Clean Water Act Section 319 Non Point Source Pollution Control Program

Watershed Project Final Report

Upper Bear River

By

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This project was conducted in cooperation with the State of Utah and the United States Environmental Protection Agency, Region 8.

(FY 08)UDAF Contract # 09-1061 UACD Job # 706 and

(FY 09)UDWQ Contract# 13-6005 UACD Job # 119-09

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EXECUTIVE SUMMARY

Project Title:	*Upper Bear River*		
Start Date:	June 1, 1999	**Completion Date:**	January, 12 2010
Funding:		**FY 08 Budget:**	**30,000.00**
		On-The-Ground:	22,300.00
		Information Education:	3,500.00
		Tracking:	3,000.00
		Technical Assistance/Admin	1,200.00
		Total Expenditures of EPA funds:	**30,000.00**
		Total 319 Match Accrued:	$30,666.67
		Total Expenditures:	$60,666.67
		FY 09 Budget:	**153,140.00**
		On-The-Ground:	115,800.00
		Information Education:	2,000.00
		Tracking:	0.0
		Technical Assistance/Admin	35,340
		Total Expenditures of EPA funds:	**153,140.00**
		Total 319 Match Accrued:	84,131.46
		Total Expenditures:	237,271.46
		Total expenditures of EPA funds (Grants FY 08 + FY 09):	183,140.00
		Total 319 Match Accrued (Grants FY 08 +FY 09):	114,798.13
		Total Expenditures (Grants FY 08 +FY 09):	297,938.13

Summary of Accomplishments

Watershed improvement projects in the Upper Bear River region began in June 1999 and are still in progress. To date the Upper Bear Watershed Project has received $460,473.00 in section 319 funds and has obligated most all of these funds to individual contracts. This document will report specifically on the FY 08 funding used along with match funds and resources to accomplish a wide range of objectives that have been set to improve the water quality of the Upper Bear River Watershed.

The primary goals of projects in the Upper Bear Watershed have been to stabilize large segments of eroded stream bank and reduce sediment and nutrient loading to waterways by:

- relocating animal feeding operations
- reducing the effects of livestock on riparian areas
- restricting access to stream banks with livestock exclusion fencing
- re-vegetating critical riparian areas
- informing and educating the community about non-point source pollution and the importance of maintaining and improving water quality within the watershed

Most projects in the Upper Bear Watershed have focused on removing livestock from stream banks by installing livestock exclusion fence and developing off stream water sources with frost free troughs, pumping plants and pipeline. The installation of livestock exclusion fence has reduced bank trampling and unregulated grazing while new watering sites have allowed cooperators to relocate animals away from waterways and implement grazing management plans that help with more uniform grazing and dispersion away from sensitive riparian areas.

The Bear River corridor provides great habitat for many wildlife species. Through implementation of planned BMP's much of this habitat can be maintained and enhanced along with water quality. Planned tree and shrub plantings along the Upper Bear should improve the condition of the riparian corridor and enhance its value as wildlife habitat by improving nesting and cover areas. In some areas re-vegetation has been unnecessary with natural re-growth occurring after livestock were removed from the stream bank. To date, the main educational and information efforts have been project tours in the area, brochures highlighting the availability of financial assistance, a full color poster explaining the benefits of water quality improvement projects, water fair, watershed tours, and newsletters.

The BMPs that have been installed and completed have covered a wide variety of water quality improvement areas like stream bank stabilization, animal waste systems and livestock management around open water and riparian areas on the Bear River corridor and upland ranges. To date FY 08 and FY 09 319 monies have helped implement 20 projects that were comprised of a variety of BMP's. The BMP's implemented were commonly fence, both pasture and corral, pipelines, troughs, pumping stations, storage tank, water well, filter strip, grazing management, concentrated nutrient management, bank/channel stabilization, willow plantings, juniper removal and range seedings. These are all very common and effective practices for the Upper Bear River Watershed. More details on each project site and the BMP's implement are found in later sections of the report.

1.0 INTRODUCTION

The Bear River heads in the Uinta Mountains in Northeastern Utah and then flows north into Wyoming. It crosses into Utah and back into Wyoming before entering Idaho, northeast of Bear Lake. The Rainbow Canal links the Bear River and Bear Lake. Three-fourths of the annual flow of the Upper Bear (about 300,000 acre-feet) is diverted into Bear Lake for storage and is later release. Please refer to the Lower Bear River Water Quality Plan, (ERI, Nov. 1995) for more detailed information.

1.1 Map

Upper Bear River Watershed 319 Projects
FY-08 Contract # 09-1061
FY-09 Contract# 13-6005

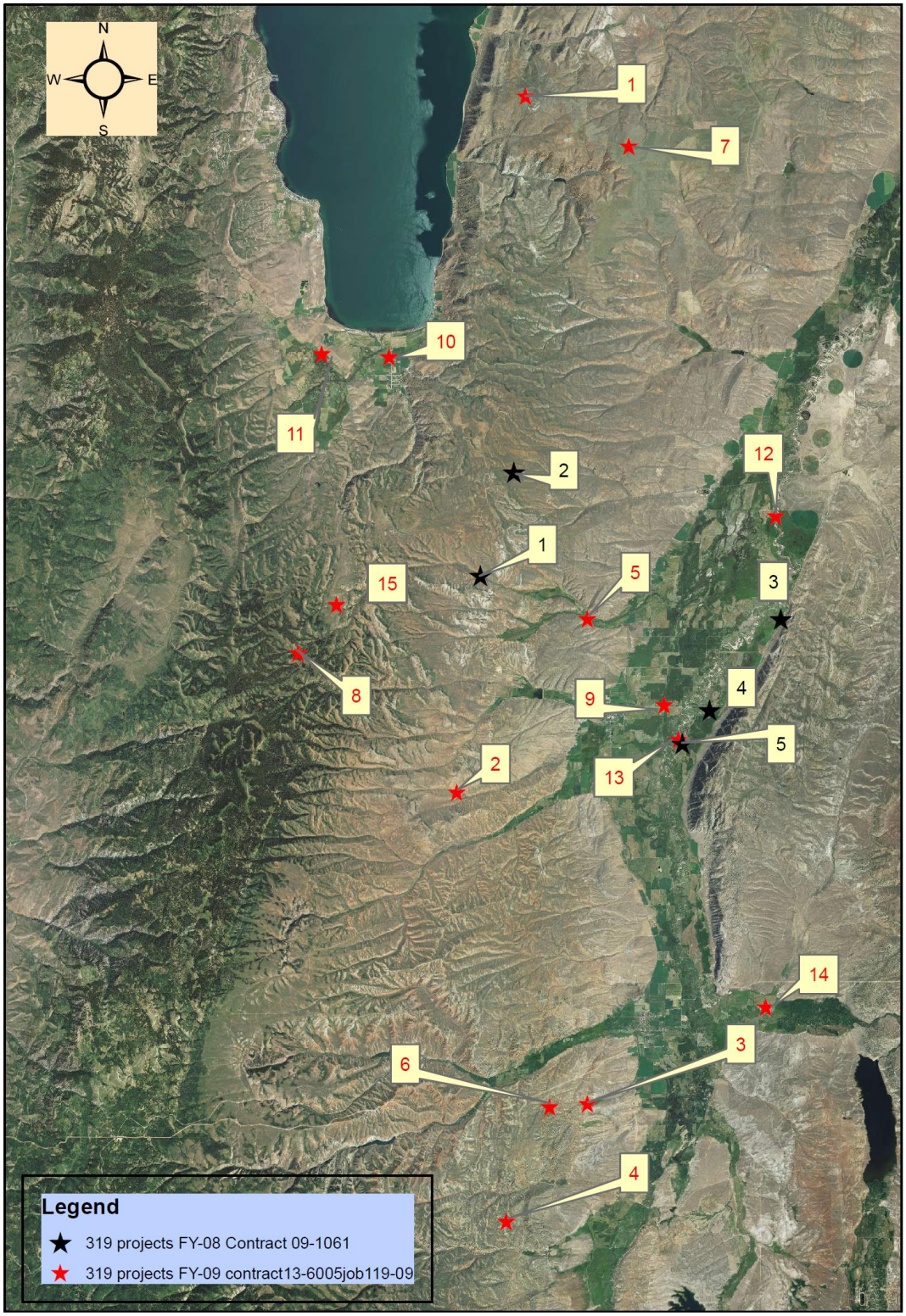


Table 1: FY 08 319 Project Descriptions By Star #

1	This project is located west of Randolph on upland grazed range. The contract was with a local grazing association. The objective was to improve riparian health and water quality by implementing a grazing management plan. To accomplish this approximately 3,333ft of barbed wire pasture division fence has been installed. The effected acres of this fence is approximately 7,033. The grazing management will help improve the water quality of Otter Creek at the headwaters. It will also help to improve riparian health in the affected area. Total 319 funds spent: $8,073.28. Total cooperator match $5,382.19.
2	This project is located north west of Randolph on an upland grazed range. The project consists of a prescribed grazing management plan, 22,100 ft of pipeline, a storage tank, pumping plant and 6 trough sites providing water along ridge tops which will pull livestock pressure off of critical riparian areas. The water system will also help disperse livestock grazing. Also a pasture system has been implemented to provide rest to each pasture after it has been grazed and making it so each pasture will be grazed at a different time of the year each grazing season. This will provide for needed rest to riparian zones which should help improve water quality in Duck Creek. Total 319 funds spent: $6,735.15. Total cooperator match $4,490.10.
3	This project is located approximately six miles north of Randolph on the east side of the Bear River. The purpose of this project was to improve water quality by building a fence to exclude livestock from accessing the Bear River and installing off site troughs for livestock water. The 319 funds paid on this project were for the fence that was built along the river. There was 2000ft of fence installed. The rest of the project was implemented with EQIP funds through the NRCS. Total 319 funds spent: $693.00. Total Match: $462.00
4	This project is located north and east of Randolph along the east side of the Bear River. Offsite water troughs were installed and 3320 feet of fence was constructed to assist with a grazing management plan and to exclude cattle from the river. Total 319 funds spent: $4,871.35. Total cooperator match $3,247.56
5	This project is located north and east of Randolph along the east side of the Bear River. A water well was drilled and offsite water troughs were installed and 228 feet of fence was constructed to assist with a grazing management plan and to exclude cattle from the river. Total 319 funds spent: $1,927.22. Total cooperator match $1,284.81.

