party** – FRCEG and Weed RT
- ☐ **Resources** - upper watershed - Paul W and Mark K; lower watershed - Diane W & Craig F
- ☐ **Proposed Product:** educational events to youth and adults
- ☐ **Past Accomplishment highlights –** See past FRCEG and RT annual reports
- ☐ **2009 –** Weed pull, spray day and bug collection completed
- ☐ **NEXT** - See FRCEG and RT workplans

☐ **Goal 2: A**ttempt to eradicate new invasive species within the ENTIRE Teton Watershed boundaries

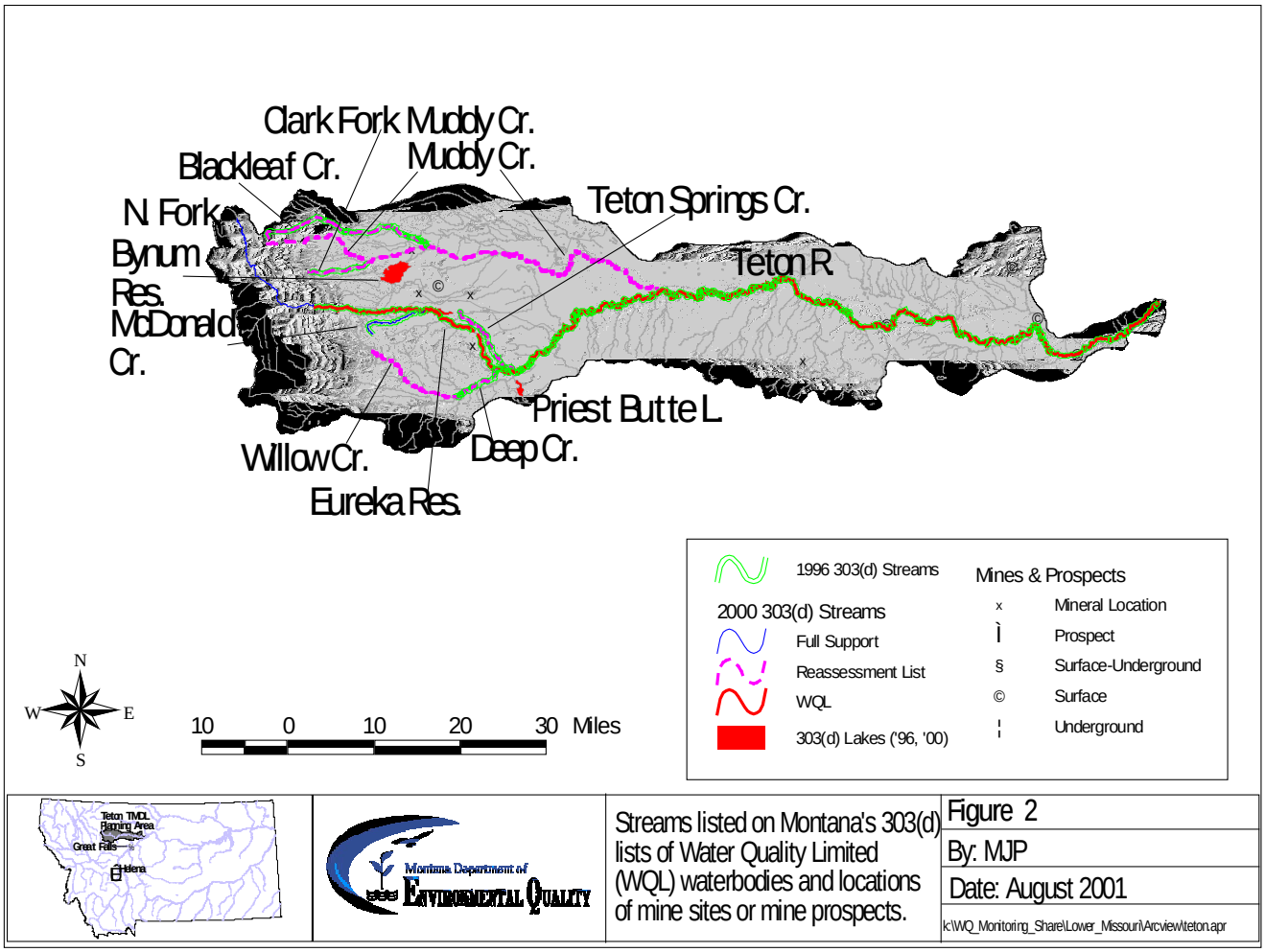
☐ **Objective 1**: Using a collaborative and integrated weed management eradicate new invasive species in the Teton Watershed

- ☐ **Task 13**: Map and immediately treat all new invasive species locations
- ☐ **Timeline** – May – October field work; winter months incorporate into last years map
- ☐ **Responsible Party** – Teton and Chouteau County Weed Districts; FS on FS lands
- ☐ **Additional Resources** - Weed districts hold primary mapping data with support from Forest Service, RMF Weed RT partners and Chouteau area DNRC
- ☐ **Proposed Product:** GIS map of weed infestations at Teton and Chouteau County Weed Districts
- ☐ **Past Accomplishment highlights –** Maps current as of December 2008
- ☐ **2009 –** No action yet
- ☐ **NEXT –** Take 2009 mapping and compile into GIS

*** WATER QUALITY ***
workplan section

BACKGROUND DATA: When the TRWG was formed in 1996, one of its key work areas that everyone could agree on was the need to improve water quality in the Teton River. Even though everyone agreed upon the need, there was not agreement on how this area should be accomplished. The primary water quality impairments the TRWG is working on is salinity and turbidity.

The majority of water quality information can be found in the September 2003 water quality management plan (WQMP) and associated total daily maximum loads (TMDLs) for the Teton River Watershed. The Teton River flows into the Marias River near Loma, in west central Montana and then into the Missouri River. Thirteen stream segment/water bodies in the Teton River watershed were listed with threatened or impaired beneficial use support on Montana's 1996 303(d) List while nine stream segment/water bodies have impaired status on the 2002 303(d) List. Five stream segment/water bodies have been determined as fully supporting all beneficial uses in 2002. All water bodies in the Teton River watershed are classified as B1, B2, or B3; therefore, they are to be maintained suitable for household use, aquatic life, cold or warm water fishery, agriculture, industry, and contact recreation beneficial uses per the Administrative Rules of Montana (17.30.620 – 629 ARM).



From: TMDL - Impaired beneficial uses identified on the 1996 & 2002 303(d) lists.

Stream Name & Reach Description	1996 Use Support						2002 Use Support					
	Aquatic Life	Fishery	Drinking Water	Agriculture	Industry	Contact Rec.	Aquatic Life	Fishery	Drinking Water	Agriculture	Industry	Contact Rec.
Teton River (N & S Fk to Deep Cr)	P	P				P	P	N				
Teton River (Deep Cr to Muddy Cr)	P	P	T	T		P	P	P		P		
Teton River (Muddy Cr to mouth)	P	P	P	P		P	P	P				
Willow Creek (Headwaters to mouth)	P	P					P	P				
Deep Creek (Headwaters to mouth)	P	P					P	P	P		P	P
McDonald Creek (Headwaters to mouth)		T					**F**	**F**	**F**	**F**	**F**	**F**
Upper Blackleaf Creek (Headwaters to Cow Cr.)	P	P	P				**F**	**F**	**F**	**F**	**F**	**F**
Lower Blackleaf Creek (Cow Cr. to mouth)							P	P				
Upper Teton Spring Cr. (Headwaters to Choteau)	P	P				P	P	P	P			P
Lower Teton Spring Cr. (Choteau to mouth)	P	P				P	P	P	P		P	P
Clark Fork Muddy Cr. (Headwaters to mouth)		T					**F**	**F**	**F**	**F**	**F**	**F**
Priest Butte Lakes	P	P	P			P	N	N				
Bynum Reservoir	P	P					**F**	**F**	**F**	**F**	**F**	**F**
Eureka Reservoir	P	P					**F**	**F**	**F**	**F**	**F**	**F**

Source: MDEQ (1996a, 2002a)
P = Partial support, N = Non-support, T = Threatened, F = Full support

The Teton River watershed is connected to the Sun River watershed via man-made canals and irrigation works. However, in the interested of simplicity, the TMDLs and Water Quality Management Plans for the Teton and Sun Rivers have been developed in separate documents. The development of each of these plans was done in close coordination since water quality in the Teton River basin is intricately linked to actions in the Sun River basin. The pivot point for these watersheds is the Freezeout Lake discharge into Priest Butte Lakes. The setting of targets, especially those set for Priest Butte Lakes, were developed with an awareness as to their potential implication to Freezeout Lake, the Greenfields Irrigation District (GID), and the Sun River. This document does not attempt to describe the complex functioning of the Freezeout Lake Wildlife Management Area, the Sun River watershed, or its irrigation systems. This information and detail is contained in the Sun River

Natural disturbance events are part of the northern Rockies Mountains and Great Plains ecosystem and include wildfire and floods. Floods of 1948 and 1953 are reported as severe but having little documented effect to the river system, although one effect of the 1953 flood was that the US Army Corps of Engineers had contractors straightened out several river bends in the lower basin (personal communication with area landowners). However, the flood of 1964 was dramatically different. Leading up to this flood, land use along the river bottoms and floodplain had changed significantly: some reaches of the river were channelized (i.e. straightened), permanent bridges for transportation were installed, and riparian areas were being heavily used which reduced the cover of bank stabilizing vegetation. When the '64 flood came, the ability of the river's floodplain to accommodate and withstand extreme flows was reduced so the flood effects were severe. When the floodwaters receded, the Teton River had lost approximately 35 miles stream length as a result of flood flows and man's reaction to it. Again, the US Army Corps of Engineers channelized a reach of river in an attempt to prevent future damage, this time near Choteau. The effects of the 1953 and 1964 floods continue to be manifested as the river works to regain its lost stream length. However, the river now has limited space within which to regain this length as people occupy much of the floodplain for agricultural purposes, homes, towns, and transportation infrastructures.

Natural disturbance events are part of the northern Rockies Mountains and Great Plains ecosystem and include wildfire and floods. Floods of 1948 and 1953 are reported as severe but having little documented effect to the river system, although one effect of the 1953 flood was that the US Army Corps of Engineers had contractors straightened out several river bends in the lower basin (personal communication with area landowners). However, the flood of 1964 was dramatically different. Leading up to this flood, land use along the river bottoms and floodplain had changed significantly: some reaches of the river were channelized (i.e. straightened), permanent bridges for transportation were installed, and riparian areas were being heavily used which reduced the cover of bank stabilizing vegetation. When the '64 flood came, the ability of the river's floodplain to accommodate and withstand extreme flows was reduced so the flood effects were severe. When the floodwaters receded, the Teton River had lost approximately 35 miles stream length as a result of flood flows and man's reaction to it. Again, the US Army Corps of Engineers channelized a reach of river in an attempt to prevent future damage, this time near Choteau. The effects of the 1953 and 1964 floods continue to be manifested as the river works to regain its lost stream length. However, the river now has limited space within which to regain this length as people occupy much of the floodplain for agricultural purposes, homes, towns, and transportation infrastructures.

The type and magnitude of water quality impairments vary across the watershed and the listed impairments also differ between the 1996 and 2002 303(d) lists. Some of the listed causes and impairments changed due to the institution of a more structured and formalized 303(d) listing process. The new process requires a minimum level of data for beneficial use support determinations and greatly improves the documentation of the listing decisions. Primary causes of water quality impairments listed on the 1996 and 2002 303(d) lists include salinity/TDS/chlorides or sulfides, selenium, organic enrichment/dissolved oxygen, siltation/suspended solids, temperature, and nutrients. Other listed causes include stream flow alteration (dewatering), bank erosion, riparian degradation, fish habitat alteration, and other habitat alteration (Tables 3-1 and 3-2). Sources of impairments listed include agricultural related (irrigated and non-irrigated crop production, range land/grazing), stream flow modification, channelization, bank modification/destabilization, habitat modification, municipal point source, resource extraction, land disposal, highway/road/bridge construction, and natural or unknown sources.

A "true" total daily maximum load (TMDL) for specific pollutants can be developed where sufficient data exists and it is logical to do so. This only proved to be the case for selenium loading into Priest Butte Lakes (Table E-2). EPA guidance also allows TMDLs to be expressed as either a reduction target or a surrogate target if applicable or warranted. This proved to be the best approach for salinity, sediment, temperature, and nutrients (Table E-2). Salinity and nutrient TMDLs are expressed as a reduction in the average and/or maximum measured concentrations of total dissolved solids (TDS), total nitrogen, total phosphorus, or

Chlorophyll *a* biomass. Sediment and temperature TMDLs are expressed using a surrogate measure of channel stability as defined by a stabile channel geometry, riparian vegetation communities, and minimum stream flows on approximately 80% of a stream's overall length (Table E-2).

Table E-2. TMDLs for Teton River Water bodies.

Pollutant: Water body	**Monitoring Location**	**Total Daily Maximum Load, Reduction Target, or Surrogate Measure**	**Conditions: Existing ↔ Target**
TDS / SC: Priest Butte Lakes	- In-lake - Discharge at Hwy 221	34% reduction in-lake SC concentrations No reduction in May to Sept. <u>average</u> SC 23% reduction in <u>maximum</u> SC	Table 4-6 Table 4-8
TDS / SC: Teton River	- USGS Loma gage	8% reduction in May to Sept. <u>average</u> SC 14% reduction in <u>maximum</u> SC	Table 4-3 Table 4-8
Selenium Priest Butte Lakes	- Yeager Seep	0.157 lbs/day to Priest Butte Lakes	Table 4-10
Sediment Teton River	- Deep Cr. to Muddy Cr. - Muddy Cr. to mouth	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.3.2	Table 4-17
Sediment Willow Creek	- Headwaters to Deep Cr.	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.3.2	Table 4-17
Sediment Deep Creek	- Willow Cr. to mouth	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.3.2	Table 4-17
Sediment Teton Spring Cr.	- Headwaters to Choteau - Choteau to mouth	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.3.2	Table 4-17
Thermal Modification Teton River	- Deep Cr. to Muddy Cr.	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.4.2	Table 4-17
Thermal Modification Teton Spring Cr.	- Headwaters to Choteau	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.4.2	Table 4-17
Nutrients Deep Creek	- Willow Cr. to mouth	**TP** 23% reduction **TN** 57% reduction **Chl *a*** 16% reduction	Table 4-20 Table 4-21
Nutrients Teton Spring Cr.	- In Choteau - Near mouth	**TP** No reduction required **TN** No reduction required **Chl *a*** 168% reduction (May – June) **TP** No reduction required **TN** 25% reduction **Chl *a*** 4% reduction (May – June)	Table 4-20 Table 4-21

Table E-3. Physical Surrogate Target values for sediment and temperature.

Water body	**Stable**	**Channel Geometry**	**Instream**	**Riparian**

(location)	**Banks & Healthy Riparian**[1] (miles)	Rosgen Channel Type	Width / Depth Ratio	Average Meander Width Ratio[2]	**Flow**[3] (cfs)	**Vegetative Community**
Teton River: (N-S Forks to Deep Creek)	147	C	> 12	11.4	35	Mix of cottonwood and willow species, which are determined by site-specific elevation and dominant soils. Refer to Tables 4-15, 4-16, and Figure A-14.
Teton River: (Deep Creek to Mouth)		C	> 12	11.4	To be determined[4]	
Deep Creek (Headwaters to Mouth)	7	C	> 12	11.4	18	
Teton Spring Creek (Headwaters to Mouth)	11.2	E	< 12	24.2	4.5	
Muddy Creek (Headwaters to Mouth)	65	C	> 12	11.4	Needs to be calculated	
Willow Creek (Headwaters to Deep Cr.)	15	C	> 12	11.4	Needs to be calculated	
McDonald Creek[5]	9.6	C	> 12	11.4	10	

[1] Refer to Table 4-17 for source of target values.
[2] Meander Width Ratio: Meander Belt Width / Bankfull Width (Rosgen, 1992).
[3] In-stream Flow Reservation requested by MFWP (refer to Table 2-6).
[4] To be determined by MFWP using wetted perimeter models and life history needs based on fish habitat requirements (Personal communication, Bill Gardner, MFWP).
[5] McDonald Creek is listed as fully supporting all beneficial uses in 2002; it is included in this table because minimum instream flows have been calculated.

Table E-4. Chemistry Targets Values.

Water body (location)	**TDS** (mg/L)	**SC** (µS/cm at 25ºC)	**Selenium** (µg/L)	**Total Phosphorus** (µg/L)	**Total Nitrogen** (µg/L)
Priest Butte Lakes: (In-Lake)	**< 5,000 mg/L**	**< 6,200 µg/L**	**< 5 µg/L**		
Priest Butte Lakes: (discharge at Hwy 221 Bridge)	**< 820 mg/L** (Seasonal Ave.) **< 1,145 mg/L** (Instantaneous max)	**< 1,000 µg/L** (Seasonal Ave.) **< 1,400 µg/L** (Instantaneous max)			
Teton River: (Dutton gage)	**< 820 mg/L** (Seasonal Ave.) **< 1,145 mg/L** (Instantaneous max)	**< 1,000 µg/L** (Seasonal Ave.) **< 1,400 µg/L** (Instantaneous max)			
Teton River: (Loma gage)	**< 820 mg/L** (Seasonal Ave.) **< 1,145 mg/L** (Instantaneous max)	**< 1,000 µg/L** (Seasonal Ave.) **< 1,400 µg/L** (Instantaneous max)			
Teton Spring Creek: (in Choteau)				**40 µg/L** (mid-June – Sept.)	**650 µg/L** (mid-June – Sept.)

Table E-4. Chemistry Targets Values.

Water body (location)	**TDS** (mg/L)	**SC** (µS/cm at 25ºC)	**Selenium** (µg/L)	**Total Phosphorus** (µg/L)	**Total Nitrogen** (µg/L)
Teton Spring Creek: (near mouth)				**40 µg/L** (mid-June – Sept.)	**650 µg/L** (mid-June – Sept.)
Deep Creek: (Hwy 287 Bridge)				**40 µg/L** (mid-June – Sept.)	**650 µg/L** (mid-June – Sept.)

Table E-5. TMDL Allocations for Salinity and Selenium for Priest Butte Lakes.

Pollutant / Source	**Existing Load** (#/day)	**Allocated Load** (#/day)	**Load Reduction** (#/day)
Salinity			
Freezeout Lake	83,500	55,000	28,500
Yeager Seep	15,000	10,000	5,000
West Side drainages/seeps	Unknown	To be determined	To be determined
East Side drainages/seeps	Unknown	To be determined	To be determined
Shallow Groundwater	Unknown	To be determined	To be determined
Selenium			
Yeager Seep	0.471	0.157	0.314
Freezeout Lake	Unknown	To be determined	To be determined
West Side drainages/seeps	Unknown	To be determined	To be determined
East Side drainages/seeps	Unknown	To be determined	To be determined
Shallow Groundwater	Unknown	To be determined	To be determined

Participants include Teton County Weed District; Teton County Extension Service; Teton Conservation District, Chouteau County Weed District; Chouteau County Conservation District; U.S. Fish & Wildlife Service; U.S. Natural Resource Conservation Service; Montana Department of Natural Resources and Conservation; Montana Fish, Wildlife & Parks; The Nature Conservancy; and private landowners.

