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**Clean Water Act**

**Section 319 Non Point Source Pollution  
Control Program**

**Watershed Project Final Report**

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**Fremont River**

**By**

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**January 2012**

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

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**Executive Summary**

<b>Project Title:</b>	Fremont River		
<b>Start Date:</b>	5/29/2003	<b>Completion Date:</b>	November 18, 2011
<b>Funding:</b>	<b>EPA Funds:</b>		<b>319 Funds + Match:</b>
<b>FY-02</b>	<b>\$100,000</b>	<b>03-1758</b>	<b>\$168,364.31</b>
<b>FY-04</b>	<b>\$100,000</b>	<b>05-0867</b>	<b>\$166,155.87</b>
<b>FY-05</b>	<b>\$100,000</b>	<b>06-1024</b>	<b>\$178,429.69</b>
<b>FY-06</b>	<b>\$100,000</b>	<b>07-1027</b>	<b>\$169,445.00</b>
<b>Total</b>	<b>\$400,000</b>	<b>Total Budget: (319 + Match)</b>	<b>\$560,000</b>
		<b>Total EPA 319 Grant:</b>	<b>\$400,000</b>
		<b>Total expenditures of EPA Funds:</b>	<b>\$400,000</b>
		<b>Total 319 Match accrued:</b>	<b>\$282,394.87</b>
		<b>Total expenditures:</b>	<b>\$682,394.87</b>
		<b>Non-disbursed 319 Grant funds By contract number:</b>	<b>\$0.00</b>

**Summary Accomplishments**

Watershed improvement projects in the Fremont River watershed began in May 2003 and concluded on November 18, 2011. Fremont River received \$400,000.00 in Section 319 funds, and has expended \$326,536.35 to complete individual projects, and \$73,463.65 for administrative and technical assistance, plus match as depicted in the chart above.

The primary goals of projects in the Fremont River watershed have been to: reduce nutrient and sediment loading from animal feeding operations (AFOs) located directly on or adjacent to the river and to improve stability of the stream channel and enhance the riparian corridor to reduce sediment nutrient loading to the river and its tributaries. These goals have largely been accomplished through the implementation of the following Best Management Practices (BMPs):

- relocating animal feeding operations
- restricting access to stream banks with protective/exclusion fencing
- repairing eroding stream banks

Most projects in the Fremont River area have focused on improving eroding stream banks by installing rock barbs, rock riprap and willows, as well as removing livestock from stream banks by installing livestock exclusion fences.

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## 1.0 INTRODUCTION

The Fremont River watershed is located in Sevier and Wayne Counties in Utah and includes the following waterways: the main Fremont River from Fishlake to its confluence with Muddy River, near Hanksville; UM Creek from its headwaters in the Fishlake Plateau to its confluence with Mill Meadow Reservoir, Spring Creek from its headwaters to its confluence with the Fremont River, and numerous springs and small tributaries. The watershed encompasses approximately 1,259,000 acres. Land within the watershed is used primarily for livestock feed production, grazing and wildlife.

The average flow of the Fremont River measured near Bicknell, Utah is 82 cfs over the period of record, 1910-1997 (Division of Water Resources, West Colorado River Basin Plan, August 2000). Discharge of the Fremont River is affected by spring runoff, irrigation diversions, irrigation returns and outlet regulation. Daily flows from July through October can be very low, averaging 10 cfs. Typical baseline flows range from 10-40 cfs.

Average annual precipitation in the drainage ranges from 6 inches in Hanksville to 44 inches on the top of the Fishlake Plateau, with most of that falling as snow during the winter months. Mean annual air temperature in Loa is 44 degrees Fahrenheit with a frost-free season of 83 days. Soils in the valley bottoms are formed in mixed alluvial deposits and lake sediments derived from volcanic and sedimentary rocks. They are nearly level to gently sloping. The soils are mostly silt loam, silty clay loams, and are moderately well drained to poorly drained. Permeability range is from 0.06 to 2 inches per hour.

Agricultural water supply and secondary contact recreation are designated beneficial uses for the Fremont River and its tributaries throughout the watershed. Current uses of the river and its tributaries include irrigation diversion, with much of the water in the Fremont and its tributaries diverted through irrigation canals. Fishing and recreation are important in the upper reaches. The river floodplain is used intensively for agricultural purposes: animal watering, pasture, and irrigated cropland.

The Fremont River from its headwaters to its confluence with the Muddy River have been identified as a *High Priority* watershed, 303(d) list Unified Assessment Category IC. The designated uses for the Fremont River from its headwaters to the eastern boundary with Capitol Reef national Park are 2B, 3A and 4. Designated uses from the Capitol Reef boundary to its confluence with Muddy River are 2B, 3C and 4. Associated tributaries include UM Creek which is also listed for impairments associated with its Class 3A beneficial use due to low dissolved oxygen concentrations.