Table 2: FY 09 319 Project Descriptions By Star #

1	This is an upland range project on Black Mountain east of Bear Lake. The purpose of this project was to improve grazing distribution by installing a livestock watering system. The watering system includes a spring development in which the spring and riparian area around the spring have been fenced to exclude livestock, the water is collected and put into a pipeline

	that services 6 1000 gallon troughs and one 17000 gallon storage tank. There is approximately 13840 feet of pipeline installed. The spring collection is designed in a way that once the water system is full the spring collection box will fill and spill out across the natural riparian area. This system will improve water quality by reducing livestock pressures on riparian areas and will help with dispersing livestock across a greater area than before due to the lack of natural water resources in the area. Total 319 funds spent: $23,874.57 Total cooperator match: $15,916.38
2	This project is located on upland range west of Randolph. This contract was for a spring development and implementation of 30880ft of 2" pipe and 7 large tire troughs. . This water system will help with livestock distribution and will help pull cattle away from riparian areas. Also it is necessary to allow for adequate water supply when the grazing management on the allotment changes with the initiation of the Three Creeks project. There are approximately 5,560 affected acres by this water improvement project. Total 319 funds spent: $7,019.45 Total cooperator match: $4,679.63
3	This project is located south west of Woodruff. It was installed to help implement a grazing plan as well as range improvement practices and riparian area protection. The project consists of grazing management, brush and juniper treatments, range seeding, livestock watering system and riparian area protection. Total treated acres is160. Total area affected by the installed BMP's is 2100 acres. Total 319 funds spent: $2,059.73 Total cooperator match: $1,373.15
4	This project is located south west of Woodruff bordering Deseret Land and Livestock. The project was to improve water quality by reducing erosion and sediment loading by removing juniper on 85 acres and reseeding 25 acres of the least vegetated area. Total 319 funds spent: $12,959.48 Total cooperator match: $8,639.65
5	This project is located north west of Randolph on Otter Creek. The purpose of this project was to install a fish barrier needed for a Bonneville Cutthroat Trout restoration project being implemented by UDWR, Trout Unlimited, BLM and private landowners. This project is part of other work that has been taking place over the past few years to make fish passage up three branches of Otter Creek possible. Most of the work has occurred on private lands with some on BLM lands. Private landowner participation has been vital to the success of the project. Total 319 funds spent: $8,000.00 Total cooperator match: $5,333.34
6	This project is located south west of Woodruff. The purpose of this project is to increase vegetation and remove juniper to help reduce erosion and sediment loading. There were 108 acres of juniper removal and 175 acres of range seeding. Total 319 funds spent: $5,000.00 Total cooperator match: $3,333.33
7	This project is located on up land range east of Bear Lake. The project was to improve livestock water access and grazing distribution. A grazing management plan is also in place. The practices installed were: 6,196 ft of livestock water pipeline, 5 livestock water troughs, 1 20,000 gallon storage tank. Total 319 funds spent: $16,000.00 Total cooperator match: $10,666.67
8	This project is located west of Randolph. This money was used to purchase a storage tank with a capacity of 17,800 gallons of water. This is needed for the

	livestock water system that has been installed in preparations for the grazing management change that will be implemented with the Three Creeks project. Total 319 funds spent: $1,040.52 Total cooperator match: $693.68
9	This project is located east of the town of Randolph, west of the Bear River. The project consists of approximately 712 feet of fence. The purpose is to exclude livestock from the Sage Creek Canal and help with a grazing management plan. This will greatly reduce canal bank erosion and nutrient loading into the canal. Total 319 funds spent: $1,884.47 Total cooperator match: $1,256.31
10	This project is located south of Bear Lake and North of the town of Laketown. The purpose of the project is to restore a highly eroded canal bank located between Big Creek and the Canal. A fence was constructed and alternate water was provided to keep cattle out of the canal and off of the banks to reduce bank erosion and nutrient loading. Total 319 funds spent: $3,450.17 Total cooperator match: $2,300.11
11	This project is located south west of Bear Lake and west of Laketown Utah. The purpose of this project is to reduce nutrient loading into Big Creek by cattle during the spring months when there are higher levels of runoff. A fence has been constructed to keep cattle out of sloughs that drain into Big Creek. The fence keeps cattle on higher sage brush covered slopes. A filter strip has been left to help reduce sediment and nutrient loading that occurs with spring runoff. Total 319 funds spent: $4,086.00 Total cooperator match: $2,724.00
12	This project is located north of the town of Randolph where Otter Creek converges with the Bear River. The purpose of the project is to reduce nutrient and sediment loading into Otter Creek and the Bear River by fencing off a portion of Otter Creek and providing an alternate water source to livestock in the area. The project consists of a water well, pumping plant, water line and a trough. The trough will service both a pasture area and a feeding coral near the creek and the river. Total 319 funds spent: $4,794.00 Total cooperator match: $3,196.00
13	This is a channel stabilization project on the Bear River east of the town of Randolph Utah. Two J hooks were installed on the east side of the river channel to prevent further bank erosion that has been accelerating in recent years. Also a fence has been constructed along the river bank all along the landowners property to prevent livestock grazing and access to the river for water. The J hooks are approximately 130 ft long helping to stabilize nearly 300ft of river bank. This project will greatly reduce sediment loading and nutrient loading. Total 319 funds spent: $8,819.58 Total cooperator match: $5,877.72
14	This is a livestock watering system to provide water resources off of the Bear River east of Woodruff Utah. The project consists of approximately 2000ft of pipe and 2 large tire troughs and a pumping plant. The system services 800 to 1000 head of cattle from October to May. With the implementation of this water system the landowner was able to fence off access to the river and more effectively implement his winter grazing system. Water quality has been improved with the restricted access of cattle to the river reducing sediment and nutrient loading. Total 319 funds spent: $4,422.00 Total cooperator match: $2,948.00
15	This is an upland range project in the Otter Creek drainage area. Otter Creek is a tributary to the Bear River. The project consists of a water well, pumping

	plant, 37,624 feet of water pipeline, and 12 large tire troughs with a capacity of approximately 1000 to 1200 gallons of water. This system has been implemented to compliment an intensive management grazing system that is planned to be implemented in the next few years. It will also greatly increase grazing distribution of livestock and take grazing pressure off of the natural water resources in the area and riparian areas. This will be beneficial to water quality as riparian zones improve and sediment and nutrients loading into Otter Creek is greatly reduced. Total 319 funds spent: $10,632.60 Total cooperator match: $7,088.40

Land use in the Bear River Watershed is dominated by agriculture, with most operations grazing or feeding beef cattle as cow/calf operations or feeder stock on pasture year-round. In many cases livestock along the Bear River and tributary streams only have access to water from these live sources. The 319 monies used from the FY 08 and FY 09 grants have been a critical resource in implementing BMP's needed to achieve load reductions in the watershed.

The Bear River through Northern Utah has been placed on Utah's 303d list of impaired waters for exceeding dissolved oxygen criteria. Sediment load, nutrient load, bacteria and temperature are also of concern for the Bear River downstream and as a whole (Lower Bear River Quality Plan, ERI, Nov. 1995). Removal of riparian vegetations by unregulated grazing has potentially caused an increase in main stem temperature, a reduction of woody debris in the channel, and increased sedimentation. Animals in direct contact with the river have contributed to nutrient and bacterial loading. There are high background levels of phosphorous from naturally occurring geologic features, which contribute to eutrophication of downstream reservoirs. Restricting livestock access to large sections of stream may reduce direct and indirect inputs of sediment and manure to the river as well as enhancing the conditions of the riparian corridor.

As required by 26-11-6 of the Utah Code annotated 1953, the Utah State waters are grouped into classes to protect against controllable pollution. The Upper Bear River from the Wyoming border to Bear Lake has been identified as a "High Priority" watershed, 303d list Unified Assessment Category 1A. The designated uses for the main stem Bear in the section are 2B, 3B, and 4. See Table 1.