☐ **Goal 1:** Improve water quality in Teton River and tributaries to meet goals established in TMDL

☐ **Objective 1**: Monitoring program that tracks water quality trends and improvements

☐ **Task 1**: Annually, TRWG review monitoring program to ensure meets actually needs to track water quality changes to meet water quality established in TMDL
☐ **Timeline** – December of each year
☐ **Responsible Party** – Coordinator
☐ **Resources** - TRWG, USGS, DEQ
☐ **Proposed Product:** Effective monitoring program that changes to meet current needs
☐ **Past Accomplishment highlights –** Past monitoring programs at coordinator's office
☐ **2009 –** Waiting for all data from 2009 field season
☐ **NEXT –** After 2009 field season, reevaluate monitoring program

☐ **Task 2**: USGS monitors flow, turbidity, and salinity on Teton River at three sites (upper, middle & lower Teton River)
☐ **Timeline** – January – December, yearly
☐ **Responsible Party** – USGS with TRWG oversight
☐ **Additional Resources** - DEQ
☐ **Proposed Product:** Water quality data tracking flow, turbidity, and salinity used as baseline for trend analysis at web site: http://waterdata.usgs.gov/mt/nwis/current?type=flow&group_key=basin_cd&search_site_no_station_nm=
☐ **Past Accomplishment highlights –** Water quality and quantity data since 1998 on USGS web site
☐ **2009 –** USGS monitoring at 3 gauges in-progress
☐ **NEXT –** After 2009 field season, reevaluate monitoring program

☐ **Task 3**: Volunteer monitoring at 10 sites on Teton River that supplements USGS monitoring
☐ **Timeline** – March – October of each year
☐ **Responsible Party** – TRWG Coordinator
☐ **Additional Resources** - upper Teton – Mark K; lower Teton – Bill R, Diane W & Barnie S
☐ **Proposed Product:** Water quality (salinity, DO, temperature, turbidity, conductivity, pH) data between USGS gauges that track changes. See monitoring map for specific locations.
☐ **Past Accomplishment highlights –** Volunteer water quality data since 1998 located at coordinator's office
☐ **2009 –** Volunteer monitoring in-progress
☐ **NEXT –** After 2009 field season, compile all data and reevaluate monitoring program

☐ **Task 4**: Monitor salinity and flow from Freezout and Priest Lakes drains into Teton River
☐ **Timeline** – March – October of each year
☐ **Responsible Party** - FWP
☐ **Additional Resources** - TRWG
☐ **Proposed Product:** Monitor salinity and flow change entering Teton River. See MSCA plan.
☐ **Past Accomplishment highlights –** Salinity data since 1998 located at coordinator's office & FWP Freezout office
  ☐ **2007, no flows so no data**
  ☐ **2008 – No flows into Teton River scheduled at this time**
☐ **2009 –** FWP monitoring in-progress
☐ NEXT – After 2009 field season, compile all data and reevaluate monitoring program

☐ **Task 5**: Calibrate water quality meters to ensure taking consistent measurements

- ☐ **Timeline** – March, annually
- ☐ **Responsible Party** – TRWG Coordinator
- ☐ **Additional Resources** - DEQ, FWP
- ☐ **Proposed Product:** All meters calibrated to same standard
- ☐ **Accomplishments –** Meters calibrated last March 3, 2007
    - ☐ **2008 –** calibrated 3 meters on March 12
- ☐ **Past Accomplishment highlights –** Meters calibrated annually. Problems with DO portion
- ☐ **2009 –** Calibrated on April 14th
- ☐ **NEXT –** Verify working properly prior to each field trip

☐ **Objective 2**: Using Best Management Practices, achieve water quality standards in TMDL

- ☐ **Task 6**: TRWG prioritize projects brought before the group based on actual water quality improvements and best bank for the dollar:
- ☐ **Timeline** – At each monthly watershed meeting review at new projects
- ☐ **Responsible Party** - TRWG
- ☐ **Resources** – TRWG, landowner and grants
- ☐ **Proposed Product:** Ongoing list that considers priorities for the watershed
- ☐ **Past Accomplishment highlights –** See list of completed projects at coordinator's office
- ☐ **2009 –** No new projects brought before TRWG board
- ☐ **NEXT –** None scheduled

- ☐ **Task 7**: Stream projects that improve water quality on the Teton River and tributaries
- ☐ **Timeline** – annually review project status
- ☐ **Responsible Party** – TRWG for tracking purposes
- ☐ **Resources** – TRWG, landowner and grants
- ☐ **Proposed Product:** Stream projects that improve water quality in Teton River
- ☐ **Past Accomplishment highlights –** See list of completed projects at coordinator's office
- ☐ **2009 –**Fellows permits completed; Kalanik awaiting NRCS design
- ☐ **NEXT –** Kalanik; Fellows; Deep Creek

- ☐ **Task 8**: Reduce saline seep from Teton Ridge by MSCA identifying recharge areas so landowners can use CRP and other farm programs to control. Annually contact 2 landowners to try to get more acres included into farm programs.
- ☐ **Timeline** – annually, evaluate progress
- ☐ **Responsible Party** - MSCA
- ☐ **Resources** - landowners, MSCA, NRCS
- ☐ **Proposed Product:** 200 acres of recharge areas reclaimed so less saline seep enters Teton River
- ☐ **Past Accomplishment highlights –** MSCA accomplished Teton Ridge study and presented data to landowners.
- ☐ **2009 –** MSCA studying saline seep problem eat of Choteau
- ☐ **NEXT –** Awaiting data from current study

- ☐ **Task 9**: Reduce saline seep into Priest Lake by MSCA identifying recharge areas so landowners can use CRP and other farm programs to control. Annually contact 2 landowners to try to get more acres included into farm programs.
- ☐ **Timeline** – annually, evaluate progress
- ☐ **Responsible Party** - TRWG
- ☐ **Resources** - landowners, MSCA, NRCS
- ☐ **Proposed Product:** 50 acres of recharge areas reclaimed so less saline seep enters Teton River
- ☐ **Past Accomplishment highlights –** 2006 saline seep study recharge maps at MSCA
- ☐ **2009 –** No action scheduled for 2009
- ☐ **NEXT –** None scheduled

☐ **Task 10**: Support City of Choteau will improve wastewater input to Teton River to meet TMDL
☐ **Timeline** – December 2009
☐ **Responsible Party** – City of Choteau
☐ **Resources** – Support letters to city for grants
☐ **Proposed Product:** City effluent that meets state water quality standards and TMDL
☐ **Past Accomplishment highlights –** City is applying for waste-water grants through the state
☐ **2009 –** No action yet
☐ **NEXT –** Awaiting direction from City of Choteau

☐ **Task 10**: Support Community of Dutton reduce lagoon seeps into Teton River
☐ **Timeline** – unknown at this time – looking into grants
☐ **Responsible Party** – Dutton City Council
☐ **Resources** – Support letters to City council for grants
☐ **Proposed Product:** City effluent that meets state water quality standards and TMDL
☐ **Past Accomplishment highlights –** Dutton pursuing grants to improve
☐ **2009 –** Dutton said does not need help
☐ **NEXT –** None scheduled

*** WATER QUANTITY ***
workplan section

BACKGROUND DATA: When the TRWG was formed in 1996, one of the key needs that everyone could agree on was the need to improve water quantity in the Teton River but could not agree on approach the TRWG should take. With the divisiveness on this issue, the TRWG water quantity projects are only educational.

Annual precipitation varies across the watershed from an average of 12 inches in the east near Fort Benton to 60 inches or more in the western headwaters where approximately 30% of annual precipitation is in the form of snow. At Choteau, reported monthly averages for the year range from 0.19 inches in February to 2.15 inches in June (Figure 2.1). Several months (December through February) have monthly averages less than 0.25 inches. May and June receive the highest amount of monthly average precipitation of 2.00 and 2.15 inches, respectively. These two months also have the highest maximum precipitation of 5.06 and 6.82 inches, respectively.

Flow in the Teton River is typical of a perennial snowmelt dominated stream. The river experiences extremes of both high and low flow conditions from a combination of climatic influences and water diversions for agricultural activities. Major tributaries to the Teton River include two perennial streams, Deep and Muddy Creeks, and two spring fed streams, McDonald and Teton Spring Creek. Two other perennial streams, Willow Creek and Blackleaf Creek (also know as North Fork Muddy Creek), are tributaries to Deep and Muddy Creeks, respectively. Several water storage reservoirs in the watershed, including Bynum and Eureka Reservoirs, were created for the development of irrigated agriculture.

Hydrographs for most streams in the Teton River watershed follow climatic events. High flows occur during the spring when a combination of spring rains and snowmelt from the mountains contribute to the flows. Stream flow decreases as summer progresses and base flow theoretically maintains stream flow through the fall and winter. At present, three active USGS gauging stations are located along the Teton River mainstem. While there are currently no active gauging stations on any of the tributaries, the USGS reports data from several historical stations for the Teton River and its tributaries.

The nature, or consistency of stream flow in the Teton River is a point of debate between local residents and the historical data. Local residents indicate that the Teton River typically goes dry near Choteau during late summer and winter periods. Field notes from MDEQ monitoring staff has documented zero-flow conditions, and additionally, MFWP has identified the lower 188 miles of the Teton River (Bynum diversion to the mouth) as chronically dewatered (MFWP, 1997b). Evaluation of the earliest stream flow data collected in the watershed may be informative as to the historical nature of the river. However, water resources in the basin were being developed during the latter half of the 19th century (MSOE, 1962) while the USGS did not begin systematic stream flow gaging until first decade of the 20th century. Regardless, the historical data may offer a glimpse as to the character of the river prior to the development of large water withdrawal infrastructures that were first completed in 1928 (e.g. Bynum Reservoir).

The current gaging stations in operations in the Teton River watershed include the station below the South Fork (06102500), near Dutton (06108000), and at Loma (06108800). These stations have been active since 1947, 1954, and 1998, respectively. The record high flow for the Teton River was recorded at Dutton on June 9, 1964 at 20,000 cfs[1]. Other high flow events recorded at the Dutton station are 11,600 cfs on June 21, 1975, 3,510 cfs on March 10, 1977, and 5,280 cfs on February 26, 1986.

Data from current Teton River gaging stations show high flows occur in June. Mean monthly flows for June range from 499 cfs near the South Fork, to 393 cfs near Dutton, to 98.5 cfs near Loma. Mean monthly low

[1] The flow of 20,000 cfs was the officially reported peak during the 1964 flood. However, the post-flood estimated peak flow was 71,300 cfs using slope-area measurements of high water marks (Boner and Stermitz, 1967).

flows are 45.1 cfs below South Fork near Choteau, 56.5 cfs near Dutton, and 10.6 cfs at Loma during March, January, and September, respectively.

Water resource infrastructure and facilities have been developed to facilitate agricultural activities in the watershed for at least the past 120 years (MSEO, 1962; 1964a; 1964b). Numerous canals have been constructed to deliver stream water to irrigate fields, water stock, or supply storage reservoirs (Figure A-9a, A-9b). Three primary reservoirs were constructed in the upper watershed during the early part of the 1900's - Bynum, Eureka, and Brady Lake.

Bynum Reservoir was completed in 1928 and stores 72,000 acre-feet of water for use by the Teton Co-operative Reservoir Company (MSEO, 1962). The reservoir was built to encourage settlement of the area by homesteaders. It was designed to serve a dual function of storing spring runoff, and thereby moderating the affects of flooding, and to provide irrigation water in the dry summer months. The Bynum Reservoir diversion canal traverses five miles from the Teton River to the reservoir and the stored water irrigates about 20,500 acres. This amounts to about one-third of the total irrigated acres (61,000 acres) in the Teton River watershed.

Eureka Reservoir was built in 1936 and stores 5,500 acre-feet of water for use by the Teton Cooperative Canal Company. The reservoir was built in response to the drought of the early 1930s (MSEO, 1962) and also uses the Teton River as its source.

Brady Lake Reservoir was constructed in 1936 and stores 3,300 acre-feet for use on 6,000 acres (14,800 potential acres) by the Brady Irrigation Company (MSEO, 1962; personal communication via TRWG & Brady Irrigation Company). The reservoir system actually uses two other lakes as storage or "transfer pools" to deliver water from Muddy Creek. Diverted water is transferred in 2½ miles of supply canal from Muddy Creek to Round Lake, then via ¼ mile supply canal to Eyraud Lake, and finally to Brady Lake via another ¼ mile length of supply canal. The Brady Lake Reservoir is also capable of receiving water from the Teton River.

Harvey and Farmers Lake Reservoirs were constructed in 1912 and 1941, respectively, by the Farmers' Co-Operative Canal Company. Each reservoir receives water from the Teton River with priority dates of 1897 and 1898. Harvey Lake has a capacity of 2,000 acre-feet while Farmers Lake Reservoir holds 2,560 acre-feet. Both reservoirs were constructed solely for irrigation purposes and are not meant support a fishery or recreational uses (personal communication via TRWG & Farmers' Co-Operative Canal Company).

Various private and incorporated water companies use the Teton River and its tributaries (MSEO, 1962). Three ditch companies, Eldorado, Farmers, and the Teton Co-operative Canal Company use Teton River water on the "Burton" or "Farmington" Bench, which is located north of Choteau. The Teton Co-operative Reservoir Company supplies Teton River water to the Brady Irrigation Company, Bynum Irrigation District, and several private ditch systems. The Bynum Irrigation District also uses water from Muddy Creek, as does a private irrigation system. Waters from Deep, Willow, Teton Spring, and McDonald Creeks are all used by private irrigation systems.

Water right claims in the Teton River watershed prior to 1973 numbered 1,405 for a total of 75,902.8 cfs. From 1973 to 1985 an additional 27 water right permits were issued for 40.5 cfs (DNRC, 1991). The Teton River main stem has water right claims for 1,638 cfs, which can be grouped by location in the watershed (Table 2-5). Most of the issued water rights concentrate in the western third of the watershed, with the oldest priority date in the watershed being 1858. The oldest, most downstream water right on the Teton River has an 1874 priority date for 6.9 cfs. This right is located downstream of the Dent Bridge area and is for irrigating 182 acres. In addition, there is also an associated stock watering right with the same priority date and owner.

Table 2-5. Location and volume of issued water rights.

Location	Water Rights Issued
Upper Teton: above Choteau	828 cfs
Middle Teton: Choteau to I-15	289 cfs

Lower Teton: I-15 to Loma	521 cfs

☐ **Goal 1:** Fair, legal and effective application of available water

☐ **Objective 1**: Pursue educational means to help water users share available water from Teton River

- ☐ **Task 1**: USGS monitor flow at three gauge stations for TRWG to use as factual information
- ☐ **Timeline** – March – October of each year
- ☐ **Responsible Party** - USGS
- ☐ **Additional Resources** – TRWG, water users
- ☐ **Proposed Product:** Water quantity data to be used by all water users
- ☐ **Past Accomplishment highlights –** Water quantity data tracking for trend analysis at web site: http://waterdata.usgs.gov/mt/nwis/current?type=flow&group_key=basin_cd&search_site_no_station_nm=
- ☐ **2009 –** USGS monitoring at 3 gauges in-progress
- ☐ **NEXT –** After 2009 field season, reevaluate monitoring program

- ☐ **Task 2**: Adjudication – keep all water users using education on status of process, deadlines and changes through annual TRWG meetings, quarterly newsletters and newspaper articles.
- ☐ **Timeline** – until adjudication is complete – unknown date at this time
- ☐ **Responsible Party** - DNRC
- ☐ **Additional Resources** – TRWG, Water Court
- ☐ **Proposed Product:** Informed water users on status of adjudication process
- ☐ **Past Accomplishment highlights –** newsletters and annual meeting updates, notes at coordinator's office
- ☐ **2009 –** Annual meeting in Dutton had DNRC and water court update participants of adjudication
- ☐ **NEXT –** Fall newsletter with updates

- ☐ **Task 3**: City of Choteau help with water conservation education
- ☐ **Timeline** – Need to establish timeline when will finish
- ☐ **Responsible Party** – City of Choteau
- ☐ **Additional Resources** – DNRC, NRCS, MSU Extension, TRWG
- ☐ **Proposed Product:** Reduced water demands by city water users
- ☐ **Past Accomplishment highlights –** Newspaper articles on reasons to conserve water
- ☐ **2009 –** None at this time
- ☐ **NEXT –** Fall newsletter with updates

☐ **Objective 2**: Water conservation projects to conserve water

- ☐ **Task 4**: Use irrigation water management programs to conserve water on 200 acres – ie. spray canals, livestock water
- ☐ **Timeline** – Annually, review progress
- ☐ **Responsible Party** - TRWG
- ☐ **Resources** – NRCS, water users
- ☐ **Proposed Product:** In 2007, 200 acres of irrigated lands reduce water demand
- ☐ **Past Accomplishment highlights –** Agriment station installed in 2000; IWM classes with irrigators; irrigation improvement projects through NRCS
- ☐ **2009 –** IWM completed by Teton Extension
- ☐ **NEXT –** None scheduled

ATTACHMENTS

ACRONYMS

ARM	Administrative Rules of Montana
BLM	Bureau of Land Management
BMP	Best Management Practice
BoR	U.S. Bureau of Reclamation
BUD	Beneficial Use Determination
CCCD	Chouteau County Conservation District
cfs	Cubic Feet Per Second
DEQ	Montana Department of Environmental Quality
DNRC	Montana Department of Natural Resource Conservation
DQO	Data quality objectives
EPA	U.S. Environmental Protection Agency.
EQC	Montana Environmental Quality Council
FRCEG	Front Range Conservation Education Group
FS	U.S. Forest Service
FWP	Montana Fish, Wildlife and Parks
GID	Greenfields Irrigation District
HUC	Hydrologic Unit
MBMG	Montana Bureau of Mines & Geology
MCA	Montana Code Annotated
MCC	Montana Conservation Corps
MPDES	Montana Pollutant Discharge Elimination System
MSU	Montana State University
NPS	Nonpoint source pollution
NRCS	Natural Resource Conservation Service
PS	Point source pollution
RT	Rocky Mountain Front Weed Roundtable
SCD	Sufficient Credible Data
TCD	Teton Conservation District
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TRWG	Teton River Watershed Group
USFWS	U.S. Fish & Wildlife Service

TETON RIVER WATERSHED GROUP

WORK PLAN

Upper Teton Lower Teton

From The Rocky Mountain Front to the lower reaches near Loma, the Teton River Watershed Group works to find consensus to address natural resource issues.

Produced
by

Teton River Watershed Group
Revised April 2010

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TETON RIVER WATERSHED GROUP

MISSION STATEMENT - The Teton River Watershed Group is a collaborative, locally directed group of interested individuals, organizations, and agencies dedicated to monitoring, improving and maintaining the quality of the natural resources within the Teton River Basin.

HISTORY - Formed in 1994, the Teton River Watershed Group (TRWG) is the key to local involvement to resolve natural resource issues, which include noxious weeds, water quality and water quantity. The TRWG used focus meetings and surveys to establish initial direction and primary tasks. In 1996 the TRWG officially formed as a 501 c (3) nonprofit organization to access additional funds to work on natural resource projects.

STRUCTURE - The Teton River Watershed board is comprised of the officers of president, vice-president, secretary and treasurer as well as individuals that have a vested interest in the watershed. The board must include members from the Chouteau County Conservation District; Teton Conservation District; Chouteau County Weed District and Teton County Weed District.

Other federal, state, and local agencies and groups participating are the U.S. Fish & Wildlife Service (USFWS), U.S. Bureau of Land Management (BLM), U.S. Forest Service (USFS), Montana Department of Environmental Quality (DEQ), Montana Department of Natural Resources and Conservation (DNRC), Montana Fish, Wildlife and Parks (MFWP), MSU Extension Service, Chouteau County, Teton County, The Nature Conservancy, the Rocky Mountain Front Weed Roundtable and many individual landowners.

PROCESSES: The TRWG board will meet monthly on the second Tuesday of each month in Great Falls, Montana. This is considered a central location for all participants. The TRWG will hold an annual meeting second Tuesday in January in Dutton, Montana. The annual meeting is to update the general public of special interest items and on past accomplishments. After the annual meeting, the TRWG board will conduct a TRWG board annual meeting where the election of officers will take place.

MAJOR ISSUES - The project objectives as laid out by local groups (in no particular order) are to:
1) Manage the noxious weed problem in the basin
2) Improve the water availability in the Teton River for all uses
3) Improve the overall water quality of the Teton River

Workplan information:
The TRWG past work plans were written and executed in 1996 and 2006. The ideas and tasks identified in each workplan were acquired from public meetings in Fort Benton and Choteau and from monthly TRWG board meetings.

The TRWG work plan will be broken into three primary categories: noxious weeds, water quality and water quantity. The workplan will use monitoring, education and on-the-ground tasks as a means to achieve the overall goals of improving the health of the Teton River Watershed.