Table 1: Utah Beneficial Use Classification and Description

2B	Protected for boating, water skiing and similar uses excluding recreational bathing (swimming).
3A	Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
3B	Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.
3C	Protected for non-game fish and other aquatic life, including the necessary aquatic organisms in their food chain.

3D	Protected for waterfowl, shore birds and other water oriented wildlife not included in classes 3A, 3B or 3C, including the necessary aquatic organisms in their food chain.
4	Protected for agricultural uses including irrigation of crops and stock watering

Identified concerns in the Fremont River include sediment, nutrients, and salinity. The West Colorado Watershed Management Unit, Water Quality assessment report (DEQ, 2000) reported high loadings of dissolved nutrients in the upper watershed and total dissolved solids in the lower watershed. In September 2002, the Water Quality Management Plan was completed incorporating the TMDL and submitted to EPA. See link below for a copy of the Plan/TMDL.

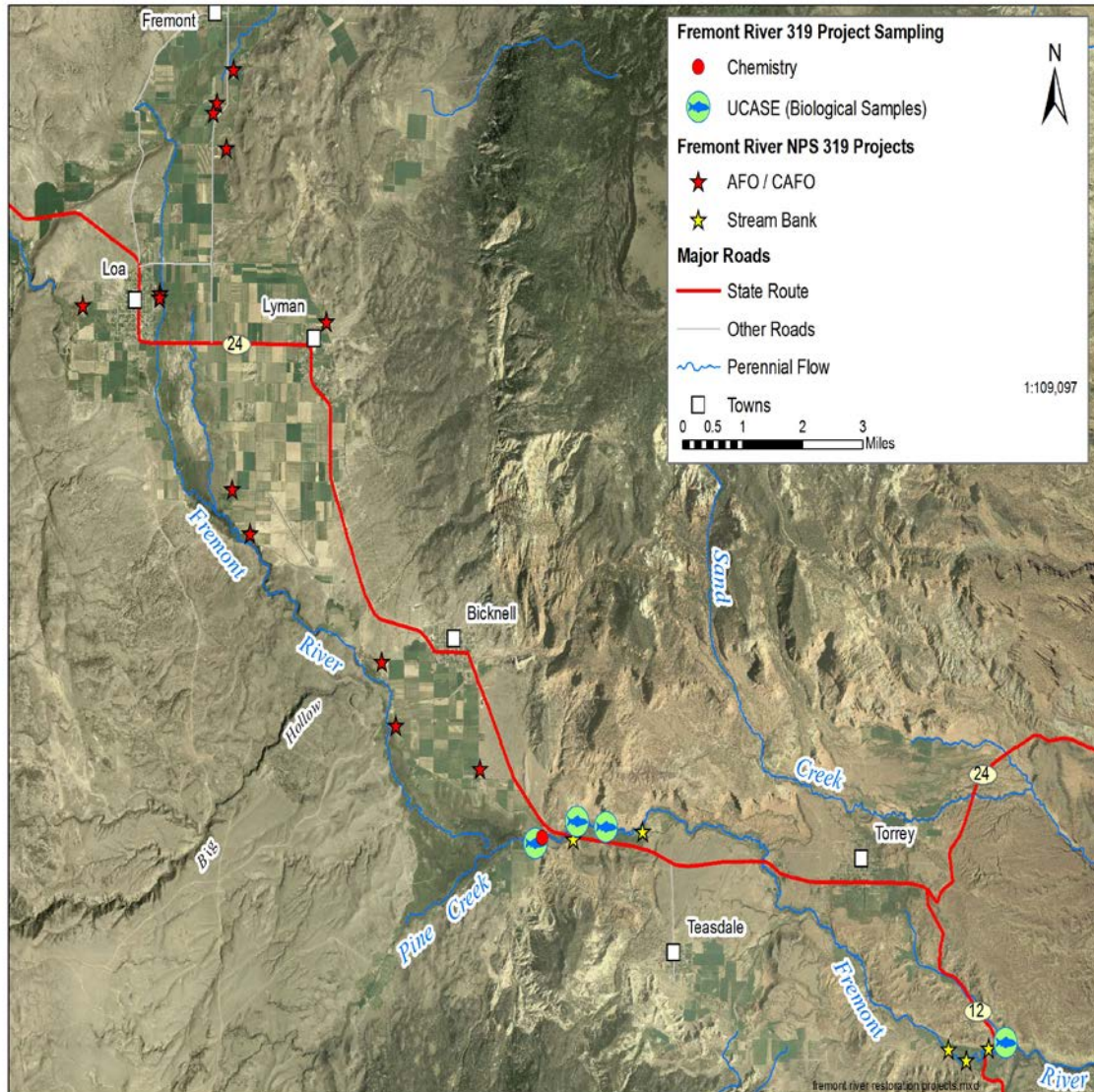
[http://www.waterquality.utah.gov/TMDL/FREMONT\\_WQMP.pdf](http://www.waterquality.utah.gov/TMDL/FREMONT_WQMP.pdf)

Several concerns emerge from the water quality and other assessment data on the Fremont River. Animal waste entering the river from animal feeding operations appears to be a large source of nutrients. The Fremont River valley bottom from Mill Meadow Reservoir to the Bicknell Bottoms is in alfalfa and grass pasture, with animal grazing occurring throughout this reach. The lower Fremont River valley bottom is in alfalfa which is sprinkler irrigated, and grass pastures which are primarily flood irrigated.