Table 2: Utah Beneficial Use Classification and Description

2B	Protected for boating, water skiing and similar uses excluding recreational bathing (swimming).
3B	Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.
4	Protected for agricultural uses including irrigation of crops and stock watering

2.0 PROJECT GOALS, OBJECTIVES, AND TASKS FY 08 CONTRACT# 09-1061 (706)

GOAL 1: Implement Best Management Practices (BMPs) to stabilize riverbanks, re-vegetate critical riparian areas, enhance wildlife habitat in this corridor and effectively reduce the input of non-point source (NPS) pollutants into the waters of Utah's Bear River.

Objective 1: Stabilize riverbank segments of the Upper Bear that are actively eroding.

Tasks: Stabilize riverbanks with vegetation; protect river banks with livestock exclusion fence; install soil protection in high use areas; monitor projects.

ACCOMPLISHMENTS: Three of the completed projects included fence to exclude livestock from the river bank. This will help stabilize these portions of bank by allowing vegetation to grow and eliminate livestock from trampling and accelerating bank erosion. Two projects implemented fence and livestock watering systems needed for grazing management that will help improve riparian zones and reduce nutrient and sediment loading into tributary creeks to the Bear River.
Total 319 funds spent on Fence and Off Site Livestock Watering Systems from FY 08 contract: $22,300.00. Total match: $14,866.67

GOAL 2: Reduce non-point source pollution, sediment and animal manure, from animal feeding operations (AFOs) in the Upper Bear River Watershed.

Objective 1: Move animal feeding operations away from Upper Bear River and its tributaries.

Tasks: Construct new feedlots/relocate animal feeding area; provide off-stream water site; install pipeline to transfer water from creek to new watering site; remove manure; monitor projects.

ACCOMPLISHMENTS: No animal feeding operations were moved with FY 08 contract funds.

GOAL 3: Inform and educate the community concerning non-point source pollution and the importance of maintaining and improving water quality within the watershed by providing outreach to the public and the remaining AFO owners within the project area.

Objective 1: Conduct two tours of project cooperators focusing on: 1) animal waste system designs and proper manure application; 2) functioning riparian areas, stable streambanks, and properly managed uplands/pasture lands.

Tasks: Plan and conduct project tours.

Objective 2: Share general and technical information with producers and area stakeholders.

Tasks: Prepare and publish news articles and other informational documents.

ACCOMPLISHMENTS: Two tours were conducted, one of which showcased proper manure handling and nutrient management while the other focused on grazing management practices. Also with the help of USU informational pamphlets and brochures were produced to showcase some of the accomplishments of the Bear River Watershed as well as resources available to producers and landowners in the watershed. **Total 319 funds spent from FY 08 contract: $3,500.00.**
Total Match: $2,333.34.

Goal 4: Provide administrative services to project sponsors.

Objective 1: Document matching contributions, track individual progress, coordinate team efforts, and generate reports and data in a timely manner.

Tasks: Track match; prepare and file semiannual, annual and final reports.

ACCOMPLISHMENTS: Administrative services were provided for each of the contracts using FY 08 funding. All matching contributions have been documented and the progress of the projects was documented as progress was made. **Total 319 funds spent from FY 08 contract: $4,200.00. Total Match: $2,800.00.**

Total 319 Monies Spent:$30,000.00 Total Match: $30,666.67 Total Spent: $60,666.67

2.1 Planned and Actual Milestones, Products, and Completion Dates 08-0785 (680)

Objective /Task	Planned Output Practices	Planned Amount	Actual Output	Completion Date
Goal 1 : Stabilize River bank Segments				
Task 1: Establish River Banks with vegetation	Plant grasses and riparian trees like willows	14, 586 ft.	0 ft.	10/1/2008
Task 2: Stabilize banks with rock barbs	Incorporate fill	10 barbs	0 barbs	8/1/2009
Task 3: Livestock Exclusion fencing	build fence	15,086 ft.	8,881 ft.	8/1/2009
Task 4: Project Monitoring	monitor and report	3 events	Utah Water Quality Data	8/1/2009
Goal 2: Reduce NPS pollution, sediment, and manure				

Task 5: Relocate Winter Feeding Area	re-locate animal feeding areas construct watering	1 ea	0 ea	8/1/2009
Task 6: Provide Off-stream water to livestock	systems; pipeline pumps, wells, trough	1 ea	5 ea	7/1/2009
Task 7: Project Monitoring	progress documentation	3 events	3 events	8/1/2009
Goal 3: I&E to producers				
Task 8: Prepare and Publish News Articles	create pamphlets and informative brochures	3 articles	3 pamphlets	8/1/2009
Task 9: Conduct Tours	conduct demonstration tours	2 tours	2 tours	10/8/2008
Goal 4: Administer projects, and reporting	Complete monitoring and reporting of contract			
Task 10: Track Matching Funds	Track all matching funds	1 ea	1 ea	8/1/2009
Task 11: Prepare and Submit progress and final reports	Present all required reporting and information	1 ea	1 ea	8/1/2009

2.2 PROJECT GOALS, OBJECTIVES, AND TASKS FY 09 CONTRACT# 13-6005 (119-09)

Goal 1: Reduce sediment and nutrient loading to waterways from rangelands within the watershed.

Objective 1: Apply grazing management systems like rotational grazing and follow an appropriate grazing plan that controls nutrient loads within the watershed. All money for this objective will go toward existing NRCS contracts and toward future funded NRCS contracts. All stand-alone contracts that do not involve NRCS will be designed and implemented by UACD engineers and planners.

Task 1 – Select and identify project cooperators
Task 2 – Develop rotational pasture grazing systems
Task 3 – Implement projects

Objective 2: Apply rangeland improvement treatments such as rangeland seeding and juniper removal.
Task 1 – Select and identify project cooperators
Task 2 – Develop treatment plans
Task 3 – Implement projects

Accomplishments for Goal 1 Objectives 1&2
Eleven of the Fifteen installed projects with FY 09 funding were to assist with the implementation of a grazing management plan that will provide for better grazing distribution and relieve pressure on riparian areas by providing livestock water away from riparian areas. Total 319 monies spent: $37,331.76

Goal #2: Reduce the amount of nitrogen and phosphorus entering the watershed by implementing off-site livestock watering facilities.

Objective 1: Pumping plants and frost free water troughs will allow for livestock to water out of critical riparian areas and reduce nutrient load.

Task 4 –Identify potential sites and select project cooperators.

Task 5 – Implement projects

Accomplishments for Goal 2 Objective 1
Nine of the Fifteen FY 09 projects included troughs located away from riparian areas or areas of live water to reduce the amount of nitrogen and phosphorus entering the waters in the watershed. Total 319 monies spent: $51,504.21

Goal #3: Prevent damage and harmful effects of overgrazing along river beds and stream banks.

Objective 1: Livestock exclusion fencing in critical riparian areas will allow for vegetation like trees and shrubs to provide natural stream bank stability. Fence lines will allow for a buffer strip to form a natural barrier that reduces nutrient discharge from NPS originations.

Task 6 – Identify potential sites and select project cooperators
Task 7 – Develop upland/rangeland management plan using BMPs.
Task 8 – Implement projects.

Accomplishments for Goal 3 Objective 1
Eleven of the Fifteen FY 09 projects implemented grazing plans as well as fencing and or steam bank stabilization BMP's that will help rehabilitate and protect river beds, stream banks and riparian areas.
Total 319 monies spent: $26,964.03

Goal #4: Inform and educate the community concerning non-point source pollution and the importance of maintaining and improving water quality within the watershed.

Objective 1: Conduct tours focusing on: 1) organized rotational grazing systems with utilization techniques; 2) proper functioning of riparian corridors and bioengineered

stream banks. This is a stand-alone contract that does not involve NRCS and will be designed and implemented by UACD engineers and planners.

Task 9 – Conduct rotational grazing, riparian, and stream bank systems tour.

Accomplishments for Goal 4 Objective 1
In 2010 $1,129.82 of I&E funds were spent to purchase hats and gloves used to promote water quality awareness in the watershed. They were also used to help put on a producer dinner where one producer in the watershed was recognized for outstanding efforts in applying BMP's that help improve water quality. In April of 2014 $870.18 of FY 09 I&E funds were spent to purchase T shirts that were given to each of the 5th grade students in the Rich School District that participated in the annual Rich Conservation District poster contest. An informative presentation was made talking about the purpose and need for conservation and how it impacts everyone in the watershed. Time was also spent discussing the poster contest topic. Total 319 monies spent: 2,000.00

Goal #5: Provide administrative services to project sponsors.

Objective 1: Handle UACD Contract Administration services for contact sponsors.

Task 10 – Conduct contract administrative services, processing cooperator reimbursements, tracking match and related accounting, and other contracts pertaining to the FY 09 PIP.

Accomplishments for Goal 5 Objective 1
Administrative services were provided for each of the contracts using FY 09 funding. All matching contributions have been documented and the progress of the projects was documented as progress was made. Total 319 funds spent: $35,340.00

Total 319 Project Monies Spent:$153,140.00 Total Match: $84,131.46 Total Spent: $237,271.46

2.3 Planned and Actual Milestones, Products, and Completion Dates 13-6005(119-09)

Objective /Task	Planned Output Practices	Planned Amount	Actual Output	Completion Date
Goal 1: Reduce sediment and nutrient loading to waterways from rangelands within the watershed.				