Due to limited resources and inability to find common ground, the TRWG is not working on issues that address water rights, wildlife, endangered species, or oil and gas exploration.

TETON RIVER WATERSHED
Basic Facts

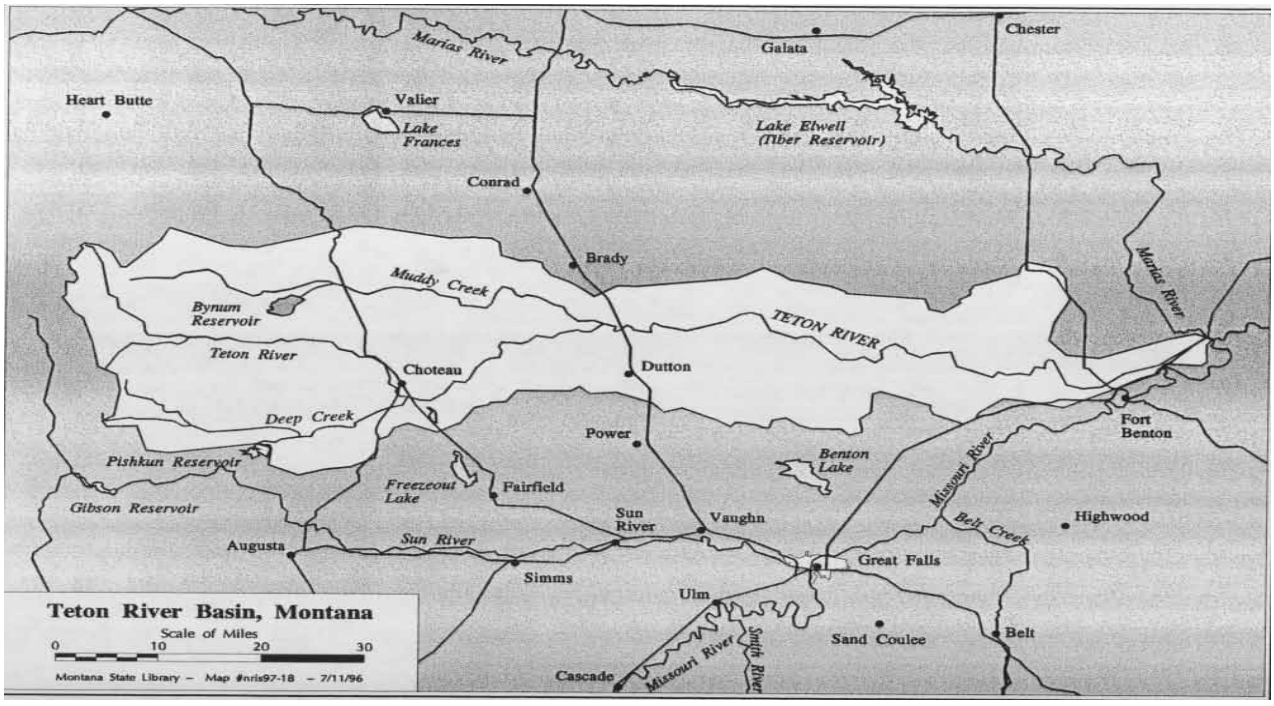
Teton River Watershed is located east of the continental divide and south of Glacier National Park. It covers an area of 1,308 square miles (**837,000 acres**), with approximately 289 square miles (**185,000 acres**) in western Chouteau County; 1,000 square miles (**640,000 acres**) in northern Teton County and 19 square miles (12,000 acres) in southern Pondera County (approximate figures only).

The Teton River starts in the Rocky Mountain Front and meanders out of the mountains through rolling grass-covered foothills and farmland to its confluence with the Marias River at Loma which flows on to the Missouri River. As it makes this trip it also passes through the community of Choteau. The major tributaries of the Teton River are Muddy Creek, Deep Creek and McDonald Creek. The basin is about 196 miles long and 1-2 miles wide.

Ownership and land patterns are (estimates only) *(in acres)*:

US Forest Service 112,640
MT State Lands 75,520
US BLM 14,720
Urban 8,370
Private property 625,750

LAND USE	TOTAL ACRES	PERCENT OF WATERSHED
Rangeland	340,000	43.0
Cropland	296,300	35.5
Forested	96,000	11.0
Hayland/pastureland	100,000	12.0
Farmsteads	1,700	.2
Urban	1,700	.2
Transportation	1,300	.15
Total	837,000	



Teton River Watershed Group History

In the fall of 1993, The Teton River Basin Resource Group was formed with the help of the Teton Conservation District (CD), agencies and an informal landowner group. The group started meeting regularly and conducted a survey of landowners on the upper Teton River in the spring of 1994. The survey indicated that weeds, water quality, bank erosion and water availability were the key issues. In October 1994 several downstream Teton River landowners from Chouteau County attended a basin meeting and were included in the group thereafter.

In November 1994 the group met with Montana Fish, Wildlife and Parks (FWP), Montana Department of Environmental Quality(DEQ), The U.S. Fish and Wildlife Service (US FWS), and the Montana Salinity Control Association(MSCA) to discuss one of the major concerns of many irrigators along the Teton River – salinity in the Teton River from Freezout and Priest Lake. All in attendance agreed to work together to find solutions reducing salinity from Freezout and Priest Lake into the Teton River.

In January 1995 a resource questionnaire was sent to 110 landowners along the entire Teton River with a 70% return rate prioritizing key issues and concerns. In March 1995, follow-up focus group meetings were conducted in Choteau and Fort Benton to prioritize issues and goals. The first watershed mission statement agreed upon was "The Teton River Watershed Project is a locally-driven, nonprofit planning group of interested individuals, organizations and agencies dedicated to defining, addressing, promoting, protecting, improving and maintaining the quality of the resources within the Teton River Basin". The word "education" was recently inserted in the mission statement. At each of the focus meetings, the majority of landowners requested that everyone with an interest in the Teton Watershed in Chouteau and Teton Counties begin working together primarily on water quality, water quantity and noxious weed issues. Chouteau and Teton CDs would lead the watershed effort with help from area landowners, agencies, and interested groups. The project objectives as agreed upon by focus group participants (in no particular order) were to: 1) Control the noxious weed problem in the basin; 2) Improve the water availability in the Teton River for all uses; and 3) Improve the overall water quality of the Teton River. In December 1995 the first workplan was put together using the above general objectives as the key areas to work on.

In 1996 the first annual Teton Watershed meeting was held in Dutton highlighting project results and updates on issues of concern. The first major watershed projects started with noxious weeds. These projects included mapping noxious weed locations and the collection and distribution of over 150,000 Leafy Spurge beetles collected from the lower Teton River. This effort, moved to the upper Teton, has also become an annual event and is now called the "Buzzy Breen" Bug Collection day in honor of Buzzy Breen, a local landowner who pushed for more biological control in the Teton Watershed. In December 1996 the Teton CD was awarded a $33,000 grant to hire a part-time coordinator and to fund stream projects.

In June 1997 the TRWG and CDs hired a part-time coordinator contracted by the Teton CD to help write grants and assist with projects. The TRWG, with help from Teton and Chouteau CDs once again held town meetings in Fort Benton and Choteau to establish a long-term/5-year watershed plan for the watershed effort. The first major stream project was started in 1997 and completed in 1998 to prevent the Teton from capturing McDonald Creek. The potential channel change would have bypassed several irrigation diversions. The same year Natural Resources and Conservation Services (NRCS) put together a tour and workshop for the CDs to inspect current river conditions and project ideas that the TRWG could help with. The first need identified was a more detailed assessment of the Teton River. Since then, additional tours AND workshops have taken place that review accomplished projects and fulfill requested trainings such as Integrated Weed Management(IWM), GPS, and water quality monitoring..

In 1998 DEQ requested assistance in monitoring the Teton River and its tributaries in an effort to remove them from the state impaired list. The CDs asked the TRWG coordinator to help DEQ with this monitoring from 1998 – 2002 on Teton River, Deep Creek, McDonald Creek, Spring Creek, and Muddy Creek. Some water quality improvements were noted from this monitoring briefly – where and what??. In 1998, the TRWG with help from the two CDs started a newsletter and volunteer water quality-monitoring program. Two high quality meters were purchased for volunteers to monitor the upper and lower Teton River. The CD administrators worked with the coordinator to submit articles for the newsletter highlighting current events going on in each county. The newsletter also included articles from "old-timers" telling their story of how they remembered the Teton River. The next major stream project, started in 1998 and completed in 1999, focused on the removal of old car bodies being used as riprap along the Teton River near Choteau. In 1998 an aerial assessment of the Teton River and its tributaries was also accomplished by NRCS. This was followed up by ground surveys on the upper Teton of all diversions in 1999.

In 1999, members of the watershed group decided there was a need to become a formal non-profit organization to be able to pursue funds that the CDs were unable to obtain. The group then changed its name officially to the Teton River Watershed Group (TRWG). A grant was awarded to restore the Teton River above and below the Chester Bridge near Fort Benton. The TRWG also obtained funding to develop and distribute a Teton Watershed brochure. In 1999 the Teton CD also started a Muddy Creek/Burton Bench water quality and quantity study bringing in the Montana Bureau of Mines and Geology to do the work.

In 2000 a Department of Natural Resources and Conservation (DNRC) 223 grant was awarded to the Teton CD to research saline seep on the Teton Ridge by M S C A. In 2000 the TRWG helped both Teton and Chouteau County Weed Districts write noxious weed grants to cost-share chemicals. The weed districts with the help from TRWG continued to pursue cost-share grants from 2000 to 2008. A major irrigation diversion modification for Eureka was started in 2000 and completed in 2001. Funds and resources for the project were pulled in from the Eureka Irrigation Company, FWP, landowner, and volunteers. A major erosion project was also started on the lower Teton River with help from NRCS, landowner and volunteers. This project, delayed by disagreements on design, was finally completed in 2007. Starting in 2000 and continuing through today, the TRWG has helped each year with a stream project on both the upper and lower Teton River.

In 2001 DEQ briefed the CDs and the TRWG on the requirement to develop a Total Maximum Daily Load (TMDL)/Water Quality Plan for the Teton River, requesting assistance. To ensure landowner views were heard the groups agreed to help. Over the next two years the TRWG and the CDs worked on a TMDL plan as required by the federal Clean Water Act.

In 2002 the TRWG secured funds to assist the Farmers Irrigation Company work on their diversion, using a similar design that was used on the Eureka diversion in 2000. After extensive effort securing permits, formal landowner permission, and contractor bids the project was dropped due to contracting issues. Another stream project was accomplished in its place on the upper Teton River. A University of Montana student finished "Living with Wildlife" a study on human/grizzly bear co-existence.

In 2003, a large display board was purchased to showcase information about watershed projects. The display highlights weed pulls, bug collections and stream projects. The TRWG was notified that the TMDL process had changed and that the state would complete the product on its own. September 2003 DEQ's TMDL was completed.

In 2004 a two-year workplan was put together for short-term direction for new projects since most projects in the original workplan had been completed or abandoned. The plan continued with the basics of controlling noxious weeds, water quality improvement projects and water quantity education programs.

In 2006 and 2007, the TRWG again hosted town meetings in Fort Benton and Choteau to gain perspective on landowner priorities for the basin over the next 5 years.. A new workplan was developed from these town meetings and other public input.

In 2006 and 2007, MSCA was hired to start monitoring saline seep in the Priest Lake area. This was area was suspected as another major contributor of salinity in the Teton River. Although MSCA has identified key recharge area needing addressed, landowners are currently unwilling to make the necessary changes because they are making more from present crops. In 2008 MSCA moved their saline seep monitoring to an area just east of Choteau that had large saline seep problems. That project is still in-work to define specific recharge areas that need addressed.

In 2008, after almost ten years of requests, a Teton River water budget was started by DNRC. The project intent is to acquire facts about water gains and losses in each key reach of the Teton River and its tributaries. That project is still in-work.

In 2009 The TRWG expanded the water quality and quantity monitoring by installing a gauge at near Highway 221 east of Choteau. The gauge monitors flow and salinity to help track saline seep improvements in the Choteau area. This gauge still needs work to be fully functional.

The TRWG annually continues to find funding for noxious weed projects, stream projects, USGS gauge stations, and education programs.

Teton River Watershed Group
Project Summary

Since TRWG's formation the CDs, landowners and agencies have tackled a multitude of projects. These accomplishments are collaborative efforts by many groups and individuals. Below is a list of project accomplishments in the Teton Watershed by this extensive list of partners.

GENERAL ITEMS:

1995 - present Monthly TRWG meetings in Great Falls to discuss projects, issues and funding.
1996 - present Annual TRWG meetings held in Dutton to educate landowners and interested people on important current issues.
1997 - present TRWG tours reviewing watershed project accomplishments.
1998 - present TRWG newsletter (when funding is available) to inform and educate people on key issues within the basin.
1999 - Educational Watershed Model Conceived as an educational tool for schools. Currently housed at the Rassmussen Education Center located at the Theodore Roosevelt Memorial Ranch.
1999 - TRWG brochure printed and distributed to highlight teamwork and watershed projects.
2000 -TRWG display assembled to highlight projects and teamwork.
1996-present Annual educational forums by watershed partners on noxious weeds, water quality, and water quantity.

RESOURCE ASSESSMENTS:

1995 - Dave Rosgen, Geomorthologist on upper Teton River sponsored by Teton CD supported by Bynum water users and TRWG.
1996 - Noxious weed mapping project primarily along the Teton River with landowners highlighting their weed infestation locations on topo maps.
1997 - NRCS tour of Teton River to identify overall needs.
1998 - Aerial stream assessment by NRCS on the entire Teton River, Muddy Creek and Deep Creek.
1998 - Upper Teton River diversion stream assessment by Watershed Consulting (consulting firm located in Whitefish, MT) to identify and prioritize irrigation diversion improvement needs.
1998 – 2001 Muddy Creek/Burton Bench watershed ground water/surface water quality/ quantity study to identify cause and effects of problems in the area.
2000 Teton Ridge saline seep study by Montana Salinity Control Association. This issue is the major water quality problem within the basin.
2002, Living with Wildlife study. A University of Montana graduate thesis "Living With Wildlife" on human/grizzly bear interaction along the Rocky Mountain Front by Seth Wilson, published???where???
2006 - 2007 Saline seep study of Priest Lake This study was again reviewed with landowners in 2008 on options and opportunities.
2008 - present Saline seep study initiated east of Choteau
2008 - present In progress watershed budget study by DNRC. Featuring seven new flow gauges and utilizing the existing three USGS gauges to help document inflows and outflows in the Teton Watershed.

NOXIOUS WEEDS

1996-present - Buzzi Breen Bug Collection Day started by TRWG and supported by numerous partners. Each year thousands of bugs are collected and distributed to help control noxious weeds.
1996 - Weed mapping started and continues by the Teton County Weed District, The Nature Conservancy (TNC), USFS and landowners for noxious weeds and control measures in the Teton Watershed. In the past,

each entity used their own GIS mapping system however, The Rocky Mountain Front Weed Roundtable will attempt to consolidate all Front-wide weed mapping data in the future.
1998 - TRWG Newsletter Features updates on proper chemical use, biological control, mapping and other useful tools.
2000 - Montana Noxious Weed Trust Fund grants written by TRWG and sponsored by the weed districts in both counties to help cost-share chemicals. This cost-share continued until 2008,
2003 - Teton Spray Day was started by area landowners and continues to be primary weed control activity on Teton Canyon Road,
2005 - Teton Canyon Weed Pull on the upper Teton River. Annual event helps educate a wide cross section of the public about noxious weeds.
2008 - GPS training sponsored by Teton County Extension Service.

WATER QUALITY
1997 – present Stream stabilization projects at 18 sites on 29,080 feet of bank,
1998 - present Priest and Freezout Lake flow and salinity monitoring into the Teton River by FWP.
2000 – present Irrigation diversion improvements at five upper Teton River sites,
2000 – present Riparian corridor management improvements over 51 miles,
2000 - USGS gauges re-installed at upper and lower Teton River USGS continues to maintain three water quality and quantity tracking sites on the Teton River. The TRWG received grants to fund the gauges and the Teton CD was the contracting agency with USGS. The water quality data is located at:
http://waterdata.usgs.gov/mt/nwis/current/?type=quality&group_key=basin_cd
2000-present Volunteer water quality-monitoring program Data collected at approximately 10 sites; Five upper and five lower on Teton River as well as Spring, Durr, upper Willow, Deep, and McDonald Creeks.
2009- New gauge installation at Hwy 221 started to track flows and salinity.

WATER QUANTITY
USGS continues to maintain three gauges on the Teton River which are same sites as water quality data. Website is: http://waterdata.usgs.gov/mt/nwis/current/?type=dailystagedischarge&group_key=basin_cd
2000 - Present Adjudication updates in newsletters and annual meetings,
2001 - Present Agrimet station installed north of Choteau to help with irrigation water management. Station was acquired from an abandoned site in the Sun River drainage. Web site is:
http://www.usbr.gov/gp/agrimet/station_trfm_teton.cfm
Irrigation Water Management on private lands is continuing by private landowners with help from NRCS.

*** General***
Work Plan

NOTE: The following tasks are for general TRWG work items that also have relevance to all other work sections.

Task 1: TRWG annual meeting in Dutton, MT to update general public on topics of watershed interest.
Timeline – First Tuesday of January.
Responsible Party – TRWG coordinator with help from TRWG Board .
Additional Resources – State and federal agencies that may address the annual topic.
Proposed Product: Informed general public on topics of special interest.
Past Accomplishment highlights – Annual meeting minutes from 1996 to current located at the TRWG coordinator's office.
2010 – January 5, 2010 in Dutton with 55 people attending. Topics included update on adjudication, noxious weeds, web site, water quality and water quantity-monitoring updates. Meeting date changed to 1st Tuesday to prevent conflicting with Montana Weed Control Assoc. meeting. Publicity for event included TRWG newsletter, local TV, radio and newspapers.
NEXT - January 4, 2011 in Dutton. Musselshell water users and DNRC have been invited as the primary topic to explain how a completed adjudicated river operates.

Task 2: TRWG monthly board meetings in Great Falls, MT to conduct TRWG business including paying bills, grants status and projects updates.
Timeline – Second Tuesday of each month unless notified of change.
Responsible Party – TRWG coordinator with help from TRWG Board president.
Additional Resources – Any person or group with pertinent information for that month.
Proposed Product- TRWG board oversight of funds and review on topics of special interest.
Past Accomplishment highlights – Monthly board meeting minutes from 1995 to current located at the TRWG coordinator's office.
2009 - TRWG monthly board meetings conducted on February 10, March 10, April 14, June 9, and July 14. No May meeting – lack of quorum. No August meeting because of farmers in field. September 15th as part of TRWG tour. October 13; November 10; and December 8. RESULT – Board making informed decisions on workplan, grant and budget.
NEXT – 2010 schedule is January 5, February 9, March 9, April 13, May 11, June 8, July 13, no meeting in Augusta, September 14, October 12, November 9, and December 7.

Task 3: Watershed tour open to public to review past watershed projects and items of interest to the TRWG.
Timeline – Tour timeframe and location set at beginning of each year.
Responsible Party – TRWG coordinator with help from TRWG Board.
Additional Resources – State and federal agencies that may address projects.
Proposed Product: TRWG board and interested citizens better understanding past projects.
Past Accomplishment highlights – 2003 tour cancelled because of bad weather; 2006 tour on upper watershed and 2008 tour on middle watershed.
2009 – Tour was on September 15th on lower Teton River. See Teton tour handout at TRWG coordinator office. RESULT – 12 participants more informed on past project results so can make better decisions on future projects.
NEXT – 2010 tour being considered for July 2010 to coincide with range and weed tour on upper Teton River.

Task 4: TRWG newsletter highlighting topics of interest. Consistent topics will include noxious weeds and past stream projects.
Timeline – Two times per year normally in spring and fall.
Responsible Party – TRWG coordinator with help from TRWG Board.
Additional Resources – State and federal agencies that may address timely topics.