## **Fremont River Watershed Map**







**Fremont River project locations and sampling sites**

## 2.0 PROJECT GOALS, OBJECTIVES, AND TASKS

**GOAL 1:** Assist four (4) animal feeding operations in the Fremont River watershed to implement and demonstrate proper containment and application of animal waste using Best Management Practices.

**Objective 1:** Develop four animal waste systems to ensure total containment of animal manure and reduce pollutants entering the Fremont River drainage.

**Deliverable:** Two animal feeding operations have received 319 funds. One is addressed in this final report, the other obtained 319 Demonstration funds reported in a earlier final report. An additional seventeen (17) animal feeding operations have installed measures to prevent animal wastes from entering the stream, all of these obtained NRCS EQIP funding.

Tasks: Identify and select project cooperators and assist them in the installation of animal waste management practices, using BMP's and CNMP's.

**Goal 2:** Improve stability of the stream channel and enhance the riparian corridor to reduce sediment and nutrient loading to the river and its tributaries.

**Objective 1:** Develop four projects that reduce sediment and nutrient loading to the river through improved function of the stream bank and riparian area.

**Deliverable:** Fourteen projects were installed that reduce sediment and nutrient loading to the river that used 319 funding and are addressed in this final report. An additional three (3) projects have been installed that reduce sediment and nutrient loading to the river that used NRCS funding.

Tasks: Stabilize riverbanks by constructing rock barbs, rock rip rap, stream bank shaping, and willow plantings. Also fence off river corridor to protect riparian areas.

**GOAL 3:** Implement upland management practices to reduce sediment and nutrient runoff to the river and its tributaries.

**Objective 1:** Reduce loading of sediment and nutrients from improved upland/pastureland management.

**Deliverable:** No upland management practices were installed using 319 funds. Consequently all 319 funding went to animal feeding operations and streambank improvement projects.

Tasks: Identify and select project cooperators and assist them in the installation of upland/pastureland BMP's.

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

**Deliverable:** Two tours took place, the first in August of 2003, where the group visited UM Creek to observe and discuss the effects of excluding livestock from



the stream by fencing. The second occurred in July of 2004, where the group visited a feedlot that was relocated away from the Fremont River. For more detailed information see section 6.0 Summary of Public Participation, and section 9.0 Appendices.

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.

**Goal 5:** 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.

## 2.1 Planned and Actual Milestones, Products, and Completion Dates

GOAL/OBJECTIVE/TASK	PLANNED OUTPUT/PRODUCT	PLANNED AMOUNT	ACTUAL OUTPUT	COMPLETION DATE
<b>Goal 1: Objective 1:</b>	Animal Waste Systems	4 ea	1 ea	11/19/2003
Task 1: Install a facility to store liquid and/or solid waste on a temporary basis	Concrete storage structure	2 ea	2 ea	02/28/2003
Task 2: Install a drinking water facility for livestock	Water well and electric pumping plant Pipeline Troughs	1 ea  500 ft 6 ea	1 ea  520 ft 6 ea	10/21/2003
Task 3: Construct fence for use as barrier to livestock	Corral fence	2500 ft	2460 ft	11/19/2003
<b>Goal 2: Objective 1:</b>	Streambank projects	4 ea	14 ea.	12/11/2008

Task 4: Streambank and Shoreline Protection	Streambank Shaping	13,000 ft.	13,292 ft.	11/18/2011
Task 5: Streambank and Shoreline Protection	Rock Barbs	125 ea.	134 ea.	11/18/2011
Task 6: Streambank and Shoreline Protection	Rock Rip Rap	3000 cu. yds	3357 cu. yds	11/18/2011
Task 7: Streambank and Shoreline Protection	Dormant Vegetative Plantings (willows)	1500 ea.	1830 ea.	11/18/2011
Task 8: Streambank and Shoreline Protection	Fence	9500 ft	9962	8/28/2008
<b>Goal 3: Objective 1:</b>				
Task 9: Implement upland management practices	Upland pasture management	120 ac	0	n/a
<b>Goal 4: Objective 1:</b>				
Task 11: Plan and conduct project tours	Conduct tours of projects focusing on functioning riparian areas and animal feedlot re-location	2	2	8/5/2003 and 7/29/2004
<b>Goal 5: Objective 1:</b>				
Task 12: Track Match	Documented funding records	Ongoing	Ongoing	January 2012
Task 13: Prepare and file reports	Semiannual, annual and final reports	Ongoing	Ongoing	January 2012

## **2.2 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. A 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 Fremont River Conservation District has played a key 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. All the above activities are consistent with the intent and scope of Utah's NPS Management Plan.