Task 1: Select and identify project cooperators	Problem Identification	2 or 3	11	11/04/2014
Task 2: Develop rotational grazing systems	Grazing Project Plans	2 or more	11	11/04/2014
Task 3: Implement Projects	Projects Implemented	1 or more	11	11/04/2014
Goal 2: Apply rangeland improvement treatments such as rangeland seeding and juniper removal.				
Task 4: Identify potential sites.	Problem Identification	1 or more	5	11/04/2014
Task 5: Implement projects	Projects Implemented	1	5	11/04/2014
Goal 3: Prevent damage and harmful effects of overgrazing along river beds and stream banks.				
Task 6: Identify potential sites	Problem Identification	2	6	11/04/2014
Task 7: Develop upland/rangeland management plans	Implement Plans		6	11/04/2014
Task 8: Implement project group	Riparian Projects Built	5	6	11/04/2014
Goal 4: Inform and educate the community concerning non-point source pollution and the				

importance of maintaining and improving water quality within the watershed.				
Task 9: Conduct tour focusing on grazing, riparian and stream banks	Perform Tour	1	1	11/04/2014
Goal 5: Provide administrative services to project sponsors.				
Task 10: Perform planning and administration services.	Perform administration	1	15	11/04/2014

2.4 Evaluation of Goal Achievement and Relationship to the State Non-Point Source (NPS) Management Plan

The State of Utah nonpoint source management plan stresses several elements necessary to achieve orderly and comprehensive planning. Private landowners, water right owners, public interest group, and local, state, and federal government agencies all play a role in the process. The Rich County Coordinated Resource Management Group has met monthly for a number of years looking at the management of natural resources and the management practices to improve them.

The Rich Conservation District has played an irreplaceable role in the leadership of locally-led conservation and directing local work group meetings. They have focused on providing direct communication between landowners and federal agencies. Considerations of resource concerns have been developed. A resource assessment was developed and a long-range plan implemented.

3.0 BEST MANAGEMENT PRACTICES DEVELOPED AND/OR REVISED

Projects in the Upper Bear Watershed were designed to demonstrate reduction in sediment and nutrient loading as well as stream bank stabilization and restoration. Recently there has also been a desire to reduce erosion on up land range land by removing juniper since over time the juniper kill out all other vegetation around them and become a major source of erosion. Best Management Practices used to achieve these goals include to date: livestock exclusion fencing; upland fencing; off-site stock watering; filter strips; juniper and brush removal and range seeding.

The feeding operations that were moved were located on or within 50 meters of the river. They have now been moved to a distance of 1000 meters or more, or where the slope of the feed lot does not enter into the river. The operations that have been implemented have been around 250-300 animals. Offsite watering structures have been installed instead of watering cattle directly in the river.

There has been extensive work in the watershed installing livestock water systems on rangeland. Usually grazing management plans are part of the project. We believe grazing management is one of the most effective tools we have in the watershed to improve the health of the landscape and have a positive impact on water quality and riparian areas. There have also been increasing efforts to remove juniper on range sites on the south end of the watershed. It is expected as these areas are treated and re vegetated and the grazing is managed erosion will greatly decrease and sediment loading will also degrease in the drainage systems.

3.1SUPPLEMENTAL INFORMATION

Upland Grazing Fence and Water System (Randolph, UT)

Pasture division fence along with a livestock water system were installed to improve grazing management as well as riparian health.

Offsite Watering Locations (Randolph, UT)

Frost free watering troughs were installed to eliminate the need for cattle to drink water from the Bear River. The new troughs are located just above the white colored steer's horns. The picture on the left shows two troughs in the distance on the right and left sides. The troughs have been found to be very beneficial and proven to work in Rich County's cold climates. Pictures below show fence installed to exclude cattle from the Bear River and troughs installed to provide livestock water.

Upland Range Improvement (Juniper Removal, Brush Treatment and Range Planting)

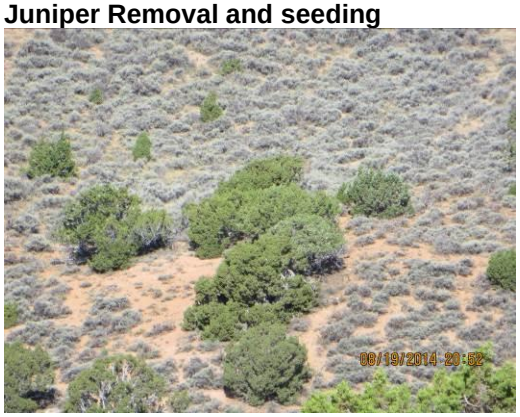
Fall of 2012

Fall of 2014

Fall of 2012

Fall of 2014

Juniper Removal and seeding



Livestock water systems


11.09.2011


10.15.2012


10.15.2012

Fish Barrier/Passage Project

Grazing Management

Riparian and Stream Bank Protection

Above is project #10 from FY 09 contract.

Above is project # 13 from FY 09 contract.

Summer 2012

Fall 2014

Fence above is around the area of Eagle Spring located on the property of project # 3 of the FY 09 contracts. The landowner fenced off approximately 5 acres.

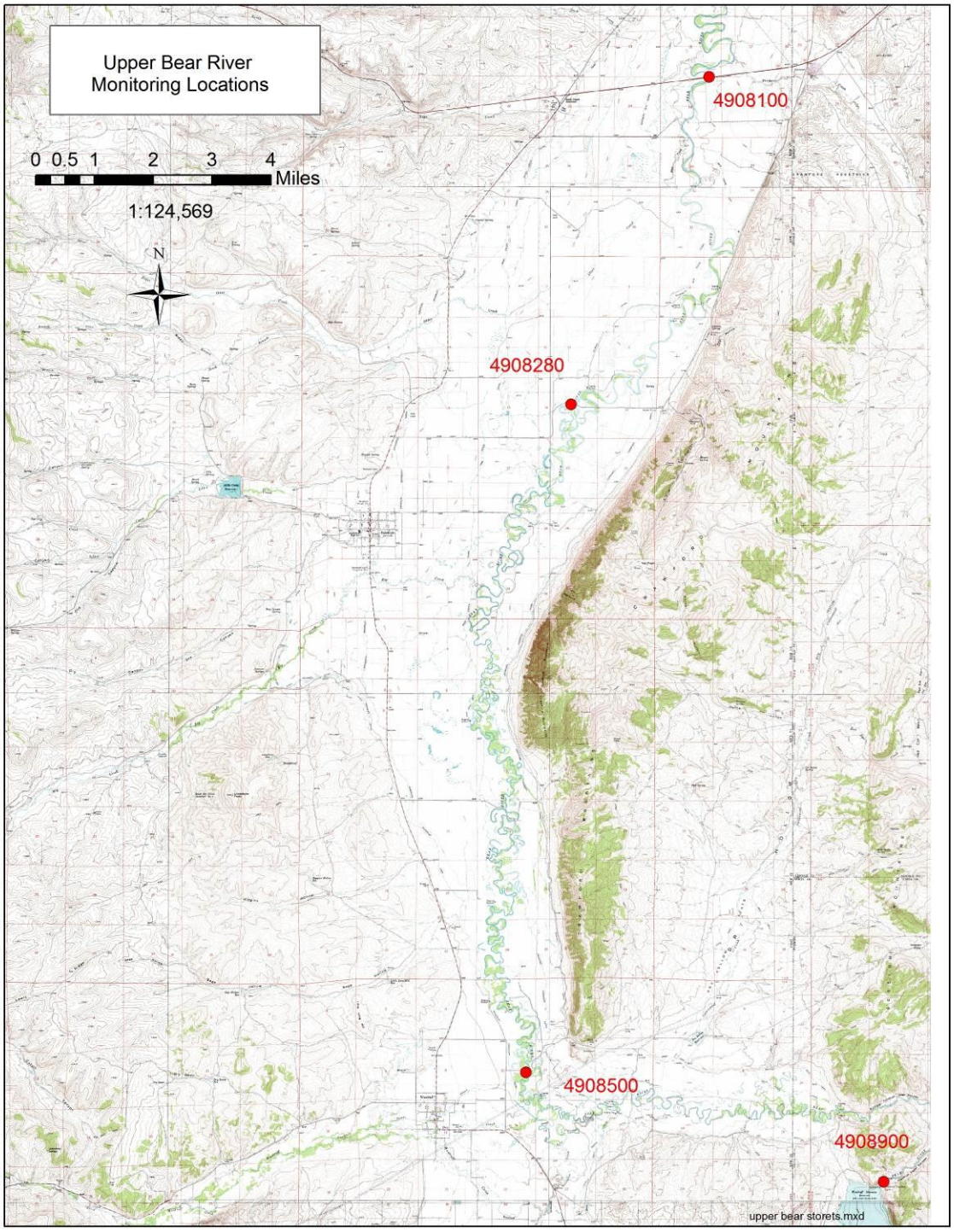
4.0 MONITORING RESULTS

The monitoring goals of this project were to document progress in achieving improved water quality conditions as non-point source control programs were implemented. Monitoring goals were also set to document and review effectiveness of BMPs. Monitoring on this project supplements the State's ongoing overall water quality monitoring program. Utah Division of Water Quality will continue to monitor several sites on the Upper Bear River and its tributaries as part of its long-term water quality monitoring efforts.