Proposed Product: Informed general public on topics of interest in the watershed.
Past Accomplishment highlights – TRWG newsletters from 1998 to current located at the TRWG coordinator's office.
2009 – No spring TRWG newsletter due to lack of funding. Fall newsletter sent December 9, 2009. RESULT – Newsletter to 1,594 people educated on important watershed issues. Newsletter mailing list was reviewed for accuracy reducing from 3,000 to 1,594 people.
NEXT – Spring newsletter will be in April 2010. Fall newsletter November 2010.

Task 5: TRWG Web site to keep interested individuals informed about the TRWG and a single site for past newsletters, past meeting minutes, past studies, water quality information, and gauge locations.
Timeline – Completed base web site by December 2009.
Responsible Party – TRWG coordinator with help from TRWG Board.
Additional Resources – Citizens along with state and federal agencies that may have useful information.
Proposed Product: Current and usable information about the TRWG and Teton Watershed.
Past Accomplishment highlights – TRWG has used Montana Watershed Coordination Council web site for basic information located at *http://mwcc.montana.edu/groups/details.asp?groupID=28.*
2010 - TRWG will use MWCC web site for interim at "mtwatershed.org". Site demonstration at January 5, 2010 annual meeting.
NEXT – TRWG pursuing own web site. Getting ideas from conservation districts on options.

Task 6: TRWG display board for special events to keep individuals informed about the TRWG.
Timeline – TRWG January annual meeting; Teton County fair in June; Teton wed pull in July; others as identified by board.
Responsible Party – TRWG coordinator with help from TRWG Board.
Additional Resources – Citizens along with state and federal agencies that may have useful information.
Proposed Product: TRWG display board and banner with current watershed information and pictures to keep public partners better informed.
Past Accomplishment highlights – Board has been displayed at many public events since 2000.
2009 – TRWG January annual meeting; Teton County fair June 25-27. RESULT – Approximately 500 people more informed about TRWG projects.
NEXT – May 2011 Teton County 4-H fair

Task 7: Educational workshops to keep watershed partners well educated on tools to help work on natural resource issues. This will be part of other workplan sections. This task is listed for those workshops that do not fit under other workplan sections.
Timeline – Will be part of other workplan sections.
Responsible Party – County Extension agents lead.
Additional Resources – Citizens along with state and federal agencies that may have useful information.
Proposed Product: Well educated watershed participants.
Past Accomplishment highlights – TRWG workshops.
2009 – See list under other work plan sections.
NEXT – 2010 schedule in work by county extension agents.

*** NOXIOUS WEEDS ***
Work Plan

BACKGROUND DATA: When the TRWG was formed in 1996, one of the focus points was management of noxious weeds. TRWG has continued to support noxious weed management through teamwork and well-rounded weed control programs.

The primary noxious weed species to be addressed by this watershed project include: spotted knapweed, leafy spurge, Canada thistle, Dalmation toadflax, yellow toadflax, sulfur cinquefoil, and houndstongue.

The Teton River Watershed (TRW) like most of Montana, has experienced a steady increase of noxious weed infestation, particularly spotted knapweed and leafy spurge. While some areas of Montana have suffered tremendous economic and habitat loss due to noxious weeds, management of the TRW weed problem is still cost-effective and physically manageable in most areas. However, chronic weed problems exist along the riparian corridors, roadways and access points to public lands. In an ever-growing number of cases, weeds are now spreading from the stream corridors to adjacent private and public lands. Both formal and informal weed management initiatives on the TRW will continue to center around drainages, since landowners tend to organize themselves that way. Further, while drainages are a perfect conduit for weed seed spread, control methods are more complex in drainages because chemical and vehicle use is more restricted, and therefore increased labor and creativity must be exerted. The TRWG partners have substantially increased weed management on irrigated lands and now need to step up the rangeland weed control. Finally, by expanding Weed Management Areas (WMA) by sub drainage, we expect to increase interest in cooperative efforts across a broad area of the TRW. The Deep Creek and upper Muddy Creek drainages have very few noxious weeds and are managed as Weed Prevention Areas.

To date, the TRWG has actively assisted with: 1) initiating public biological insect collection; 2) starting the first Teton Canyon Weed Pull in 2004; 3) the distribution of over one million bio-control insects for leafy spurge; 4) writing noxious weed grants that have brought in $100,000 in additional funds to the watershed to fight noxious weeds; 5) mapping of major weed infestations; and 6) the financial support of the Rocky Mountain Front Weed Roundtable.

Partners include Teton County Weed District, Teton County Extension Service, Chouteau County Weed District, Chouteau County Conservation District and the Rocky Mountain Front Weed Roundtable.

☐ **Goal 1:** Manage all existing noxious weeds across the entire 837,000 acres in the Teton Watershed.

☐ **Objective 1**: Use a collaborative and integrated approach to manage the densities and spread of the primary noxious weed species (see above) in the TRW over the next ten years.

☐ **Task 1**: Map locations of existing infestations of the primary noxious weeds in the TRW.
☐ **Timeline** – May – October field map work; November-April incorporate data into last year's map.
☐ **Responsible Party** – Teton and Chouteau County Weed Districts, RMFWR on upper river; USFS on USFS lands
☐ **Additional Resources** - Weed districts and RMFWR hold primary mapping data with support from USFS and Chouteau County area DNRC.
☐ **Proposed Product:** GIS map of weed infestations at Teton and Chouteau County Weed Districts to help control noxious weeds.
☐ **Past Accomplishment highlights –** Initial mapping in 1996 by NRCS, Teton and Chouteau Weed District. Since then, Teton and Chouteau Weed Districts, RMFWR partners and private landowners have continued to map noxious weeds in the entire watershed. GIS maps are located in each county Weed District office and an extensive weed database for the upper river rests with the RMFWR.
☐ **2009 –M**aps and databases of noxious weeds inventoried and sprayed located at Chouteau and Teton Weed Districts and RMFWR. RESULT – Helps track infestations of noxious weeds and provides information to better manage weeds throughout the TRW.
☐ **NEXT –** Continue efforts in 2010 field season.

☐ **Task 2**: Establish weed management plans to address the treatment of each infestation of the primary noxious weeds in the TRW.
☐ **Timeline** – Winter months incorporate changes into last year's plan.
☐ **Responsible Party** – Teton and Chouteau County Weed Districts; USFS on USFS lands.
☐ **Additional Resources** - RMFWR partners and Chouteau area DNRC.
☐ **Proposed Product:** Active weed plan to address all current known patches of noxious weeds.
☐ **Past Accomplishment highlights –** Each county has weed plans addressing specific areas.
☐ **2009 –** Compiling weed data to edit weed plans. County weed districts are discussing options for 2010 weed plans. RESULTS – None yet.
☐ **NEXT –** Each county will incorporate new data into existing weed plans.

☐ **Task 3**: TRWG and partners will write grants from NWTF, USFS, BLM, and others to help control noxious weeds with focus on the primary noxious weeds in the TRW.
☐ **Timeline** – Annual, depending upon grant due dates.
☐ **Responsible Party** - Teton and Chouteau County Weed Districts.
☐ **Additional Resources** – RMFWR partners and Chouteau area DNRC.
☐ **Proposed Product:** Financial assistance for noxious weed projects.
☐ **Past Accomplishment highlights –** Past successful grant results since 1995 at Weed District offices
☐ **2009 –** No grants were submitted since received NWTF grants for past 5 years. RESULTS – None
☐ **NEXT –** Looking for potential funding sources for 2010 weed projects other than NWTF.

☐ **Task 4**: Collect and distribute biological controls throughout TRW to control noxious weeds.
☐ **Timeline** – June, July and August of each year.
☐ **Responsible Party** – Teton and Chouteau County Weed Districts.
☐ **Additional Resources** - RMFWR partners, Chouteau area DNRC and volunteers.
☐ **Proposed Product:** 100,000 beetles collected and distributed to 30 landowners on 50 sites to help control noxious weeds.
☐ **Past Accomplishment highlights –** Collaboration with partners on the collection and distribution of approximately 3.6 million insects to over 720 sites for 100 landowners. See past RMFWR Annual Report for more details.

- ☐ **2009 –** July 15th 40 people collected 180,000 bugs and delivered 90 releases to 40 sites. RESULT – Biological control introduced as one tool to control noxious weeds at 40 sites in TRW.
- ☐ **NEXT –** Prepare for 2010 bug collection and distribution. Scheduled for July 14th.

- ☐ **Task 5**: Support Teton Canyon Weed Pull.
- ☐ **Timeline** – annually on third Saturday in July.
- ☐ **Responsible Party** – Teton Weed District.
- ☐ **Additional Resources** - RMFWR partners, FRCEG, MSU Extension and volunteers.
- ☐ **Proposed Product:** 50 volunteers pull 1,000 lbs of Spotted Knapweed along upper Teton Canyon Road and learn more about weed biology and control.
- ☐ **Past Accomplishment highlights -** Implemented in 2005, averaging 50 volunteers pulling approximately 750 lbs spotted knapweed. See RMF Weed RT annual report for more details
- ☐ **2009 –** July 18th 75 volunteers pulled 778 lbs of knapweed. RESULT – A more informed and engaged public controlling noxious weeds.
- ☐ **NEXT –** Plan for 2010 weed pull. Need prizes and food. Scheduled for July 17th.

- ☐ **Task 6**: Conduct a landowner/agency Spray Day along Teton Canyon Road.
- ☐ **Timeline** – June 17, depending upon road construction
- ☐ **Responsible Party** – Teton County Weed District.
- ☐ **Additional Resources** - RMFWR partners, landowners.
- ☐ **Proposed Product:** 20 people spray roughly 20 miles of roadway along Teton Canyon Road to control noxious weeds and educate private landowners.
- ☐ **Past Accomplishment highlights –** 2003-present - see RMFWR Annual Report for full details.
- ☐ **2009 –** June 17th 20 landowners and agency partners, along with Teton Weed district sprayed 20 miles of Teton Canyon Road. RESULT – More informed weed fighters and actual control on Teton Canyon Road.
- ☐ **NEXT -** 2010 spray day on June 17.

- ☐ **Task 7**: Montana Conservation Corps weed pulling and mapping along Teton River.
- ☐ **Timeline** – July of each year.
- ☐ **Responsible Party** – The Nature Conservancy, USFWS, landowners.
- ☐ **Additional Resources** - RMFWR partners.
- ☐ **Proposed Product:** follow-up hand-pull treatment for Teton Canyon Road and at least 500 acres surveyed/mapped yearly.
- ☐ **Past Accomplishment highlights –** 2003-present, see RMFWR Annual Report for full details.
- ☐ **2009 –** MCC crew pulled weeds along Teton Canyon Road July 14 thru 18 and participated as crew leaders at Teton Canyon Weed Pull. Crew surveyed/mapped over 500 acres of private land adjacent to Teton Canyon Road July 20 – 24. RESULT – Nearly total control of noxious weeds along Teton Canyon Road and mapping information available to private landowners for future control efforts.
- ☐ **NEXT -** Tentative dates July 12-17.

- ☐ **Task 8**: Private landowner weed management plans mandatory for stream projects funded by TRWG.
- ☐ **Timeline** - Accomplish with implementation of stream projects.
- ☐ **Responsible Party** – Teton and Chouteau County Weed Districts.
- ☐ **Additional Resources** – TRWG coordinator, landowners and weed districts will work together to put together weed plan.
- ☐ **Proposed Product:** Private landowner weed management plans.
- ☐ **Past Accomplishment highlights –** Since 2006, (3) projects with weed management plans.
- ☐ **2009 –** No completed action yet but two in work by Teton county. RESULT – Nothing in 2009 but projects started will be completed in 2010.
- ☐ **NEXT –** (2) private landowner weed management plans
    - ☐ Weed District follow-up on 3 weed management plans.

☐ **Objective 2**: Noxious weed education program that compliments collaborative weed management approach.

- ☐ **Task 9**: Semi-annual newsletter will contain noxious weed updates addressing types of control, information on new invaders, and available resources.
- ☐ **Timeline** – Quarterly.
- ☐ **Responsible Party** – TRWG coordinator
- ☐ **Resources** - Teton and Chouteau County Weed Districts, and weed partners.
- ☐ **Proposed Product:** Semi-annual newsletters mailed to 3,000 TRW residents.
- ☐ **Past Accomplishment highlights –** Past newsletters since 1999 located at coordinator's office.
- ☐ **2009 –** December newsletter published with articles about noxious weeds. RESULT – Noxious weed information to 1,600 TRW residents.
- ☐ **NEXT –** Spring 2010 newsletter with weed articles from weed districts

- ☐ **Task 10**: Train landowners each year to use GPS units to map and treat noxious weeds.
- ☐ **Timeline** – May – October of each year.
- ☐ **Responsible Party** – Teton and Chouteau County Weed Districts.
- ☐ **Resources** -Weed districts and County Extension.
- ☐ **Proposed Product:** Landowners trained to use GPS to manage noxious weeds.
- ☐ **Past Accomplishment highlights –** In 2007 30 landowners where trained to use GPS to manage noxious weeds.
- ☐ **2009 –** No completed action yet. RESULT – Training delayed to 2010
- ☐ **NEXT –** Schedule event to train 10- 20 landowners GPS for mapping noxious weeds

- ☐ **Task 11**: TRWG display board to be shown at public events.
- ☐ **Timeline** – January – December, annually.
- ☐ **Responsible Party** – TRWG coordinator.
- ☐ **Resources** - Upper watershed - Paul W and Mark K; lower watershed - Diane W & Craig F.
- ☐ **Proposed Product:** Display at TRWG annual meeting, Choteau fair and Fort Benton fair to reach 2,000 people.
- ☐ **Past Accomplishment highlights –** Since 2000, displayed at TRWG annual meeting, Teton County 4-H fair and Fort Benton fair.
- ☐ **2009 –** TRWG annual meeting, Teton County 4-H fair. RESULT - Illustrating positive results of weed projects to approximately 500 people.
- ☐ **NEXT –** 2010 TRWG annual meeting and Teton County 4-H fair

- ☐ **Task 12**: Support ongoing noxious weed educational programs including FRCEG and RMFWR.
- ☐ **Timeline** – January – December, annually
- ☐ **Responsible Party** – FRCEG and RMFWR.
- ☐ **Resources** - upper watershed – Paul Wick and Casey Perkins; lower watershed - Diane Walker and Craig Ferris.
- ☐ **Proposed Product:** Educational events for youth and adults
- ☐ **Past Accomplishment highlights –** See past FRCEG and RMFWR Annual Reports.
- ☐ **2009 –** Weed pull, spray day and bug collection completed. RESULT – Listed in above tasks
- ☐ **NEXT** - See FRCEG and RMFWR 2010 work plans.

☐ **Goal 2: A**ttempt to eradicate new invasive species within the TRW boundaries.

☐ **Objective 1**: Using a collaborative and integrated weed management eradicate new invasive species in the Teton Watershed.

- ☐ **Task 13**: Map and treat all new invasive species locations, monitor into future.
- ☐ **Timeline** – May – October field work; November-April incorporate data into last year's map.
- ☐ **Responsible Party** – Teton and Chouteau County Weed Districts. RMFWR, USFS on USFS lands
- ☐ **Additional Resources** - Weed districts hold primary mapping data with support from USFS, RMF

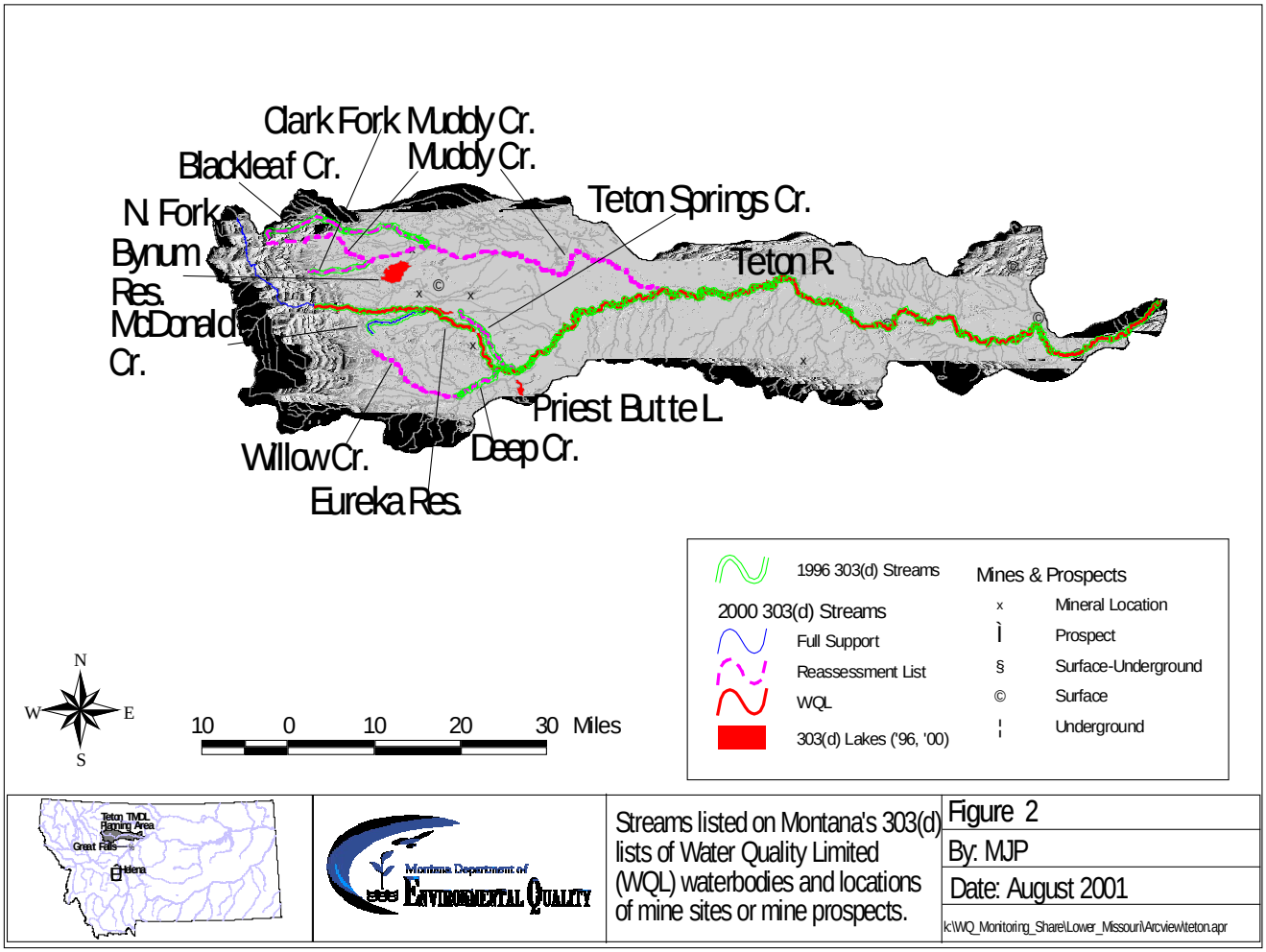
WR partners and Chouteau area DNRC.

- ☐ **Proposed Product:** GIS map of weed infestations at Teton and Chouteau County Weed Districts to better control new noxious weeds.
- ☐ **Past Accomplishment highlights –** Maps current as of December 2008.
- ☐ **2009 –** Teton and Chouteau Weed District have mapped weed infestations. RESULT – Maps to help track and control new noxious weeds
- ☐ **NEXT –** Follow up all previous treatments in 2010 field season.

*** WATER QUALITY ***
Work Plan

BACKGROUND DATA: Since 1996, one of the TRWG's primary work goals has been to improve water quality in the Teton River. The primary water quality impairments the TRWG continues to pursue are salinity and turbidity.

The majority of water quality information can be found in the September 2003 water quality management plan (WQMP) and associated Total Daily Maximum Loads (TMDLs) for the Teton River Watershed. The Teton River flows into the Marias River near Loma, in west central Montana. Thirteen stream segment/water bodies in the Teton River watershed were listed with threatened or impaired beneficial use support on Montana's 1996 303(d) List while nine stream segment/water bodies have impaired status on the 2002 303(d) List. Five stream segment/water bodies have been determined as fully supporting all beneficial uses in 2002. All water bodies in the Teton River watershed are classified as B1, B2, or B3; therefore, they are to be maintained suitable for household use, aquatic life, cold or warm water fishery, agriculture, industry, and contact recreation beneficial uses per the Administrative Rules of Montana (17.30.620 – 629 ARM).



From: TMDL - Impaired beneficial uses identified on the 1996 & 2002 303(d) lists.

Stream Name & Reach Description	1996 Use Support						2002 Use Support					
	Aquatic Life	Fishery	Drinking Water	Agriculture	Industry	Contact Rec.	Aquatic Life	Fishery	Drinking Water	Agriculture	Industry	Contact Rec.
Teton River (N & S Fk to Deep Cr)	P	P				P	P	N				
Teton River (Deep Cr to Muddy Cr)	P	P	T	T		P	P	P		P		
Teton River (Muddy Cr to mouth)	P	P	P	P		P	P	P				
Willow Creek (Headwaters to mouth)	P	P					P	P				
Deep Creek (Headwaters to mouth)	P	P					P	P	P		P	P
McDonald Creek (Headwaters to mouth)		T					F	F	F	F	F	F
Upper Blackleaf Creek (Headwaters to Cow Cr.)	P	P	P				F	F	F	F	F	F
Lower Blackleaf Creek (Cow Cr. to mouth)							P	P				
Upper Teton Spring Cr. (Headwaters to Choteau)	P	P				P	P	P	P			P
Lower Teton Spring Cr. (Choteau to mouth)	P	P				P	P	P	P		P	P
Clark Fork Muddy Cr. (Headwaters to mouth)		T					F	F	F	F	F	F
Priest Butte Lakes	P	P	P			P	N	N				
Bynum Reservoir	P	P					F	F	F	F	F	F
Eureka Reservoir	P	P					F	F	F	F	F	F

Source: MDEQ (1996a, 2002a)
P = Partial support, N = Non-support, T = Threatened, F = Full support

The Teton River watershed is connected to the Sun River watershed via man-made canals and irrigation works. However, in the interested of simplicity, the TMDLs and Water Quality Management Plans for the Teton and Sun Rivers have been developed in separate documents. The development of each of these plans was done in close coordination since water quality in the Teton River basin is intricately linked to actions in the Sun River basin. The pivot point for these watersheds is the Freezeout Lake discharge into Priest Butte Lakes.The setting of targets, especially those set for Priest Butte Lakes, were developed with an awareness as to their potential

implication to Freezeout Lake, the Greenfields Irrigation District (GID), and the Sun River. This document does not attempt to describe the complex functioning of the Freezeout Lake Wildlife Management Area, the Sun River watershed, or its irrigation systems. This information and detail is contained in the Sun River Watershed Water Quality Restoration Plan and Total Maximum Daily Loads for the Sun River, Muddy Creek, Ford Creek, Gibson Reservoir, Willow Creek Reservoir, and Freezeout Lake

Natural disturbance events are part of the northern Rockies Mountains and Great Plains ecosystem and include wildfire and floods. Floods of 1948 and 1953 are reported as severe but having little documented effect to the river system, although one effect of the 1953 flood was that the US Army Corps of Engineers had contractors straightened out several river bends in the lower basin (personal communication with area landowners). However, the flood of 1964 was dramatically different. Leading up to this flood, land use along the river bottoms and floodplain had changed significantly: some reaches of the river were channelized (i.e. straightened), permanent bridges for transportation were installed, and riparian areas were being heavily used which reduced the cover of bank stabilizing vegetation. When the '64 flood came, the ability of the river's floodplain to accommodate and withstand extreme flows was reduced so the flood effects were severe. When the floodwaters receded, the Teton River had lost approximately 35 miles stream length as a result of flood flows and man's reaction to it. Again, the US Army Corps of Engineers channelized a reach of river in an attempt to prevent future damage, this time near Choteau. The effects of the 1953 and 1964 floods continue to be manifested as the river works to regain its lost stream length. However, the river now has limited space within which to regain this length as people occupy much of the floodplain for agricultural purposes, homes, towns, and transportation infrastructures.

The type and magnitude of water quality impairments vary across the watershed and the listed impairments also differ between the 1996 and 2002 303(d) lists. Some of the listed causes and impairments changed due to the institution of a more structured and formalized 303(d) listing process. The new process requires a minimum level of data for beneficial use support determinations and greatly improves the documentation of the listing decisions. Primary causes of water quality impairments listed on the 1996 and 2002 303(d) lists include salinity/TDS/chlorides or sulfides, selenium, organic enrichment/dissolved oxygen, siltation/suspended solids, temperature, and nutrients. Other listed causes include stream flow alteration (dewatering), bank erosion, riparian degradation, fish habitat alteration, and other habitat alteration (Tables 3-1 and 3-2). Sources of impairments listed include agricultural related (irrigated and non-irrigated crop production, range land/grazing), stream flow modification, channelization, bank modification/destabilization, habitat modification, municipal point source, resource extraction, land disposal, highway/road/bridge construction, and natural or unknown sources.

A "true" total daily maximum load (TMDL) for specific pollutants can be developed where sufficient data exists and it is logical to do so. This only proved to be the case for selenium loading into Priest Butte Lakes (Table E-2). EPA guidance also allows TMDLs to be expressed as either a reduction target or a surrogate target if applicable or warranted. This proved to be the best approach for salinity, sediment, temperature, and nutrients (Table E-2). Salinity and nutrient TMDLs are expressed as a reduction in the average and/or maximum measured concentrations of total dissolved solids (TDS), total nitrogen, total phosphorus, or Chlorophyll *a* biomass. Sediment and temperature TMDLs are expressed using a surrogate measure of channel stability as defined by a stabile channel geometry, riparian vegetation communities, and minimum stream flows on approximately 80% of a stream's overall length (Table E-2).

Table E-2. TMDLs for Teton River Water bodies.

Pollutant: Water body	Monitoring Location	Total Daily Maximum Load, Reduction Target, or Surrogate Measure	Conditions: Existing ↔ Target
TDS / SC: Priest Butte Lakes	- In-lake - Discharge at Hwy 221	34% reduction in-lake SC concentrations No reduction in May to Sept. average SC 23% reduction in maximum SC	Table 4-6 Table 4-8
TDS / SC: Teton River	- USGS Loma gage	8% reduction in May to Sept. average SC 14% reduction in maximum SC	Table 4-3 Table 4-8
Selenium Priest Butte Lakes	- Yeager Seep	0.157 lbs/day to Priest Butte Lakes	Table 4-10
Sediment Teton River	- Deep Cr. to Muddy Cr. - Muddy Cr. to mouth	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.3.2	Table 4-17
Sediment Willow Creek	- Headwaters to Deep Cr.	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.3.2	Table 4-17
Sediment Deep Creek	- Willow Cr. to mouth	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.3.2	Table 4-17
Sediment Teton Spring Cr.	- Headwaters to Choteau - Choteau to mouth	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.3.2	Table 4-17
Thermal Modification Teton River	- Deep Cr. to Muddy Cr.	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.4.2	Table 4-17
Thermal Modification Teton Spring Cr.	- Headwaters to Choteau	80% of total stream length exhibiting stabile channel geometry, riparian vegetative communities, and minimum stream flows. Refer to Section 4.4.2	Table 4-17
Nutrients Deep Creek	- Willow Cr. to mouth	**TP** 23% reduction **TN** 57% reduction **Chl *a*** 16% reduction	Table 4-20 Table 4-21
Nutrients Teton Spring Cr.	- In Choteau - Near mouth	**TP** No reduction required **TN** No reduction required **Chl *a*** 168% reduction (May – June) **TP** No reduction required **TN** 25% reduction **Chl *a*** 4% reduction (May – June)	Table 4-20 Table 4-21

Table E-3. Physical Surrogate Target values for sediment and temperature.

Water body (location)	Stable Banks & Healthy Riparian[1] (miles)	Channel Geometry			Instream Flow[3] (cfs)	Riparian Vegetative Community
		Rosgen Channel Type	Width / Depth Ratio	Average Meander Width Ratio[2]		
Teton River: (N-S Forks to Deep Creek)	147	C	> 12	11.4	35	Mix of cottonwood and willow species, which are determined by site-specific elevation and dominant soils. Refer to Tables 4-15, 4-16, and Figure A-14.
Teton River: (Deep Creek to Mouth)		C	> 12	11.4	To be determined[4]	
Deep Creek (Headwaters to Mouth)	7	C	> 12	11.4	18	
Teton Spring Creek (Headwaters to Mouth)	11.2	E	< 12	24.2	4.5	
Muddy Creek (Headwaters to Mouth)	65	C	> 12	11.4	Needs to be calculated	
Willow Creek (Headwaters to Deep Cr.)	15	C	> 12	11.4	Needs to be calculated	
McDonald Creek[5]	9.6	C	> 12	11.4	10	

[1] Refer to Table 4-17 for source of target values.
[2] Meander Width Ratio: Meander Belt Width / Bankfull Width (Rosgen, 1992).
[3] In-stream Flow Reservation requested by MFWP (refer to Table 2-6).
[4] To be determined by MFWP using wetted perimeter models and life history needs based on fish habitat requirements (Personal communication, Bill Gardner, MFWP).
[5] McDonald Creek is listed as fully supporting all beneficial uses in 2002; it is included in this table because minimum instream flows have been calculated.

Table E-4. Chemistry Targets Values.

Water body (location)	TDS (mg/L)	SC (µS/cm at 25ºC)	Selenium (µg/L)	Total Phosphorus (µg/L)	Total Nitrogen (µg/L)	Chlorophyll *a* (mg/m^2)
Priest Butte Lakes: (In-Lake)	< 5,000 mg/L	< 6,200 µg/L	< 5 µg/L			
Priest Butte Lakes: (discharge at Hwy 221 Bridge)	< 820 mg/L (Seasonal Ave.) < 1,145 mg/L (Instantaneous max)	< 1,000 µg/L (Seasonal Ave.) < 1,400 µg/L (Instantaneous max)				
Teton River: (Dutton gage)	< 820 mg/L (Seasonal Ave.) < 1,145 mg/L (Instantaneous max)	< 1,000 µg/L (Seasonal Ave.) < 1,400 µg/L (Instantaneous max)				
Teton River: (Loma gage)	< 820 mg/L (Seasonal Ave.) < 1,145 mg/L (Instantaneous max)	< 1,000 µg/L (Seasonal Ave.) < 1,400 µg/L (Instantaneous max)				
Teton Spring Creek: (in Choteau)				40 µg/L (mid-June – Sept.)	650 µg/L (mid-June – Sept.)	50 mg/m^2 (May – June max) 100 mg/m^2 (July – Sept. Ave.) 150 mg/m^2 (July – Sept. max)
Teton Spring Creek: (near mouth)				40 µg/L (mid-June – Sept.)	650 µg/L (mid-June – Sept.)	50 mg/m^2 (May – June max) 100 mg/m^2 (July – Sept. Ave.) 150 mg/m^2 (July – Sept. max)
Deep Creek: (Hwy 287 Bridge)				40 µg/L (mid-June – Sept.)	650 µg/L (mid-June – Sept.)	50 mg/m^2 (May – June max) 100 mg/m^2 (July – Sept. Ave.) 150 mg/m^2 (July – Sept. max)

Table E-5. TMDL Allocations for Salinity and Selenium for Priest Butte Lakes.

Pollutant / Source	Existing Load (#/day)	Allocated Load (#/day)	Load Reduction (#/day)
Salinity			
Freezeout Lake	83,500	55,000	28,500
Yeager Seep	15,000	10,000	5,000
West Side drainages/seeps	Unknown	To be determined	To be determined
East Side drainages/seeps	Unknown	To be determined	To be determined
Shallow Groundwater	Unknown	To be determined	To be determined
Selenium			
Yeager Seep	0.471	0.157	0.314
Freezeout Lake	Unknown	To be determined	To be determined
West Side drainages/seeps	Unknown	To be determined	To be determined
East Side drainages/seeps	Unknown	To be determined	To be determined
Shallow Groundwater	Unknown	To be determined	To be determined

Participants include Teton County Weed District; Teton County Extension Service; Teton Conservation District, Chouteau County Weed District; Chouteau County Conservation District; U.S. Fish & Wildlife Service; U.S. Natural Resource Conservation Service; Montana Department of Natural Resources and Conservation; Montana Fish, Wildlife & Parks; The Nature Conservancy; and private landowners.

☐ **Goal 1:** Improve water quality in Teton River and tributaries to meet goals established in TMDL table 5-2 within 10 years (2020).

☐ **Objective 1**: Monitoring program that annually tracks water quality trends and improvements.

☐ **Task 1**: TRWG annually review monitoring program to ensure meets actually needs to track water quality changes to meet water quality established in TMDL.
☐ **Timeline** – December of each year.
☐ **Responsible Party** – Coordinator.
☐ **Resources** - TRWG, USGS, DEQ.
☐ **Proposed Product:** Compilation and published data for TRWG to evaluate trends to decide next steps on monitoring program
☐ **Past Accomplishment highlights –** Past monitoring programs at coordinator's office.
☐ **2009 –** Waiting for all data from 2009 field season. Presented data at March 9, 2010 meeting
☐ **NEXT –** Reevaluate monitoring program in 2010.

☐ **Task 2**: With TCD as contracting authority, USGS annually monitors flow, turbidity, and salinity on Teton River at three sites (upper, middle & lower Teton River). See attached map on page ?? for USGS monitoring sites
☐ **Timeline** – January – December, annually.
☐ **Responsible Party** – USGS with TRWG oversight. TCD is the contracting authority with USGS.
☐ **Additional Resources** – DEQ.
☐ **Costs** - $13,000 grant funds for 50% and USGS for 50% of annual costs for upper Teton; USGS pays all of middle gauge and DNRC pays for lower gauge
☐ **Proposed Product:** Water quality data tracking flow, turbidity, and salinity used as baseline for trend analysis at web site: http://waterdata.usgs.gov/mt/nwis/current?type=flow&group_key=basin_cd&search_site_no_station_nm=
☐ **Past Accomplishment highlights –** Water quality and quantity data since 1998 on USGS web site
☐ **2009 –** USGS monitoring at 3 gauges in-progress. Waiting for final data from USGS.
☐ **NEXT –** Reevaluate monitoring program in 2010.

☐ **Task 3**: Volunteer annually monitor at 10 sites (See attached map) on Teton River that supplements USGS monitoring. Volunteers use attached monitoring sheet during sampling.
☐ **Timeline** – March – October annually.
☐ **Responsible Party** – TRWG Coordinator.
☐ **Additional Resources** - upper Teton – Mark K; lower Teton – Bill R, Diane W & Barnie S.
☐ **Proposed Product:** Water quality (salinity, DO, temperature, turbidity, conductivity, pH) data between USGS gauges that track changes. See monitoring map for specific locations.
☐ **Past Accomplishment highlights –** Volunteer water quality data since 1998 located at coordinator's office.
☐ **2009 –** Volunteer monitoring completed and coordinator compiling data.
☐ **NEXT –** Compile all data and reevaluate monitoring program in 2010.

☐ **Task 4**: Annually, monitor salinity and flow from Freezout and Priest Lakes drains into Teton River.
☐ **Timeline** – March – October annually.
☐ **Responsible Party** – FWP.
☐ **Additional Resources** – TRWG.
☐ **Proposed Product:** Monitor salinity and flow change entering Teton River. See MSCA plan.
☐ **Past Accomplishment highlights –** Salinity data since 1998 located at coordinator's office & FWP Freezout office.
☐ **2007, no flows so no data.**

- ☐ **2008 – No flows into Teton River**
- ☐ **2009 –** FWP monitoring completed.
- ☐ NEXT – Compile all data and reevaluate monitoring program in 2010.

- ☐ **Task 5**: Annually, calibrate water quality meters to ensure taking consistent and accurate measurements.
- ☐ **Timeline** – March, annually.
- ☐ **Responsible Party** – TRWG Coordinator.
- ☐ **Additional Resources** - DEQ, FWP.
- ☐ **Proposed Product:** All meters calibrated to same standard.
- ☐ **Past Accomplishment highlights –** Meters calibrated annually. Problems with DO portion.
- ☐ **2009 –** Calibrated on April 14th. Meter Dissolved Oxygen portion failed in June. RESULT – More accurate meter for sampling on all but DO.
- ☐ **NEXT –** Replace DO portion of meter before 2010 field season.

☐ **Objective 2**: Using Best Management Practices, achieve water quality standards in TMDL table 5-2.

- ☐ **Task 6**: TRWG prioritize projects brought before the group based on actual water quality improvements and best use of available resources. TRWG use attached project ranking sheet to evaluate each project.
- ☐ **Timeline** – At each monthly watershed meeting review at new projects.
- ☐ **Responsible Party** – TRWG.
- ☐ **Resources** – TRWG, landowner and grants.
- ☐ **Proposed Product:** Ongoing list that considers priorities for the watershed.
- ☐ **Past Accomplishment highlights –** See list of completed projects at coordinator's office.
- ☐ **2009 –** TRWG is in the process of completing existing Teton River projects first. There is currently interest in new landowner projects. TRWG has advised landowners to put together project plans and present them to the board. RESULT – An effective method to evaluate projects. See selection process in workplan attachments.
- ☐ **NEXT –** Waiting for new projects from landowners.

- ☐ **Task 7**: Stream projects that improve water quality on the Teton River and tributaries
- ☐ **Timeline** – Annually review project status
- ☐ **Responsible Party** – TRWG for tracking purposes.
- ☐ **Resources** – TRWG, landowner and grants.
- ☐ **Proposed Product:** Stream projects that improve water quality in Teton River.
- ☐ **Past Accomplishment highlights –** See list of completed projects at coordinator's office.
- ☐ **2009 –** Fellows Ranch permits completed and waiting for contractor to complete; Kalanik property awaiting NRCS design. Working on final designs for Deep Creek projects. RESULTS – No change in 2009.
- ☐ **NEXT –** Kalanik property, Deep Creek.

- ☐ **Task 8**: Use MSCA data to identify recharge areas so landowners can use better land management practices to control saline seep problems. Annually contact 2 landowners to try to get more acres under better management practices.
- ☐ **Timeline** – Annually, evaluate progress.
- ☐ **Responsible Party** – MSCA.
- ☐ **Resources** - Landowners, MSCA, NRCS.
- ☐ **Proposed Product:** 200 acres of recharge areas reclaimed to lessen saline seep entering Teton River.
- ☐ **Past Accomplishment highlights –** MSCA accomplished Teton Ridge study and presented data to landowners.
- ☐ **2009 –** MSCA studying saline seep problem east of Choteau; project not completed yet so not sure what action plan should be taken. RESULTS – None .
- ☐ **NEXT –** MSCA continue monitoring in 2010.

- ☐ **Task 9**: Reduce saline seep into Priest Lake by using MSCA data to identify recharge areas so landowners can control saline seep thru better land management practices.. Annually contact 2 landowners to try to get more acres under better management practices.
- ☐ **Timeline** – Annually, evaluate progress.
- ☐ **Responsible Party** – TRWG.
- ☐ **Resources** - Landowners, MSCA, NRCS.
- ☐ **Proposed Product:** 50 acres of recharge areas change land use so less saline seep enters Teton River.
- ☐ **Past Accomplishment highlights –** 2006 saline seep study recharge maps at MSCA.
- ☐ **2009 –** No action scheduled for 2009. Landowners are evaluating options from data presented to them by MSCA. RESULT – None in 2009 but hope landowners will engage in a change in management in 2010.
- ☐ **NEXT –** None scheduled yet. Waiting for landowner direction.

- ☐ **Task 10**: Support City of Choteau design improvements to better manage wastewater discharge into Teton River and meet TMDL standards.
- ☐ **Timeline** – December 2009.
- ☐ **Responsible Party** – City of Choteau.
- ☐ **Resources** – Support letters to city for grants.
- ☐ **Proposed Product:** City effluent that meets state water quality standards and TMDL.
- ☐ **Past Accomplishment highlights –** City is applying for waste-water grants through the state.
- ☐ **2009 –** Nothing yet. RESULT - City is getting grants but no actual project started yet.
- ☐ **NEXT –** Awaiting direction from City of Choteau.