4.1 Total Maximum Daily Load (TMDL) Implementation Effectiveness

In the Upper Bear River TMDL the assessment of water quality conditions indicate that concentrations of DO and TP in the study area generally do not meet the criteria for aquatic wildlife use (Class 3A). Both DO and TP drive important chemical and biological reactions that support viable aquatic habitat. Dissolved oxygen is regulated primarily by temperature, but photosynthesis, respiration, aeration of the water, the presence of other gases, and nutrient concentrations can also affect its concentrations. The oxygen demand generated by non-point source pollution reduces oxygen concentrations in streams. The inflow of TP to the Bear River results from erosion of soil particles from steep slopes and disturbed areas as well as from domestic, agricultural wastes.

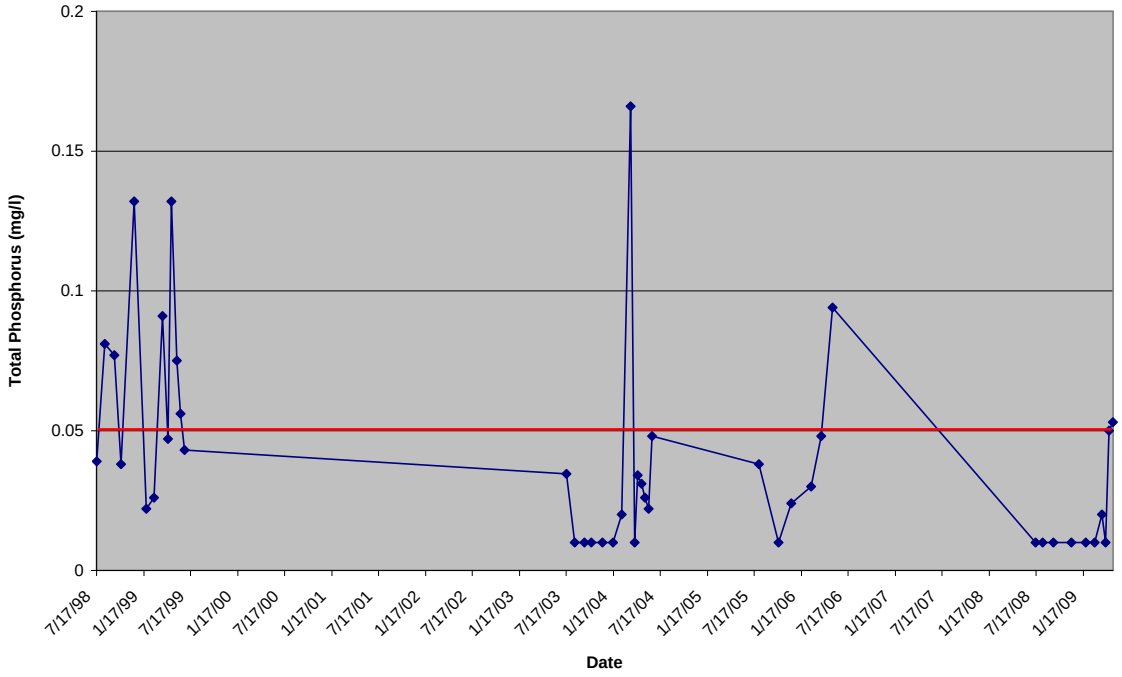
The stations included in this analysis of water quality condition include the Bear River site at Sage Creek Junction (Station 4908100), Bear River at Randolph (Station 4908280), and the Bear River at Woodruff (Station 4908500). The sites are identified on the map below.



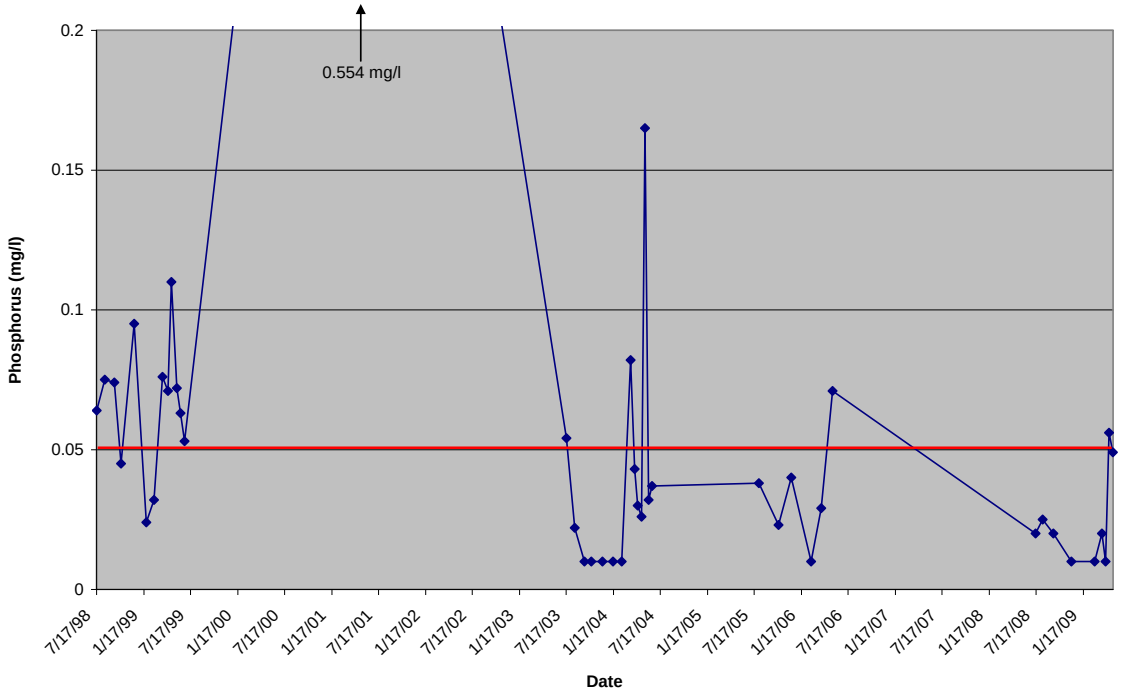
Upper Bear River Monitoring Sites

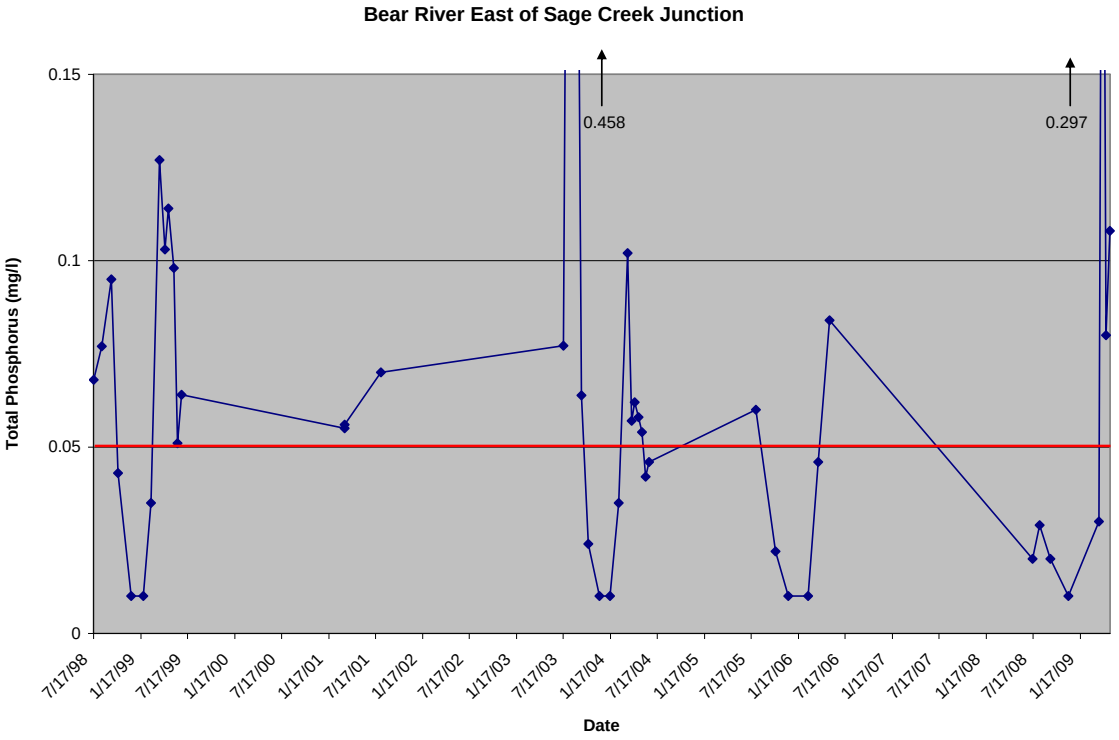
The plots below show the concentration of total phosphorus and dissolved phosphorus from the upstream site East of Woodruff to the downstream site east of Sage Creek Junction. As can be seen most samples fall below the 0.05 criteria identified in the TMDL. Still there is an observed increase as we move downstream. As implementation activities continue it is expected that the TMDL endpoints will be met.