*** WATER QUANTITY ***
Work Plan

BACKGROUND DATA: When the TRWG was formed in 1996, one of the primary concerns was the need to study water quantity issues throughout the Teton River watershed. Because of impending legal adjudication of water rights within the basin and the divisive nature of this process TRWG has taken the stance of being an educational forum for water quantity issues.

Annual precipitation varies across the watershed from an average of 12 inches in the east near Fort Benton to 60 inches or more in the western headwaters where approximately 30% of annual precipitation is in the form of snow. At Choteau, reported monthly averages for the year range from 0.19 inches in February to 2.15 inches in June (Figure 2.1). Several months (December through February) have monthly averages less than 0.25 inches. May and June receive the highest amount of monthly average precipitation of 2.00 and 2.15 inches respectively. These two months also have the highest maximum precipitation of 5.06 and 6.82 inches respectively.

Flow in the Teton River is typical of a perennial snowmelt dominated stream. The river experiences extremes of both high and low flow conditions from a combination of climatic influences and water diversions for agricultural activities. Major tributaries to the Teton River include two perennial streams, Deep and Muddy Creeks, and two spring fed streams, McDonald and Teton Spring Creek. Two other perennial streams, Willow Creek and Blackleaf Creek (also know as North Fork Muddy Creek), are tributaries to Deep and Muddy Creeks, respectively. Several water storage reservoirs in the watershed, including Bynum and Eureka Reservoirs, were created for the development of irrigated agriculture.

Hydrographs for most streams in the Teton River watershed follow climatic events. High flows occur during the spring when a combination of spring rains and snowmelt from the mountains contribute to the flows. Stream flow decreases as summer progresses and base flow theoretically maintains stream flow through the fall and winter. At present, three active USGS gauging stations are located along the Teton River mainstem. While there are currently no active gauging stations on any of the tributaries, the USGS reports data from several historical stations for the Teton River and its tributaries.

The consistency of stream flow in the Teton River is a point of debate between local residents and the historical data. Local residents indicate that the Teton River typically goes dry near Choteau during late summer and winter periods. Field notes from MDEQ monitoring staff has documented zero-flow conditions, and additionally, MFWP has identified the lower 188 miles of the Teton River (Bynum diversion to the mouth) as chronically dewatered (MFWP, 1997b). Evaluation of the earliest stream flow data collected in the watershed may be informative as to the historical nature of the river. However, water resources in the basin were being developed during the latter half of the 19th century (MSOE, 1962) while the USGS did not begin systematic stream flow gauging until first decade of the 20th century. Regardless, the historical data may offer a glimpse as to the character of the river prior to the development of large water withdrawal infrastructures that were first completed in 1928 (e.g. Bynum Reservoir).

The current gauging stations in operation in the Teton River watershed include stations below the South Fork (06102500), near Dutton (06108000), and at Loma (06108800). These stations have been active since 1947, 1954, and 1998, respectively. The record high flow for the Teton River was recorded at Dutton on June 9, 1964 at 20,000 cfs[1]. Other high flow events recorded at the Dutton station are 11,600 cfs on June 21, 1975, 3,510 cfs on March 10, 1977, and 5,280 cfs on February 26, 1986.

Data from current Teton River gauging stations show high flows occur in June. Mean monthly flows for June range from 499 cfs near the South Fork, to 393 cfs near Dutton, to 98.5 cfs near Loma. Mean monthly low

[1] The flow of 20,000 cfs was the officially reported peak during the 1964 flood. However, the post-flood estimated peak flow was 71,300 cfs using slope-area measurements of high water marks (Boner and Stermitz, 1967).

flows are 45.1 cfs below South Fork near Choteau, 56.5 cfs near Dutton, and 10.6 cfs at Loma during March, (MSEO, 1962; 1964a; 1964b).January, and September, respectively.

Water resource infrastructure and facilities have been developed to facilitate agricultural activities in the watershed for at least the past 120 years Numerous canals have been constructed to deliver stream water to irrigate fields, water stock, or supply storage reservoirs (Figure A-9a, A-9b). Three primary reservoirs were constructed in the upper watershed during the early part of the 1900's - Bynum, Eureka, and Brady Lake.

Bynum Reservoir was completed in 1928 and stores 72,000 acre-feet of water for use by the Teton Co-Operative Reservoir Company (MSEO, 1962). The reservoir was built to encourage settlement of the area by homesteaders. It was designed to serve a dual function of storing spring runoff, and thereby moderating the affects of flooding, and to provide irrigation water in the dry summer months. The Bynum Reservoir diversion canal traverses five miles from the Teton River to the reservoir and the stored water irrigates about 20,500 acres. This amounts to about one-third of the total irrigated acres (61,000 acres) in the Teton River watershed.

Eureka Reservoir was built in 1936 and stores 5,500 acre-feet of water for use by the Teton Co-Operative Canal Company. The reservoir was built in response to the drought of the early 1930s (MSEO, 1962) and also uses the Teton River as its source.

Brady Lake Reservoir was constructed in 1936 and stores 3,300 acre-feet for use on 6,000 acres (14,800 potential acres) by the Brady Irrigation Company (MSEO, 1962; personal communication via TRWG & Brady Irrigation Company). The reservoir system actually uses two other lakes as storage or "transfer pools" to deliver water from Muddy Creek. Diverted water is transferred in 2½ miles of supply canal from Muddy Creek to Round Lake, then via ¼ mile supply canal to Eyraud Lake, and finally to Brady Lake via another ¼ mile length of supply canal. The Brady Lake Reservoir is also capable of receiving water from the Teton River.

Harvey and Farmers Lake Reservoirs were constructed in 1912 and 1941, respectively, by the Farmers' Co-Operative Canal Company. Each reservoir receives water from the Teton River with priority dates of 1897 and 1898. Harvey Lake has a capacity of 2,000 acre-feet while Farmers Lake Reservoir holds 2,560 acre-feet. Both reservoirs were constructed solely for irrigation purposes and are not meant support a fishery or recreational uses (personal communication via TRWG & Farmers' Co-Operative Canal Company).

Various private and incorporated water companies use the Teton River and its tributaries (MSEO, 1962). Three ditch companies, Eldorado, Farmers, and the Teton Co-operative Canal Company use Teton River water on the "Burton" or "Farmington" Bench, which is located north of Choteau. The Teton Co-operative Reservoir Company supplies Teton River water to the Brady Irrigation Company, Bynum Irrigation District, and several private ditch systems. The Bynum Irrigation District also uses water from Muddy Creek, as does a private irrigation system. Waters from Deep, Willow, Teton Spring, and McDonald Creeks are all used by private irrigation systems.

Water right claims in the Teton River watershed prior to 1973 numbered 1,405 for a total of 75,902.8 cfs. From 1973 to 1985 an additional 27 water right permits were issued for 40.5 cfs (DNRC, 1991). The Teton River main stem has water right claims for 1,638 cfs, which can be grouped by location in the watershed (Table 2-5). Most of the issued water rights concentrate in the western third of the watershed, with the oldest priority date in the watershed being 1858. The oldest, most downstream water right on the Teton River has an 1874 priority date for 6.9 cfs. This right is located downstream of the Dent Bridge area and is for irrigating 182 acres. In addition, there is also an associated stock watering right with the same priority date and owner.

Table 2-5. Location and volume of issued water rights.

Location	Water Rights Issued
Upper Teton: above Choteau	828 cfs
Middle Teton: Choteau to I-15	289 cfs
Lower Teton: I-15 to Loma	521 cfs

☐ **Goal 1:** Fair, legal and effective application of available water based on existing USGS flow data.

☐

- ☐ **Objective 1**: Pursue educational means to help water users share available water from Teton River.

  - ☐ **Task 1**: USGS monitor flow at three gauge stations for TRWG to use as factual information.
  - ☐ **Timeline** – March – October of each year.
  - ☐ **Responsible Party** – USGS.
  - ☐ **Additional Resources** – TRWG, water users.
  - ☐ **Proposed Product:** Water quantity data to be used by all water users.
  - ☐ **Past Accomplishment highlights –** Water quantity data tracking for trend analysis at web site: http://waterdata.usgs.gov/mt/nwis/current?type=flow&group_key=basin_cd&search_site_no_station_nm=
  - ☐ **2009 –** USGS monitoring at 3 gauges in-progress. RESULT – Accurate tracking of Teton River flows.
  - ☐ **NEXT –** After 2009 field season, reevaluate monitoring program.

  - ☐ **Task 2**: Adjudication – keep all water users informed through information on status of process, deadlines and changes through annual TRWG meetings, quarterly newsletters and newspaper articles.
  - ☐ **Timeline** – U.ntil adjudication is complete – unknown date at this time
  - ☐ **Responsible Party** – DNRC.
  - ☐ **Additional Resources** – TRWG, Water Court.
  - ☐ **Proposed Product:** Informed water users on status of adjudication process.
  - ☐ **Past Accomplishment highlights –** newsletters and annual meeting updates, notes at coordinator's office.
  - ☐ **2010 –** January 5, 2010 annual meeting update by DNRC and water court.
  - ☐ NEXT - January 4, 2011 discuss at annual meeting

- ☐ **Objective 2**: Water conservation projects.

  - ☐ **Task 4**: Use irrigation water management programs to conserve water on 200 acres – ie. spray canals, livestock water.
  - ☐ **Timeline** – Annually, review progress.
  - ☐ **Responsible Party** – TRWG.
  - ☐ **Resources** – NRCS, water users.
  - ☐ **Proposed Product:** 200 acres of irrigated lands reduce water demand.
  - ☐ **Past Accomplishment highlights –** Agriment station installed in 2000; IWM classes with irrigators; irrigation improvement projects through NRCS.
  - ☐ **2009 –** March 24, 2009 with 12 local producers
  - ☐ **NEXT –** Teton extension looking at possible 2010 dates for irrigation water management classes in Choteau.

APPENDICES

Appendix 1

ACRONYMS

ARM	Administrative Rules of Montana
BLM	Bureau of Land Management
BMP	Best Management Practice
BoR	U.S. Bureau of Reclamation
BUD	Beneficial Use Determination
CCCD	Chouteau County Conservation District
cfs	Cubic Feet Per Second
DEQ	Montana Department of Environmental Quality
DNRC	Montana Department of Natural Resource Conservation
DQO	Data quality objectives
EPA	U.S. Environmental Protection Agency.
EQC	Montana Environmental Quality Council
FRCEG	Front Range Conservation Education Group
USFS	U.S. Forest Service
FWP	Montana Fish, Wildlife and Parks
GID	Greenfields Irrigation District
HUC	Hydrologic Unit
MBMG	Montana Bureau of Mines & Geology
MCA	Montana Code Annotated
MCC	Montana Conservation Corps
MPDES	Montana Pollutant Discharge Elimination System
MSU	Montana State University
NPS	Nonpoint source pollution
NRCS	Natural Resource Conservation Service
NWTF	Noxious Weed Trust Fund
PS	Point source pollution
RMFWR	Rocky Mountain Front Weed Roundtable
SCD	Sufficient Credible Data
TCD	Teton Conservation District
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TRW	Teton River Watershed
TRWG	Teton River Watershed Group
USFWS	U.S. Fish & Wildlife Service

APPENDIX 2

TETON WATERSHED PROJECTS

TASK SEQUENCE LIST

	WHO LEADS	TASK	SCHEDULED	
	Landowner	Brings project before TRWG and/or CD		
	TRWG	Review and ranks project using project evaluation checklist		
		- accompanying weed management plan		
	Landowner	Review and approve		
	TRWG & partners	Crude design of proposed project		
	TRWG & partners	Pursue appropriate funding for proposed project		
		Pursue in-kind support where possible		
	TRWG & partners	Acquire project funding for proposed project		
	Partners or contract	Final design of proposed project		
	TRWG & partners	Pursue permits for proposed project		
		- 310		
		- 404		
		- Turbidity		
		- State lands		
	Landowner & TRWG	Pursue contractors to accomplish project – bid if necessary		
		Landowners accomplish as much as possible, track in-kind		
	Landowner & TRWG	Buy supplies for project – bid if necessary		
	Contractor or landowner	Start project		
	TRWG & partners	Landowner keep TRWG of project status		
		Project completed, inspect results		
	TRWG & partners	1 year later, project follow-up		
		- weed management in-progress		
		- part of TRWG tour if possible		
	TRWG & partners	2-3 year follow-up project inspection		
		- weed management review		
	TRWG & partners	7-8 year follow-up project inspection		
		- weed management review		

vs. #2 September 9, 2007

TRWG
GRANT FUNDS - PROJECTS
RANKING CRITERIA

	CRITERIA	YES	NO	COMMENTS
1	Does the project improve water quality?			
2	Does the project look at the “big” picture?			
3	Are there better resources to accomplish project?			
4	What is the total project cost?			
5	Is there appropriate landowner match?			
6	What is the cost-benefit ratio of the project?			
7	Is the project environmentally friendly?			
8	Weed management plan in place?			
9				

TETON RIVER WATERSHED GROUP WATER QUALITY DATA SHEET

STREAM RIVER:_____ STATION NAME:_____ DATE: ___/___/___

RECORDED BY: _____ TIME: _____

EQUIPMENT CALIBRATED: _____

COMMENTS ON READINGS

PH: _____

CONDUCTIVITY: _____

TURBIDITY: _____

DISSOLVED OXYGEN: _____ mg/2 _____%

WATER TEMPERATURE: _____ C _____ F

SALINITY: _____

AIR TEMPERATURE: _____ C _____ F

FLOW: CHOTEAU: _____ CFS LOMA: _____ CFS

PICTURES:

UPSTREAM	Y	N
DOWNSTREAM	Y	N
AT MONITORING SITE	Y	N

OTHER PICTURES

VEGETATION COMMENTS:

WEATHER (STORMS, ETC) COMMENTS:

VISUAL CHANGES AT SITE:

APPENDIX 3

Key Contact Information

Teton River Watershed Group - Cliff Heuscher, President, 466-5584
Web Link
Coordinator - Alan Rollo, 727-4437; arollo7@msn.com

US Department of Geological Survey
Web Link
Phone

Teton County Weed District - Paul Wick, 466-2155

Teton County Conservation District - John Finch, 466-5722 x103

Teton County Extension Agent - Mark Major, 466-2491

Chouteau County Weed District - Craig Ferris, 622-5824

Chouteau County Conservation District - Sonia Sylvan, 622-5627 x101

Chouteau County Extension Agent -

COPY

Assessment and Characterization of the Teton River Corridor

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JAN 28 2008
DEQ
Planning Division

December, 1998

Ted Hawn, District Conservationist
U.S. Natural Resource Conservation Service
Lewistown, Montana

Warren Kellogg, Watershed Specialist
U.S. Natural Resource Conservation Service
Helena, Montana

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ACKNOWLEDGEMENTS:

This report is possible due to the contributions of many individuals. Ted Hawn, District Conservationist, NRCS, Lewistown, Montana; Warren Kellogg, Watershed Specialist, U.S. Natural Resources Conservation Services, Helena, Montana; Steve Henry, Ecologist/GIS Specialist U.S. Fish and Wildlife Service, Charles M. Russell National Wildlife Refuge, Lewistown, Montana were flight personnel and assisted in writing and editing the report. In addition, Steve developed the tables, bar graphs and maps for this Report. Central Air Service of Lewistown provided the helicopter for the flight. Allan Rollo, Teton River Watershed Coordinator and NRCS staff from the Fort Benton and Choteau field office provided guidance and direction for the overall scope of the Project. Finally, Shonny Nordlund, Fergus County Conservation District assisted in completing the text. Thanks to all for their contributions on this project.

INTRODUCTION:

Assessments are necessary to provide reliable information on the condition of, and threats to watershed health. This assessment and characterization of the Teton River Corridor provides a general overview of the condition of the major streams in the watershed and associated floodplains. The use of this assessment and characterization, through voluntary watershed planning and implementation provides an opportunity for citizen involvement and action.
This assessment is intended to help local people prioritize and focus on reaches of most concern. Through a collaborative effort, local citizens, businesses, groups, private landowners, and goverment agencies can work together to implement changes that improve watershed health.
While this assessment and characterization provides a general overview, site specific planning is necessary to provide greater levels of detail. This assessment is designed to use as the starting point for ground-based follow-up and prioritization.

Extensive research has documented that watershed health is strongly related to healthy riparian areas and stable natural stream channels. Healthy riparian areas protect and stabilize streambanks, preserve water quality, provide for water storage and are important aquatic and terrestrial habitat. Riparian vegetation protects and stabilizes streambanks, while filtering sediments and reducing flood damage. The relationship of healthy riparian areas to natural stable stream channels and water quality cannot be overstated. The quality of our water directly correlates to the condition of our streams and riparian areas. This assessment will assist the local citizens in developing strategies to improve and protect these vital natural resources and to quickly narrow down a watershed by identifying reaches to focus on, thereby increasing the effectiveness of management actions.

Methodology

Data was collected using the "Rapid Aerial Assessment" approach. A Bell Jet Ranger helicopter was used with 4 crew members: a pilot, two spotters, and a "mapper" who operated the GPS Unit.
Flights occurred on July 14, 1998 and October 7 & 8, 1998. Total flight time was approximately 11.5 hours at $575/hr, which includes expenses for a fuel truck and ferry time. Air speed varied between 20-60 mph dependent upon the number and extent of features present within any given reach. Altitude was typically 200-300' above ground level.

A Trimble Pathfinder Pro XL GPS receiver was used for mapping. A data dictionary was created prior to the assessment in consultation with Teton River Basin Resource Group and NRCS field staff. Features were mapped as either points or arc segments using a 1 second logging interval. GPS data was differentially corrected using PathFinder Office 2.02 to an accuracy of 3-5 meters.

Although infestations of noxious weeds are a key issue in the Basin, there was no attempt made to map them in this flight.

Documented features were based upon the visual observations of the spotters in the helicopter. Features recorded included:

1. Point Features
   * Stream Crossings - bridges, including railroad trestles.
   * Dump Sites
   * Headcuts -active downcutting on side coulees.
   * Car Bodies
   * Confined Animal Feeding Operations - corrals, feedlots, etc. along the stream.
   * Irrigation Diversions/Instream Structures
   * Irrigation Pump Sites
   * Irrigation Return Flow Sites
   * Rock Riprap

2. Arc Segments
   * Flight Path - Route flown by the helicopter
   * Bank Erosion - Active erosion of stream banks within the floodplain.
   * Mass Bank Sloughing - Natural sloughing of high terraces/banks along the sides of the valley.
   * Unhealthy Riparian - Low density and diversity of riparian species and age indicating an apparent downward trend in condition and function.
   * Aggraded Channel - Channel reaches characterized by an excess of bedload causing an increase in the elevation of the stream channel.
   * Channelized Channel - Man-induced straightening and downcutting of the stream channel.

Data analysis was performed using Arc/Info NT 7.1-1, PC Arc/Info 3.5.1 and ArcView v3.0. Features have been plotted on hydrographic base maps. Seven feature maps were produced that includes:

- Flight Path
- Bank Erosion/Mass Bank Sloughing/Channelized Reaches
- Unhealthy Riparian
- Irrigation Features
- Selected Point Features
- Aggraded Channel
- Composite Map - Cumulative Features

Data tables, bar graphs, and pie charts were also developed to summarize and display the data collected.

GENERAL DESCRIPTION:

The Teton River- Marias Confluence to Choteau

The Teton river from the its confluence at the Missouri river near Fort Benton to the community of Choteau is characterized by a vertically entrenched channel with active streambank erosion on almost all the meander bends. This results in a high volume of sediment for the stream to transport. Midstream deposition in the lower stream reaches is causing split and in some locations braided channels. Low flow conditions aggravate the sediment transport problem. In addition to vertical entrenchment of the stream with 5' to 10 ' high streambanks, there is active lateral channel movement characterized by active erosion on almost all meander bends. The enormous volume of bank erosion is probably not technically or economically feasible to treat. The rate of erosion of these streambanks is very high.

In some stream reaches, there are cropfields up to the immediate edge of the streambank contributing to bank erosion and hindering riparian vegetation establishment. In addition, riparian conditions are unhealthy on many of the rangeland and pasture areas. One area in the upper Teton near Choteau is devoid of riparian woody vegetation.

There are a number of intermittent confluences with active headcuts. The maps will show these locations. These are unstable sites that are an additional source of sediment to the system.

It is apparent that past historic flood events have affected the mainstem Teton River. Channel adjustments resulting in channel instability occur both from sediment deposition and

from scouring, causing entrenchment. It is beyond the scope of this assessment to determine the magnitude and effect of the past flood events.

The Teton River-from Choteau to the Rocky Mountain Front

The upper Teton river above the community of Choteau is characterized by a channelized reach just above the townsite. There are also numerous reaches of aggraded and braided (multiple) channel from the channelized reach to the Bynum Diversion. The Restoration Concepts for the Teton River 12/92 by renowned hydrologist and Stream Restoration Expert Dave Rosgen discussed that the Bynum diversion is the most significant site causing channel instability. Additionally, there are numerous other irrigation diversions which cumulatively are having an impact on channel stability. The significant reaches of aggraded channels will most likely continue to cause lateral channel movement and new channel development. Because of the extensive nature of the aggraded channels, it may be difficult and expensive to treat. The large expanse of floodplain in the aggraded reach that currently does not have active homesite development is beneficial, because the aggraded channel causes out of bank flows necessitating a very wide floodplain for potential flood events.

Riparian conditions above Choteau to the Rocky Mountain Front are generally in good condition. Unhealthy riparian sites were observed just about the community of Choteau adjacent to the channelized reach. Above the channelized reach, riparian conditions improve to the Rocky Mountain Front Area.

The headwaters reaches of the Teton river in the Rocky Mountain Front Area are in good condition and provide many of the values associated with a properly functioning stream and riparian area. There is a fair amount of homesite development that could eventually impact this area. Preserving the stream and associated floodplain in this area could help maintain the integrity of the river in these headwaters.

Deep Creek/Willow Creek

Deep Creek and Willow Creek are perennial foothill streams that originate in the mountains of the Rocky Mountain Front, flowing east. Willow Creek joins Deep Creek about 8 miles southwest of Choteau. Deep Creek then continues to flow east before entering the Teton River immediately south of Choteau.

The lower reach of Deep Creek, below its confluence with Willow Creek, has the most disturbance. A high percentage of this reach is characterized by an unhealthy riparian zone, unstable streambanks, and late summer dewatering. There were 8 irrigation diversions mapped on Deep Creek, mostly on this lower end. Nearly 35% of the Deep Creek channel has some degree of bank erosion occurring, mostly on the outside bends.

The upstream reaches of both Willow Creek and Deep Creek, as you near the Front, have relatively fewer disturbances associated with them and are in generally good to excellent condition.

Muddy Creek

Muddy Creek flows east out of the Rocky Mountain Front west of Bynum as a cold-water foothill stream. Soon after it crosses under Highway 89 outside of Bynum, it transitions into more of a warm-water prairie stream. Muddy Creek enters the Teton River approximately 1 mile west of Interstate 15 near the community of Collins.

The upper reaches of Muddy Creek, above the Bynum Reservoir in-flow, is in good to excellent condition. There is very little bank erosion and the riparian vegetation is in excellent shape. From the Bynum Reservoir in-flow downstream to Highway 89, impacts from the increased Bynum Reservoir flows appear to be creating more occurrences of bank erosion and some salt accumulation.

About five miles east of Highway 89, the irrigation system take-out structures end. From this point on, Muddy Creek flows another 25-30 miles before joining with the Teton River. The lower end of Muddy Creek is heavily impacted through extensive bank erosion, increased salt accumulation, and unhealthy riparian plant communities on nearly the entire lower reach.

CONSIDERATIONS FOR FUTURE ACTION:

The Rapid Aerial Assessment shows that the Teton River Corridor has several significant issues. Resource planning strategies can be developed to address these issues and improve overall watershed health. The Teton River Basin is a large watershed; the following considerations are intended to help local citizens prioritize and focus their efforts on voluntary measures.

- Streambank erosion on the Teton River is a big problem, but it is economical to only treat sites where high value property is in jeopardy (houses, roads, pump sites, etc). Stream bank erosion sites identified on the tributaries (Deep, Willow, and Muddy Creeks) should be prioritized and treatment alternatives developed.

- The development of a comprehensive riparian management strategy should be considered as a high priority. An experienced Range Conservationist could be dedicated to this watershed to work with landowners in developing and implementing this strategy. Such a strategy should include the establishment of riparian buffer zones and re-vegetation where appropriate.

  Suggested targets: Lower reaches of deep Creek
  Teton River below Choteau
  Muddy Creek below the Bynum in-flow

- Improving existing irrigation diversions, conveyance system infrastructure, and on-farm irrigation practices should be considered a high priority to minimize de-watering, salinization, and enhanced flows to the streams. More on-site inventory and planning needs to occur to work on those issues.

  Suggested targets: Bynum Irrigation District
  Upper Teton River
  Upper Muddy Creek

- There are a number of intermittent and ephemeral coulees on the lower end of the Teton River mainstem that have active headcuts that are actively moving up these coulees. These sites should have

a more comprehensive on-site investigation to determine priorities and develop alternative treatment methods.

- The aggraded section of the Teton River above Choteau is a difficult and expensive problem. Designing in-stream structures to be more compatible with this high bedload reach will help. This type of channel requires a wide floodplain. Any future development in this floodplain could be adversely affected by floodwaters and should be carefully reviewed.

- Cultivated cropland immediately adjacent to the channel is creating bank erosion and contributing large amounts of sediment to portions of the Teton River mainstem between Choteau and the Marias River. An active buffer initiative would address this issue.

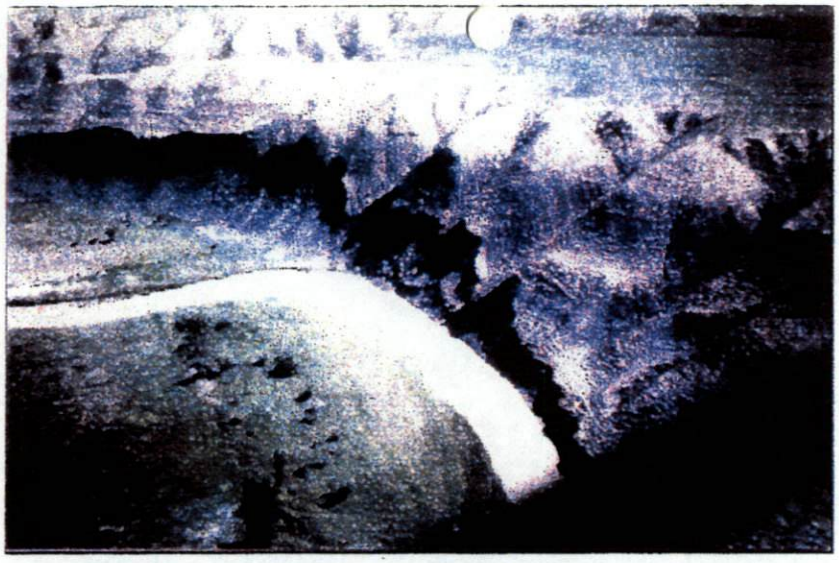
- Wildlife were readily observed during the assessment. Large populations of whitetail deer, ringneck pheasants, owls, raptors, beaver, and various species of waterfowl were seen. These streams serve as important wildlife corridors and there is a good opportunity to further improve habitat along all streams in the watershed.

- Extensive salinization was observed on the middle reaches of the Teton River and the lower half of Muddy Creek. An active long-term saline seep effort targeting both irrigated and dryland cropland in this region of the watershed would help reclaim this salinized land.

- Develop a comprehensive information/education/outreach program that addresses stream integrity, riparian management, and irrigation water management. Demonstration projects could be an important component of this program.

- Initiate a long-term monitoring plan that provides the local citizens with baseline and trend information on the natural resources throughout the watershed. This monitoring plan might include water quality sampling, permanent channel cross-sections, photopoints, and riparian transects and follow-up aerial assessments.

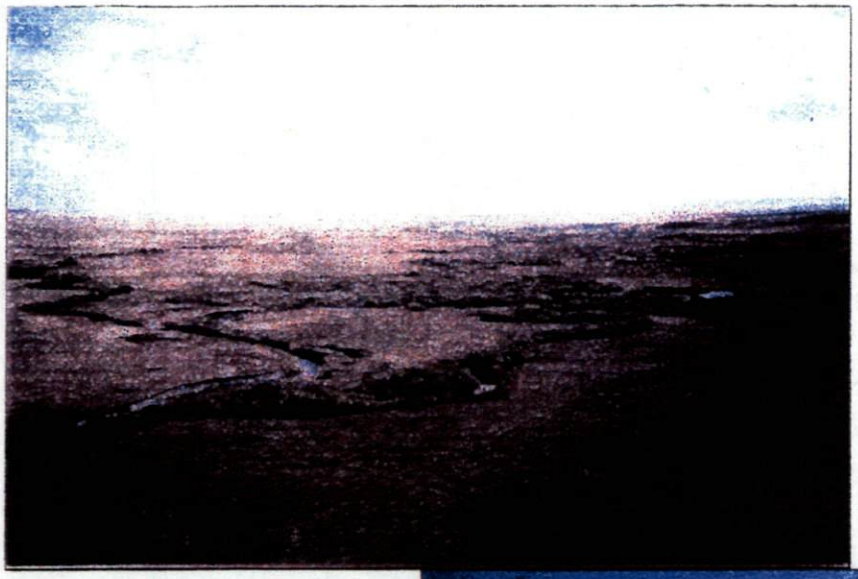
- Since the Teton River Watershed is so large and complex, breaking the watershed up into sub-watersheds may help the overall planning process. It is suggested that the Willow/Deep Creek sub-watershed be targeted for planning. The sub-watershed is small enough and assuming the local landowners are willing, treatment of the problems in this sub-watershed could be effectively and economically accomplished.



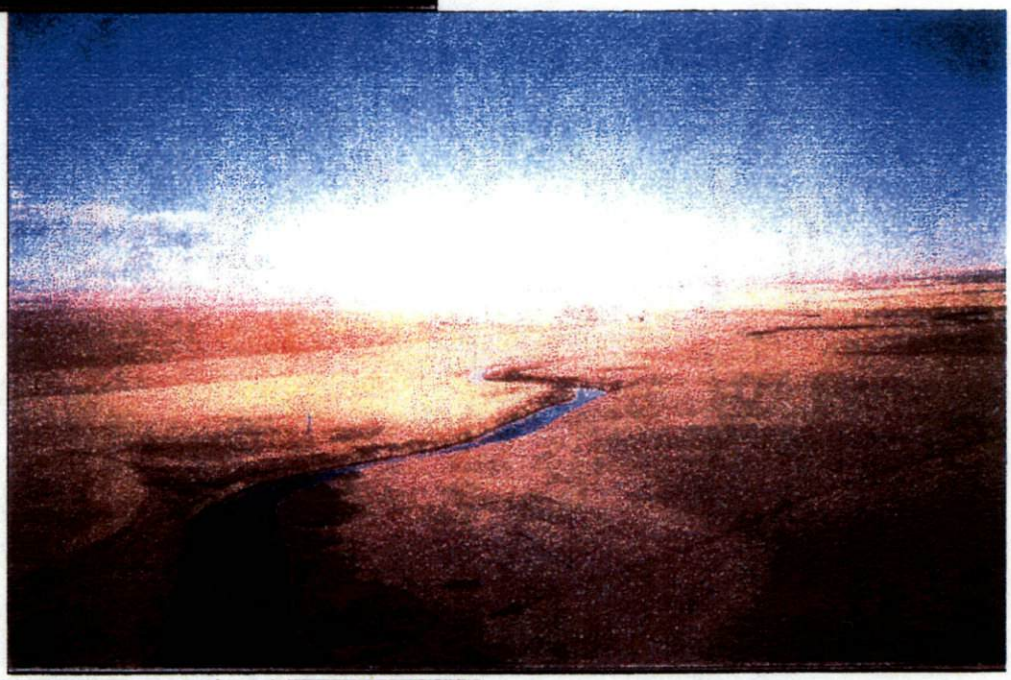
View of Mass Bank Sloughing on the Teton River

View of Teton River Valley below Choteau

View of Streambank Erosion on the Teton River

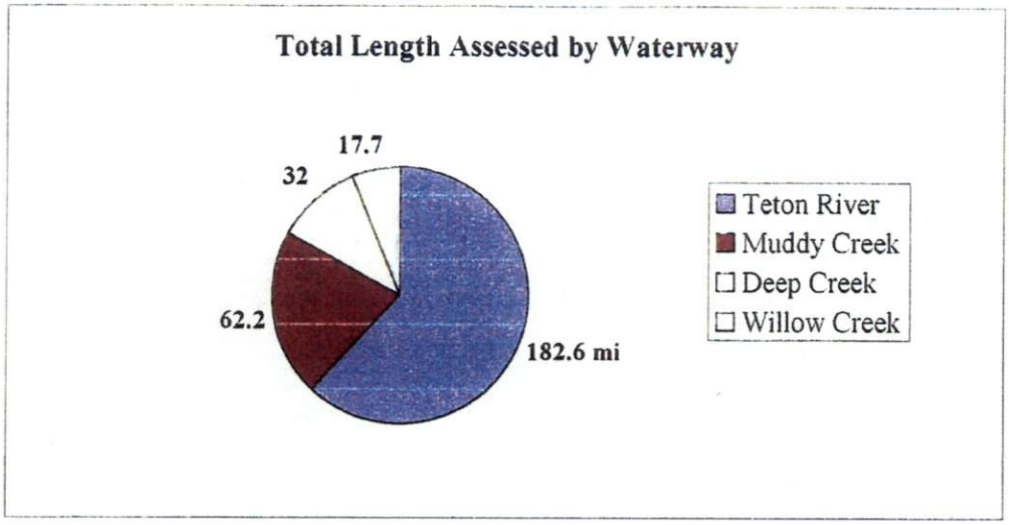


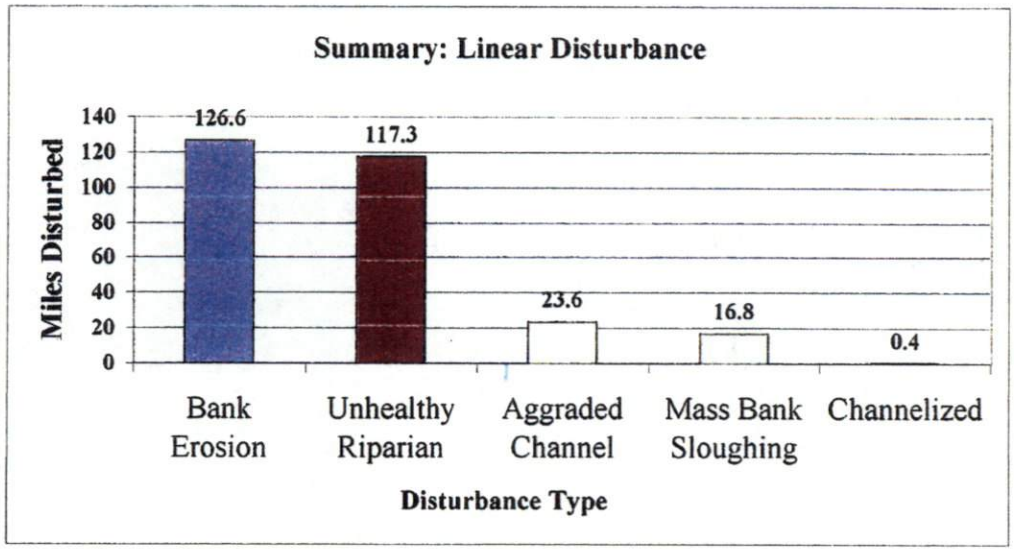
View of Willow Creek
above Choteau

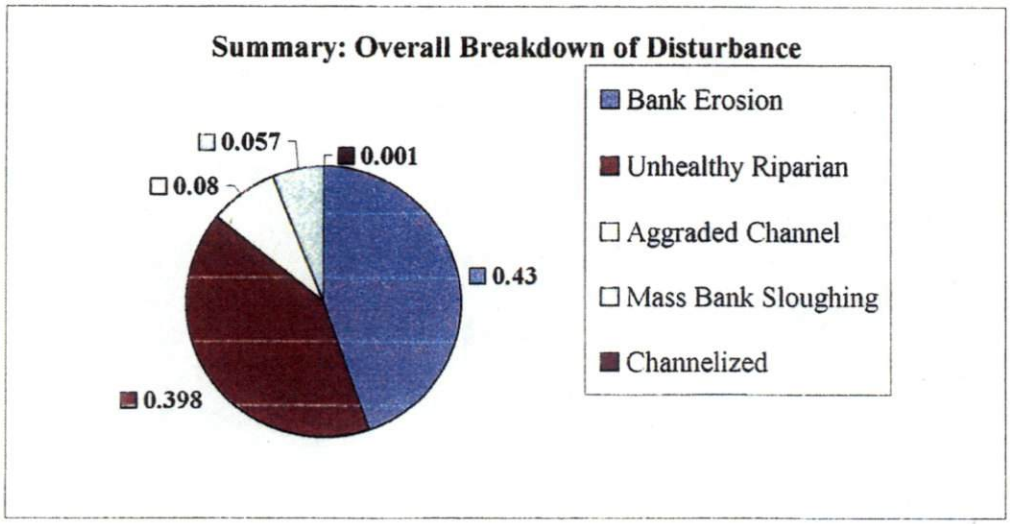


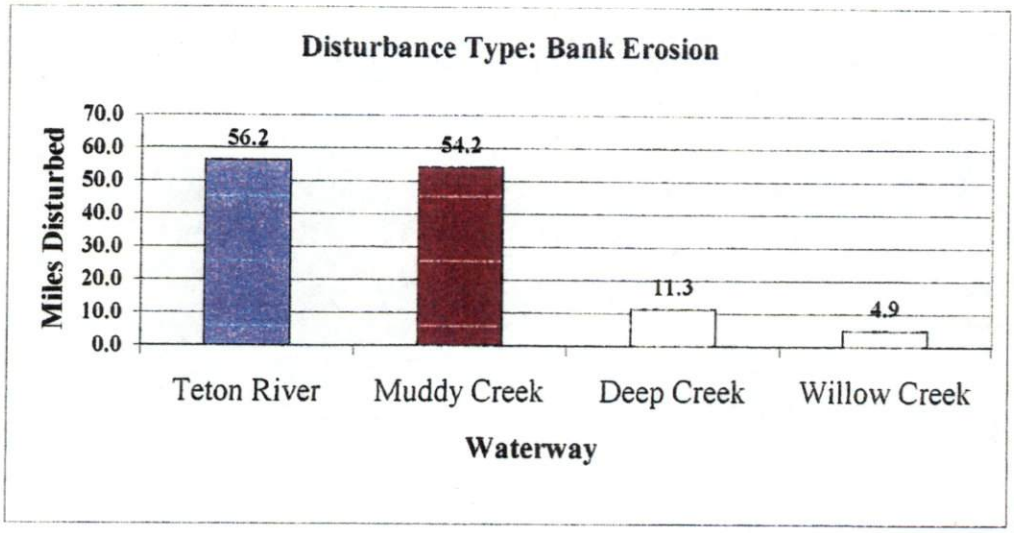
View of Muddy Creek
below Hwy 89

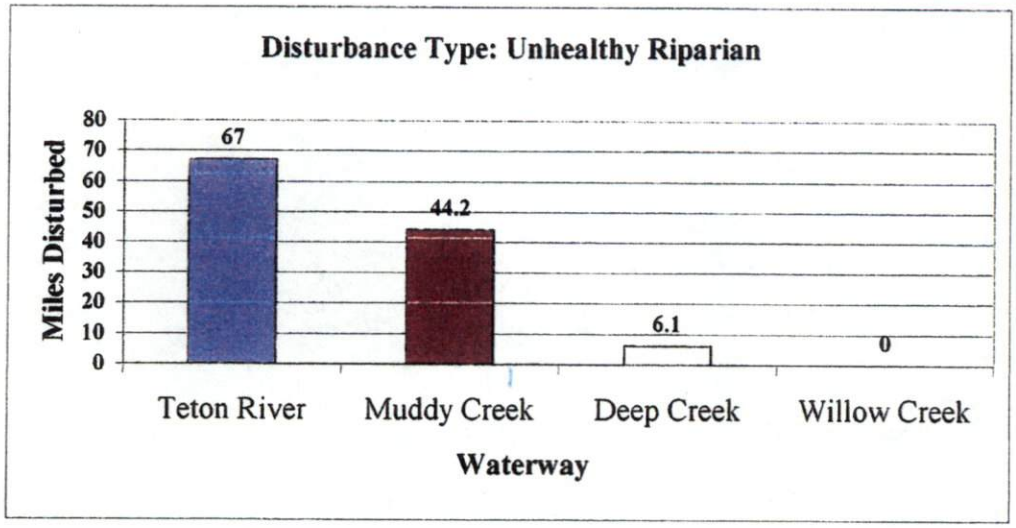
View of active headcut on
ephemeral coulee