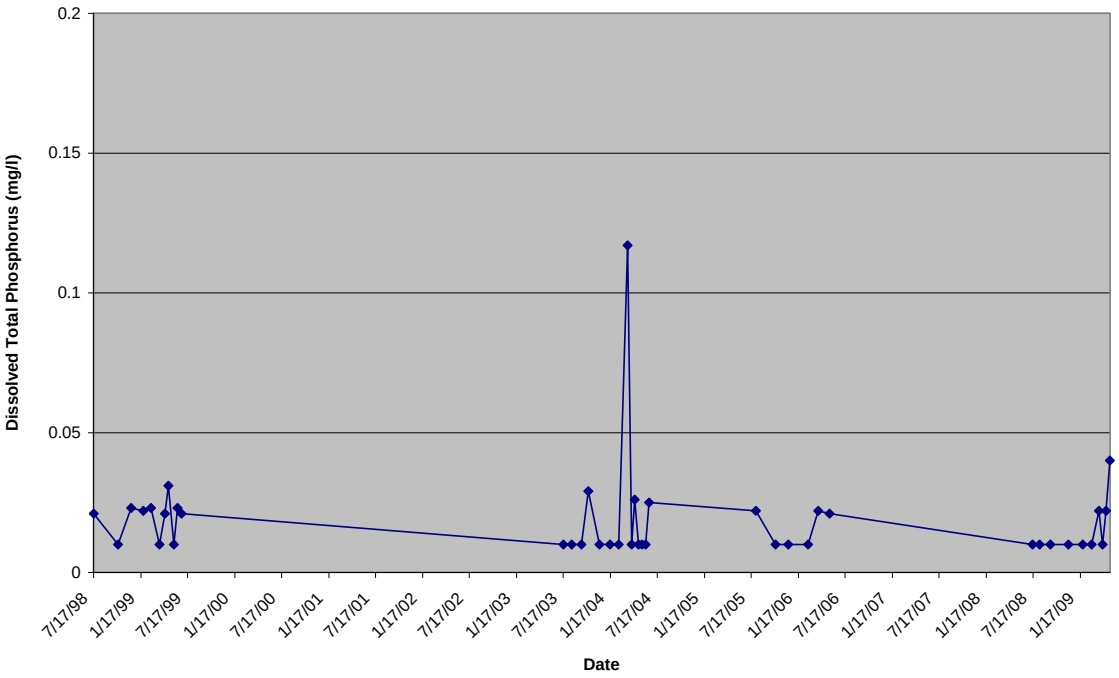
Bear River East of Woodruff



Bear River at Randolph/Crawford Mountain Road




Bear River East of Sage Creek Junction
Total Phosphorus (mg/l)
0.15
0.1
0.05
0
0.458
0.297
7/17/98
1/17/99
7/17/99
1/17/00
7/17/00
1/17/01
7/17/01
1/17/02
7/17/02
1/17/03
7/17/03
1/17/04
7/17/04
1/17/05
7/17/05
1/17/06
7/17/06
1/17/07
7/17/07
1/17/08
7/17/08
1/17/09
Date


Bear River East of Woodruff
Dissolved Total Phosphorus (mg/l)
0.2
0.15
0.1
0.05
0
7/17/98
1/17/99
7/17/99
1/17/00
7/17/00
1/17/01
7/17/01
1/17/02
7/17/02
1/17/03
7/17/03
1/17/04
7/17/04
1/17/05
7/17/05
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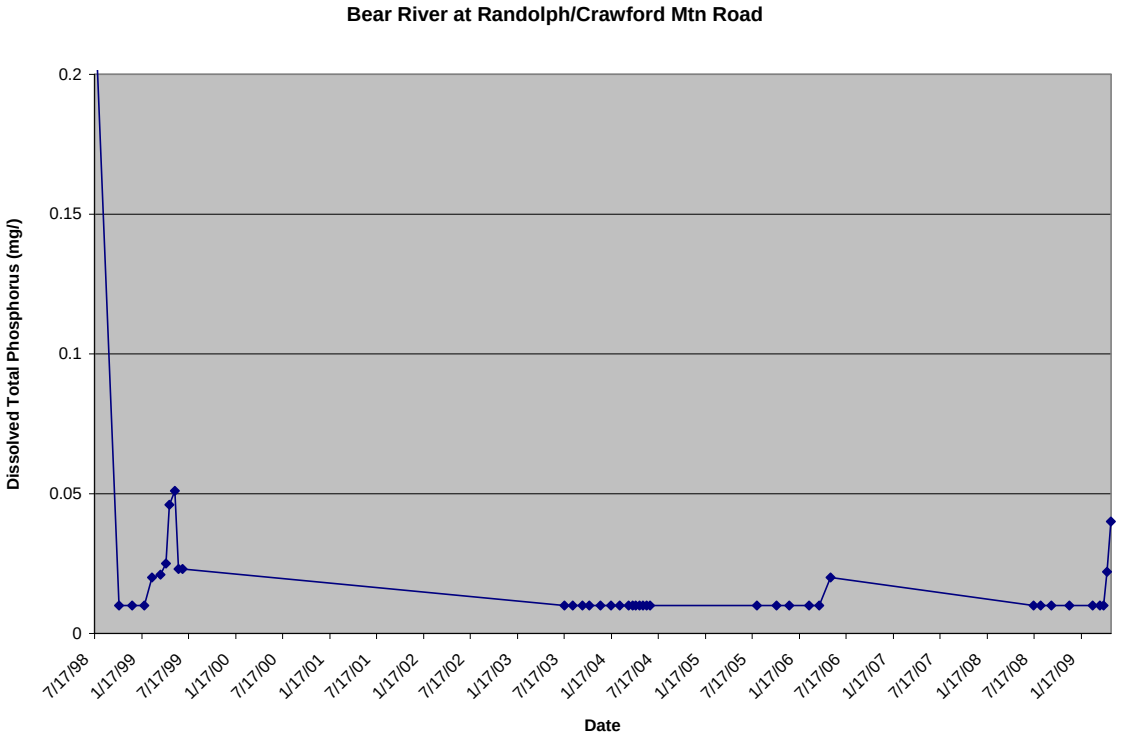
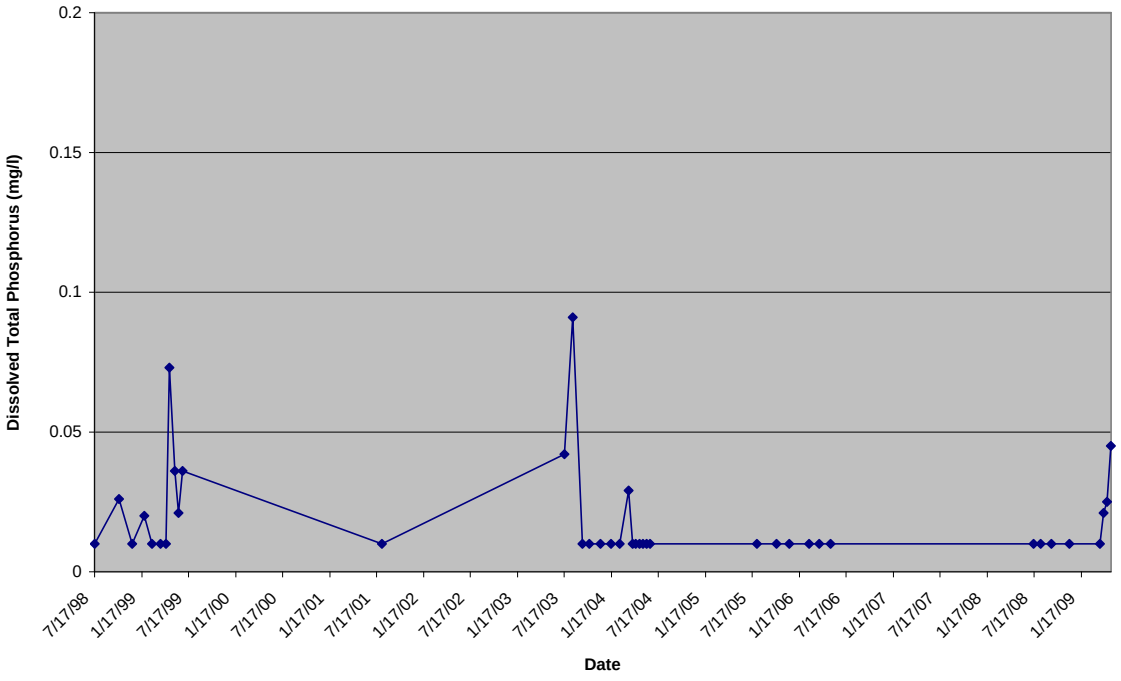
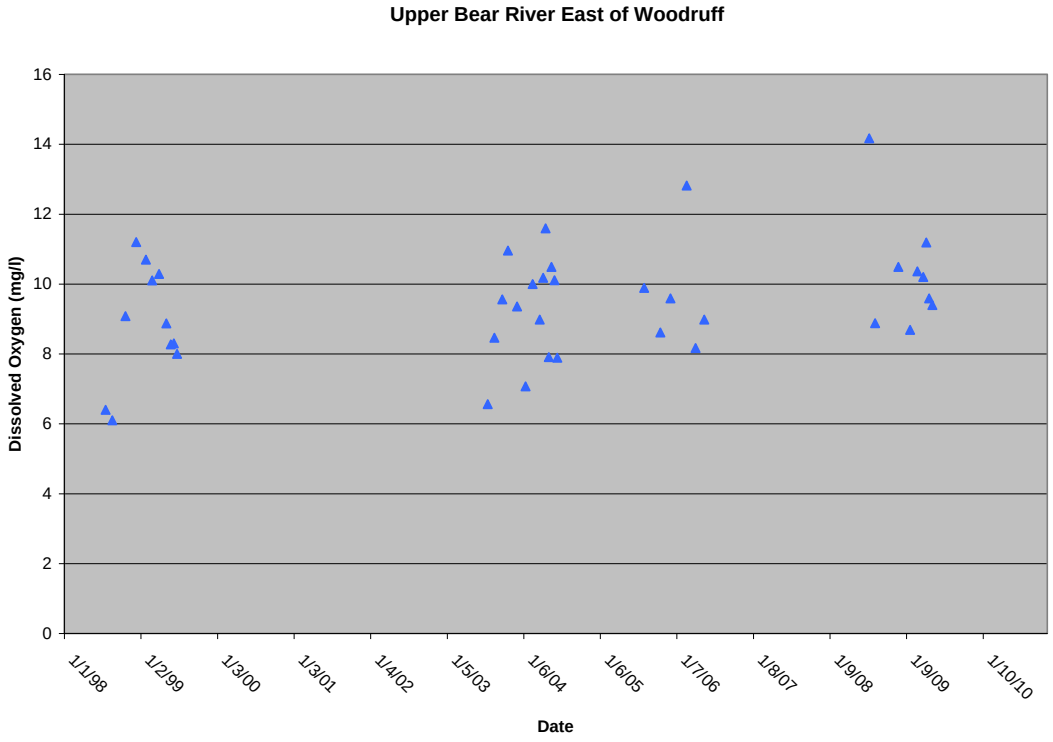
7/17/07
1/17/08
7/17/08
1/17/09
Date

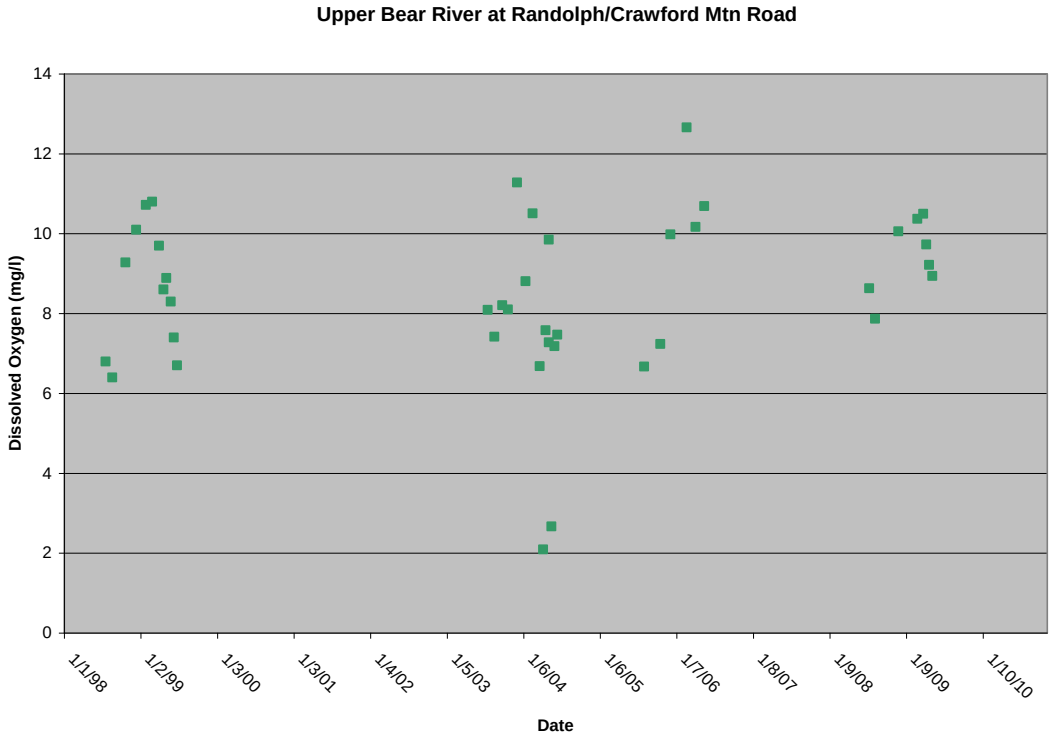


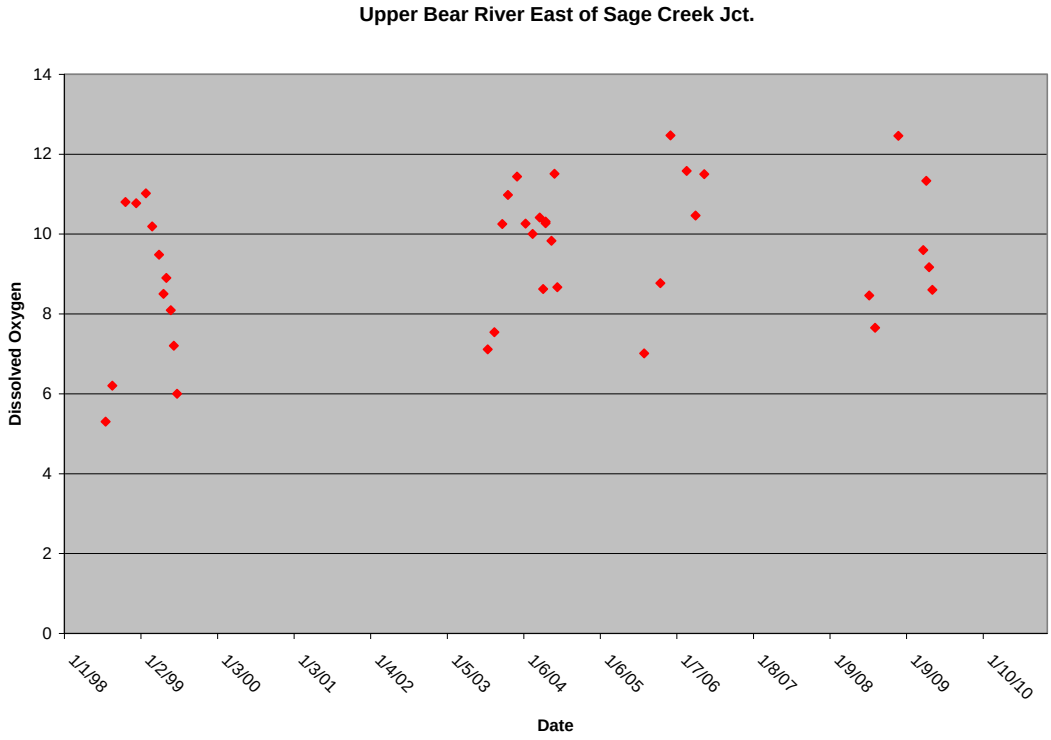


Plots of DO show scattered concentrations throughout the year. This temporal difference may be associated with drought conditions during the 2003-2004 monitoring cycle. Water releases from the Reservoir, and water withdrawals from the main stem of the Upper Bear River, were lower

during 2003-2004 than during 1998-1999 and 2008-2009. Observations during the 2008-2009 intensive monitoring cycle do not show the low DO measurements seen in previous years.







The concentration of DO in the Upper Bear River is influenced by physical and chemical factors, each of which can vary by season or from year to year. Long-term drought cycles influence precipitation which in turn influences the rate and volume of water flowing in the Bear River. Water quality parameters such as temperature, nutrients, sediment and organic matter can influence the solubility of DO in water as well as rates of oxygen production and consumption. TP is a nutrient that can influence algal and periphyton growth in river systems. Other pollutants such as sediment, Biochemical Oxygen Demand (BOD), nitrate and ammonia are likely delivered through the same loading process that delivers TP to the Bear River. However, the methods used to control and reduce TP loads from nonpoint sources will also reduce loads from other constituents in the study area. Based on field observations, discussions with the Natural Resources Conservation Service (NRCS), Utah Association of Conservation Districts (UACD), Utah Department of Water Quality (Utah DWQ), and Utah State University (USU) extension, the following pollutant categories contributing to water quality impairment in the Upper Bear River watershed have been identified:

1. Upstream Bear River
2. Animal Feeding Operations
3. Livestock Grazing
4. Irrigation Return Flows
4. Diffuse Loads from Runoff

In general the data show there has been little change in the amount of pollutants entering into the river. However, often times it has been found that it can take many years for any significant improvements to be observed. Monitoring will continue to take place on a regular basis, and the loads will continue to be measured.

4.2 Best Management Practice (BMP) Implementation Effectiveness

The implementation of BMPs such as use of manure storage structures, proper manure application, and nutrient and pest management has allowed Burdett Weston, William Stuart, Bill Jackson, and Stuart Hopkin and to contain and use animal waste more effectively. They are able to apply and incorporate nutrients into the soil in a timely manner. Odor has decreased and pest management practices are in check. The animals are cleaner and production has increased through agronomic means of nutrient budgeting.