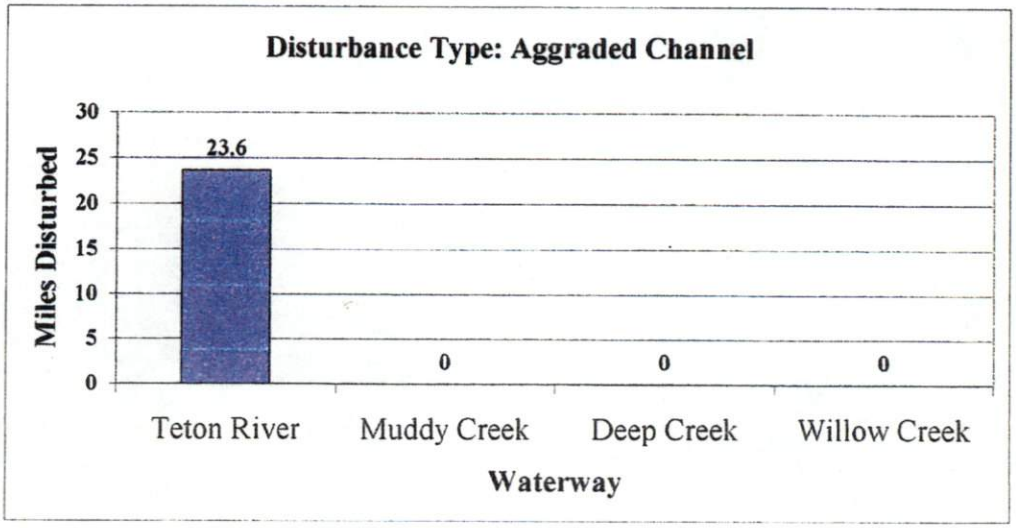

Total Length Assessed by Waterway
17.7
32
62.2
182.6 mi
Teton River
Muddy Creek
Deep Creek
Willow Creek

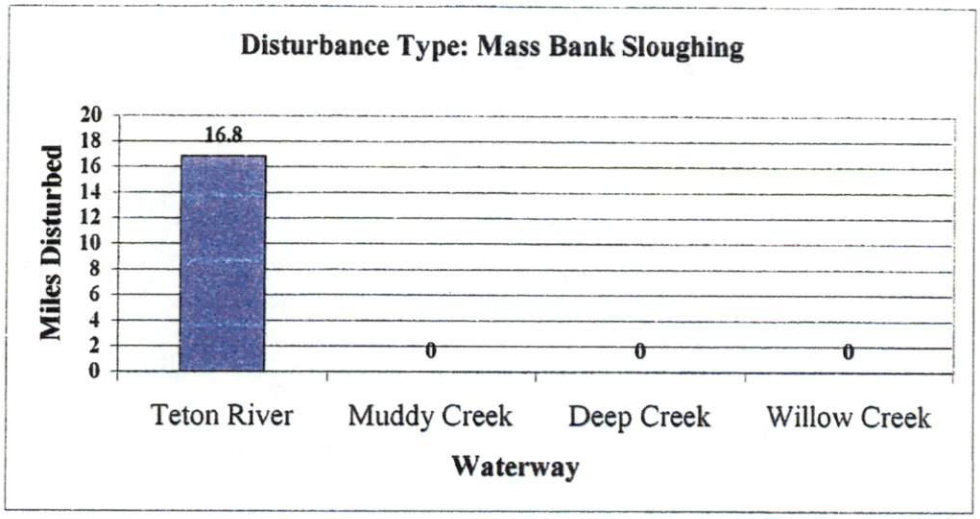

Summary: Linear Disturbance
Miles Disturbed
140
120
100
80
60
40
20
0
126.6
117.3
23.6
16.8
0.4
Bank Erosion
Unhealthy Riparian
Aggraded Channel
Mass Bank Sloughing
Channelized
Disturbance Type

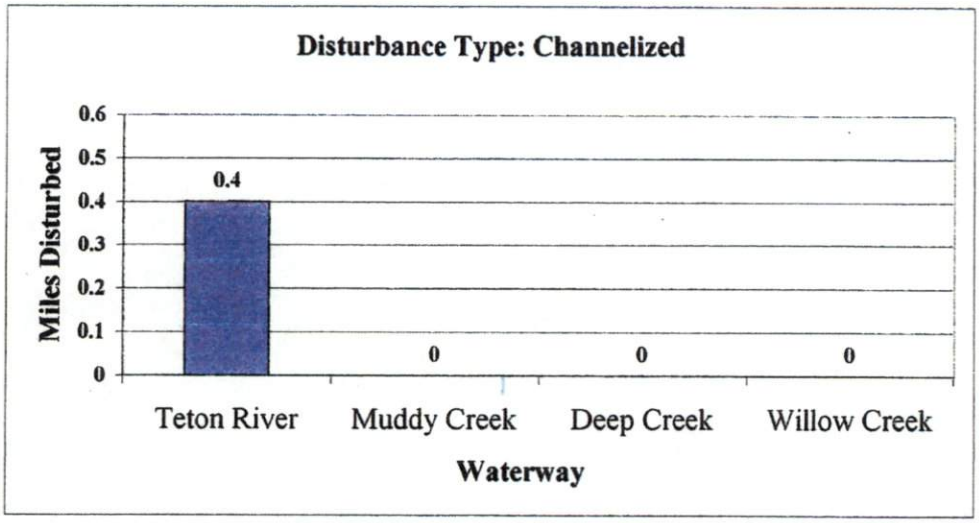

Summary: Overall Breakdown of Disturbance
0.057
0.001
0.08
0.43
0.398
Bank Erosion
Unhealthy Riparian
Aggraded Channel
Mass Bank Sloughing
Channelized

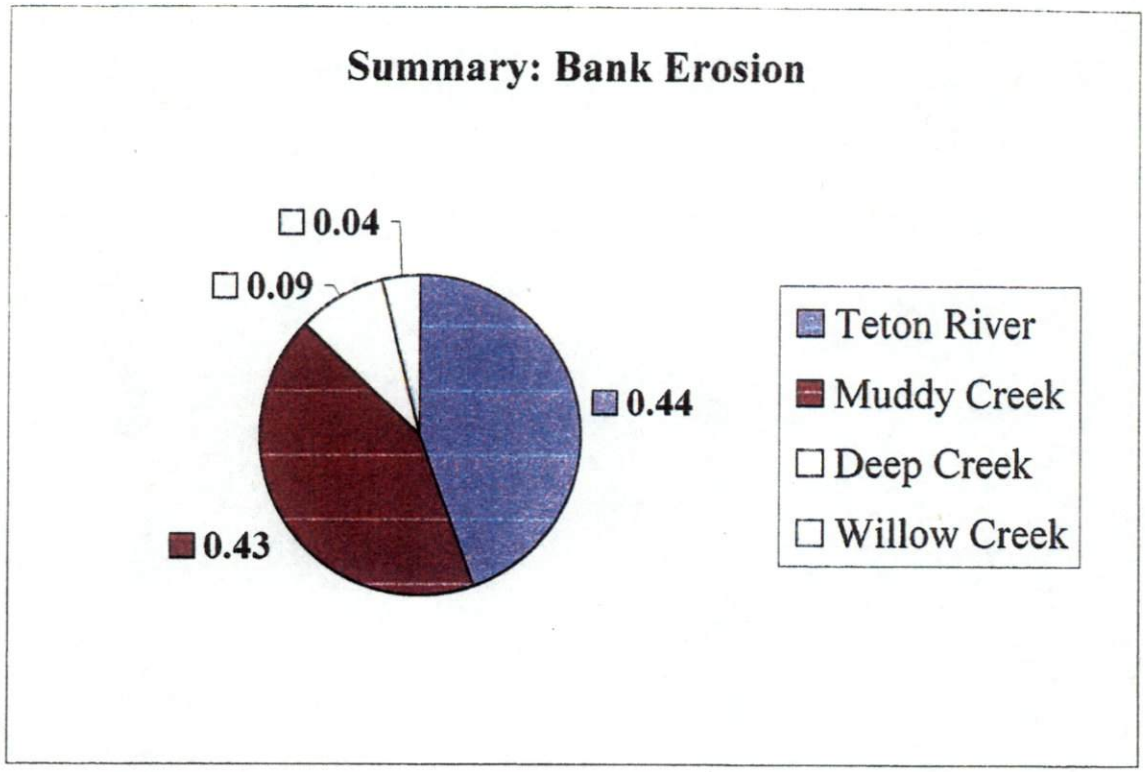

Disturbance Type: Bank Erosion
Miles Disturbed
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
56.2
54.2
11.3
4.9
Teton River
Muddy Creek
Deep Creek
Willow Creek
Waterway

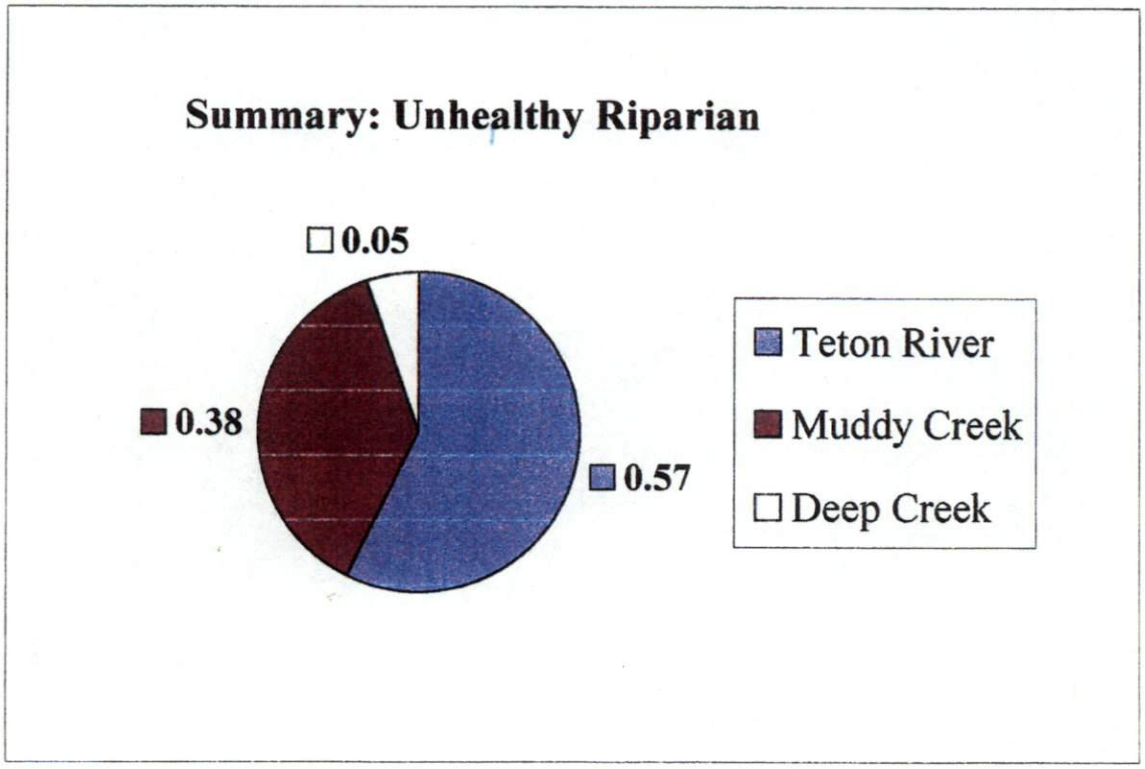

Disturbance Type: Unhealthy Riparian
Miles Disturbed
80
70
60
50
40
30
20
10
0
67
44.2
6.1
0
Teton River
Muddy Creek
Deep Creek
Willow Creek
Waterway

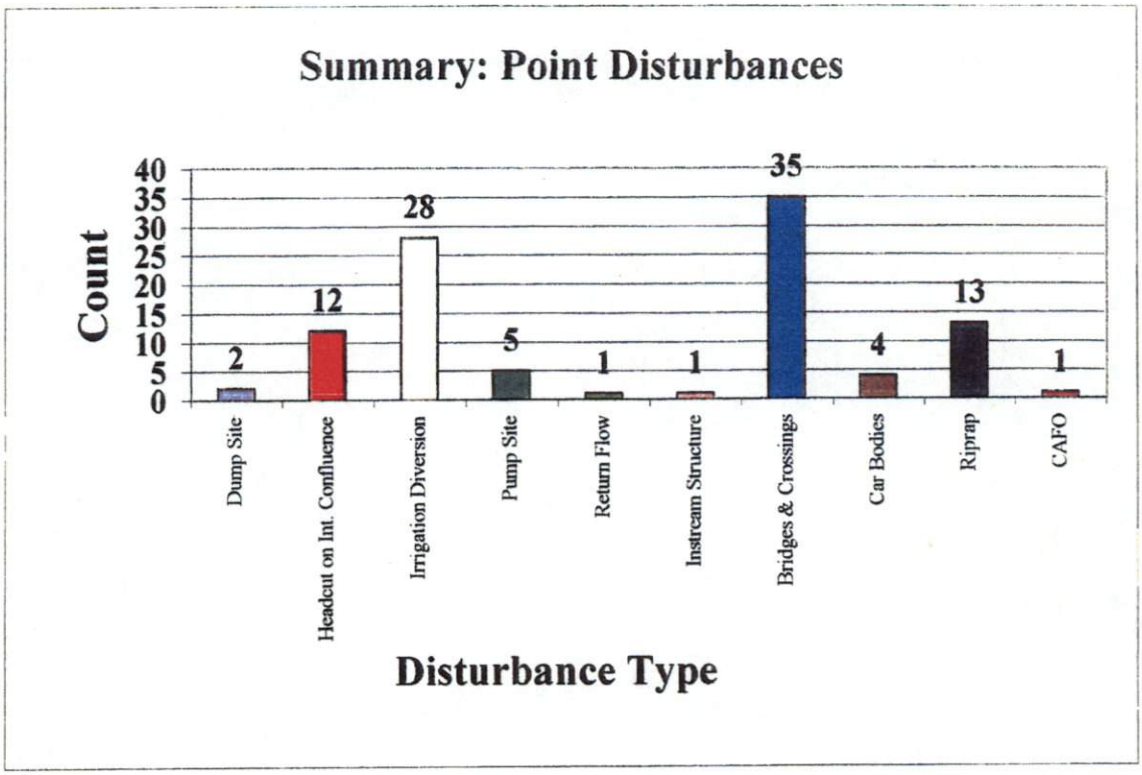

Disturbance Type: Aggraded Channel
Miles Disturbed
30
25
20
15
10
5
0
23.6
0
0
0
Teton River
Muddy Creek
Deep Creek
Willow Creek
Waterway

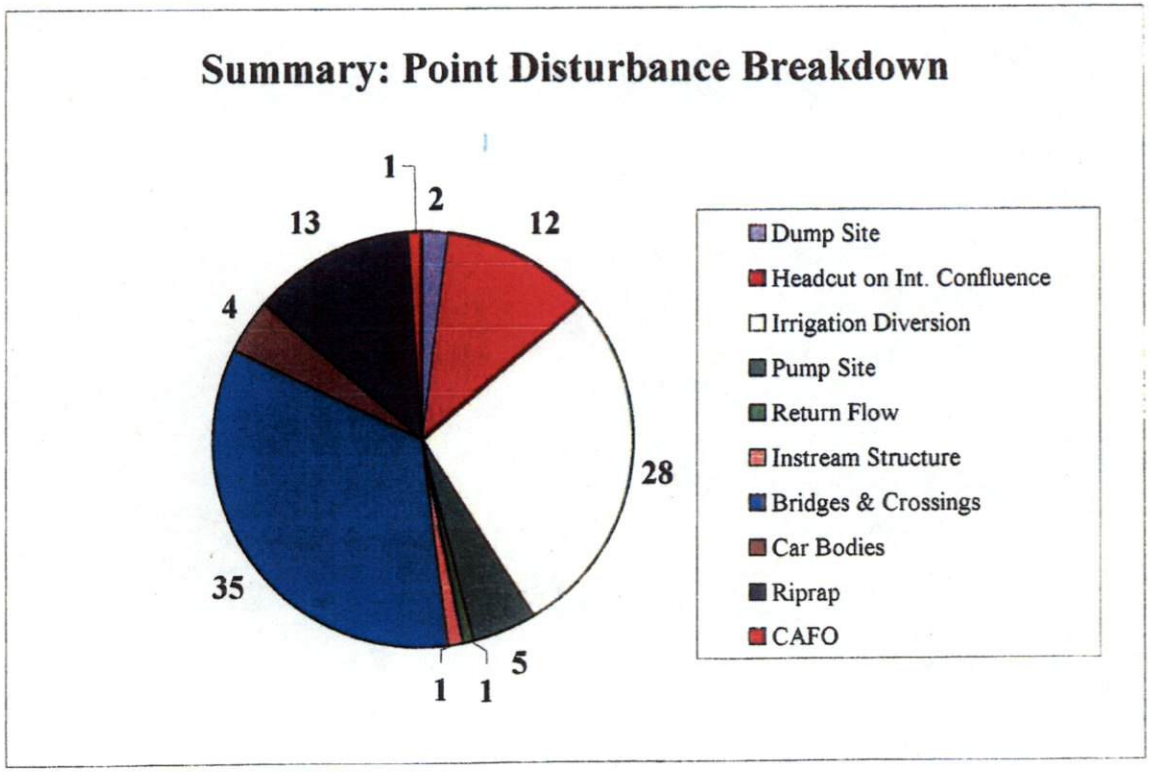

Disturbance Type: Mass Bank Sloughing
Miles Disturbed
20
18
16
14
12
10
8
6
4
2
0
16.8
0
0
0
Teton River
Muddy Creek
Deep Creek
Willow Creek
Waterway


Disturbance Type: Channelized
Miles Disturbed
0.6
0.5
0.4
0.3
0.2
0.1
0
0.4
0
0
0
Teton River
Muddy Creek
Deep Creek
Willow Creek
Waterway


Summary: Bank Erosion
0.04
0.09
0.44
0.43
Teton River
Muddy Creek
Deep Creek
Willow Creek


Summary: Unhealthy Riparian
0.05
0.38
0.57
Teton River
Muddy Creek
Deep Creek


Summary: Point Disturbances
Count
40
35
30
25
20
15
10
5
0
2
12
28
5
1
1
35
4
13
1
Dump Site
Headcut on Int. Confluence
Irrigation Diversion
Pump Site
Return Flow
Instream Structure
Bridges & Crossings
Car Bodies
Riprap
CAFO
Disturbance Type


Summary: Point Disturbance Breakdown
1
2
12
28
5
1
1
35
4
13
Dump Site
Headcut on Int. Confluence
Irrigation Diversion
Pump Site
Return Flow
Instream Structure
Bridges & Crossings
Car Bodies
Riprap
CAFO