4.3 Surface Water Improvements (Chemical, Biological and Physical/Habitat)

As animals are removed from the corridor, nutrient management plan developed, stream banks stabilized and grazing management plans incorporated the amount of nutrients in the system will continue to decrease. With this decrease in nutrients other water quality standards such as dissolved oxygen will continue to improve.

With the implementation of the projects that have taken place the nutrients in the system will continue to decrease. This decrease in nutrients should decrease algal blooms and improve dissolved oxygen conditions for other living organisms such as macro invertebrates and fish.

By stabilizing the banks of the rivers and allowing for vegetation to increase along the banks of the rivers, the habitat for fish and other riparian organisms will improve. Water temperatures could decrease due to better shading along the river, and the gravel substrate on the bed will get larger which will create better spawning habitat for cutthroat trout.

4.4 Other Monitoring

Natural Resources Conservation Service (NRCS) was responsible for conducting a project implementation check. The Utah Association of Conservation Districts (UACD) continues to follow-up with cooperators to make sure proper management practices are implemented and to resolve any problems.

Since 2010 water quality monitoring as well as photo point monitoring has been taking place on the Three Creeks project area. This data will be compiled and used to assess the effects on riparian health and water quality after the Three Creeks Grazing management plan is fully implemented. The photo point monitoring consists of 13 separate monitoring locations in key riparian areas across the proposed grazing allotment. Photos are taken each year at each monitoring site to document any changes. The water quality monitoring plan consists of 7 monitoring sites across the proposed grazing allotment. In 2012 the BLM began working with UACD employees to accomplish the water monitoring and together the agencies have compiled a Sampling Analysis Plan (SAP) and provided it to the UDWQ. Water quality samples are taken once a month as many months as possible (weather permitting). E-coli samples are also taken and data is submitted quarterly to the UDWQ.

Also the Utah Department of Agriculture Grazing Improvement Program has been working to build some riparian health data with the use of satellite and infrared technology. They have also been building data on cattle utilization of the rangeland with the use of GPS collars placed on a percentage of the cattle turned out on the existing

allotments. GIP currently has two years data with this method. This data will be vital in portraying the effects of the Three Creeks Grazing Management Plan.

FY 09 Load Reductions Table 1

Project Star #	Total N Reduction lbs/yr	Total P Reduction lbs/yr	Total BOD Reduction lbs/yr	Total Sediment Reduction tons/yr
1	2077.6	391.5	5801.9	237.6
2	2364.6	440.2	6625.2	265
3	109.6	28.7	273.7	20.6
4	57.8	15.5	142.8	11.2
5	42.5	14.8	85.5	11.5
6	253	56.7	670	38.1
7	1136.5	226.1	3125.5	142
8	214	40	599	24
9	22.1	6.3	53.1	5
10	34	9.4	83	7.2
11	169.8	39.2	445.4	26.6
12	155.6	36.1	407.1	24.6
13	41.9	11.7	101.8	9.7
14	165.9	38.3	434.7	26.1
15	2145	403	5995	244.1
Total Reductions:	8989.9	1757.5	24843.7	1093.3

4.5 Results of BMP Operation and Maintenance Reviews

Best Management Practices (BMPs) for the Upper Bear River projects have focused on excluding animal access to the Bear River and its tributaries. BMPs include fencing, grazing management improvements, improved watering systems, stream bank restoration and re-vegetation, and feedlot relocation projects. Managing manure, nutrient, and sediment runoff has also been a priority BMP.

When projects are completed a certified planner reviews the work accomplished to verify completion of each practice. If irrigation water management or nutrient management is required by the contract, producers must submit evidence of completion/continuation of each practice tied to EQIP contracts.

The completed projects have excluded livestock from entering the waters of the Bear River. Areas of degradation now have a vegetative cover, reducing the potential for soil erosion and runoff. Operation and maintenance are required for the life of the installed practices or structures.

5.0 COORDINATION EFFORTS

The Rich Conservation District is the sponsor of the Rich County Local Work Group and is the lead sponsor for this project. The Rich County Local Work Group provided oversight of project planning, cooperator selection, volunteer work, and information sharing generated by this project. The Local Work Group directed the Rich Conservation District to oversee project development, planning, implementation, approval, creation of fact sheets and educational materials, administration, and reporting. Specific duties (listed below) were transferred, as per Memoranda of Understanding, to the following agencies:

- Rich Conservation District: approval
- Natural Resources Conservation Service: technical assistance, follow-up
- Department of Environmental Quality: oversight, project management
- Utah State University Extension Service: I&E, technical assistance
- Utah Association of Conservation Districts: administer contract, implementation, education, reporting, technical assistance

UACD handled project administration, match documentation and contracting with agencies and individuals. They also provided staffing assistance at the direction of the District.

5.1 Coordination with State and Local Agencies

The state and local agencies listed below helped carry out the project by providing support in the following areas:

- Utah State University Extension: Information and Education (I&E), technical assistance
- Utah Department of Agriculture and Food (UDAF): I&E, technical assistance
- Utah Association of Conservation Districts (UACD): Administration, contracting, staff and technical support
- Cache County: Advisory assistance
- Bear River Resources Conservation and Development (Bear River RC&D): Additional funding and coordination of volunteers

5.2 Coordination with State Environmental Programs

The following State Environmental Programs supported the project in the following areas:

- Utah Division of Water Quality: Standard program monitoring, technical assistance, 319 Grant Management
- Utah Division of Wildlife Resources: Advisory and monitoring assistance
- Utah Division of Water Rights: Permits, advisory and monitoring assistance
- Utah Division of Water Resources: Advisory assistance

5.3 Coordination with Federal Agencies

The following federal agencies made key contributions to the project:

- EPA: Financial assistance, Clean Water Act Section 319
- NRCS: Technical planning, design, and oversight

5.4 Accomplishments of Agency Coordination Meetings

The Rich County Local Work Group has met and reviewed resource concerns. Priorities were set and projects have reflected the greatest identified needs. Although EQIP was a focus, other funding mechanisms including 319 were discussed and listed as possible funding resources.

The Coordinated Resource Management Group has also met to address grazing concerns posed by special interest groups. It is proposed to consider a consolidation of 9 separate grazing allotments found west of the town of Randolph. It is the goal of the CRM to increase water quality through grazing management practices and also increase wildlife populations. It has been a concern to create sustainable ranges with sustainable long-term ranches in Rich County. The CRM is continually working to satisfy all interested parties and land uses.

Several new groups have recently joined the CRM to participate in long range planning efforts of the Rich County region. The increased collaboration of information has improved open communication in conservation efforts such as water quality.

5.5 Other Coordinated Resources

Multiple groups have collaborated on project ideas to communicate their management objectives to the conservation effort of the county. The increased efforts of these groups have helped form relationships with private producers which provided opportunities for each party involved. Example groups who have collaborated are Trout Unlimited, and the Utah Grazing Improvement Program.

6.0 SUMMARY OF PUBLIC PARTICIPATION

The citizens and landowners of Rich County are proactive in maintaining a healthy environment. Two tours have been conducted to highlight projects completed with 319 funding to demonstrate improved water quality. The Rich County Conservation District sponsored a dinner at the conclusion of the tour thanking those who have worked so hard to improve the natural resources.

7.0 ASPECTS OF THE PROJECT THAT DID NOT WORK WELL

Adoption of water quality improvement projects is slow. Even though a sixty percent cost share is offered, providing matching funds is significantly burdensome to landowners with tight profit margins. If a larger cost share were offered, more opportunities would be available for projects.

We have also found that some of the projects that have been implemented needed some minor repairs or adjustments to help them come completely into compliance. These projects are either because of issues that were overlooked in the planning process, or negligence on the landowner's part. We have contacted the land owners to explain the changes needed to make their projects more complete and they have willingly accepted the suggestions. We feel as though it would be beneficial to spend more time with the land owners and explain precisely what we expect of them, and how they can better manage their property. It is estimated that more complex projects such as stream bank restoration areas take a considerable amount of time. Other projects

such as fencing is considerably less time. Each producer averages out to have approximately 4 hours of one on one time over the life of the project. Again this is just an estimate but the more time spent with a producer, the better the projects can be. It is planned to spend more time with producers either on their property or through outreach events.
One re occurring issue is planning project budgets too tight. More and more it seems that we end up cutting corners at times because there are insufficient funds in the project budget. This is due to a number of different reasons such as: poor budget planning, or the cost of BMP implementation increases during the life of the contract, or rising contractor costs. These problems will be kept in mind in future planning.

8.0 FUTURE ACTIVITY RECOMMENDATIONS

Water quality will always be a resource concern. Because water resources are so limited in the West, maintaining water quality is vital to sustainable agricultural production which drives the local economy. Future efforts will focus on grazing management improvements that allow livestock to make use of renewable resources while controlling access to waterways and riparian areas to see that they are not degraded by over grazing. By using best management practices and ongoing monitoring and evaluation sustainable grazing methods can be utilized and the health of the watershed can continue to improve.

Also it is intended that the local conservation district and agency personnel maintain a good working relationship with landowners after projects are implemented to ensure BMP's are kept up and maintained. It is also important to work with landowners to have them share successes and problems they have had occur to better the work that is done in the future.

9.0 APPENDICES

1. Utah Department of Water Quality, Upper Bear River TMDL Document. http://www.waterquality.utah.gov/TMDL/Upper_Bear_TMDL.pdf