### 2.3 Supplemental Information



**Before:** Raw vertical banks, erosion has cut into the bank where a fence was once installed.



**After:** Streambank practices included shaping, rock rip rap, rock barbs and willow planting.





**Before:** Raw vertical banks, evidence of severe erosion.



**After:** Practices included shaping, rock rip rap, rock barbs, and willow planting.





**Before:** Raw vertical banks with significant erosion.



**After:** Practices installed include shaping, rock rip rap, rock barbs and willow planting.



Picture of Jacobs new corrals, 3000 ft away from Fremont River.

### **3.0 BEST MANAGEMENT PRACTICES DEVELOPED AND/OR REVISED**

Projects in the Fremont River Watershed were designed to demonstrate reduction in sediment and nutrient loading as well as streambank stabilization and restoration. Best Management Practices used to achieve these goals include to date: livestock exclusion fencing; off-site stock watering; rock barbs; rock rip rap; and willow plantings.

The feed lots that were moved were originally located on or within 50 meters of the Fremont River. They have now been moved to a distance of 1000 meters or more from the river, or to where the slope of the feedlot does not allow runoff to reach the river. The operations that have been implemented have been between 50-600 animals. In addition to the feedlots, off site watering structures have been installed instead of watering cattle directly in the river.

### **4.0 MONITORING RESULTS**

There was no specific monitoring plan set up when this project work began in 2003. DWQ had one long term water quality monitoring site that was located below the AFO/CAFO feedlot projects that were installed in the Loa valley. A summary of the data from that site follows. DWQ has not yet collected water chemistry data below the stream restoration sites. Intensive monitoring of the Colorado River basin will begin in the fall of 2012. At that time, sites above and below the streambank projects will be selected and sampled on a monthly basis for water chemistry parameters including nutrients and dissolved solids. Physical and biological assessments were conducted above, mid, and

below project sites prior to the work and DWQ plans to return for follow up in the fall of 2012 for additional assessments at those same sites to determine BMP effectiveness

#### 4.1 Total Maximum Daily Load (TMDL) Implementation Effectiveness

A Fremont River TMDL was approved by EPA in 2002. The upper Fremont from Bicknell to the US Forest Service boundary was 303(d) listed as impaired for total phosphorus and dissolved oxygen. The TMDL endpoints are total phosphorus concentrations of less than 0.05 mg/L, dissolved oxygen concentrations of greater than 6.5 mg/L and elimination of nuisance algae growth in the main stem and tributaries. The projects completed with this EPA 319 funding all address the impairment in the Fremont River and are recommended BMPs from the TMDL.

#### 4.2 Best Management Practice (BMP) Implementation Effectiveness

To help estimate the effectiveness of the feedlot repairs or replacements we used the Utah Animal Feedlot Runoff Risk Index (UAFRRRI) worksheet. This Worksheet estimates the amount of nutrients taken out of the system through the improvements, and is attached in the Appendices. Also to estimate the effectiveness of the streambank repairs we use the Spreadsheet Tool for the Estimation of Pollutant Load (STEPL). The following table shows results of these calculations:

Project	Risk before	Risk after	Nitrogen Reduction (lbs/year)	Phosphorous Reduction (lbs/year)	BOD Reductions (lbs/year)
Paul Jacobs Corral Relocation	High	Low	983	472	4310
13,292 linear feet of Streambank Repairs to include shaping, rock barbs, rock rip rap, willow plantings	High	Low	3042	1170	2236

#### 4.3 Surface Water Improvements

##### 4.3.1 Chemical

Upgrades to several feedlots were installed to control and manage animal waste to improve water quality. Animal waste operations can yield an increase in nutrients, pathogens, and solids to nearby waterways thus degrading surface water quality. Excessive nutrients can lead to eutrophic conditions causing large algal blooms, low dissolved oxygen, and fish kills. The segment of the Fremont River that these feedlots were impacting is listed on the Utah 303(d) list of impaired water bodies for excess nutrients and low dissolved oxygen. An

increased concentration of pathogens will adversely affect human health. Large amounts of solids could instigate the destruction of aquatic habitat thus decreasing the diversity and abundance of aquatic organisms. It may also cause an increase in turbidity in the water column causing a reduction of photosynthesis (light) hindering both algae and plant growth.

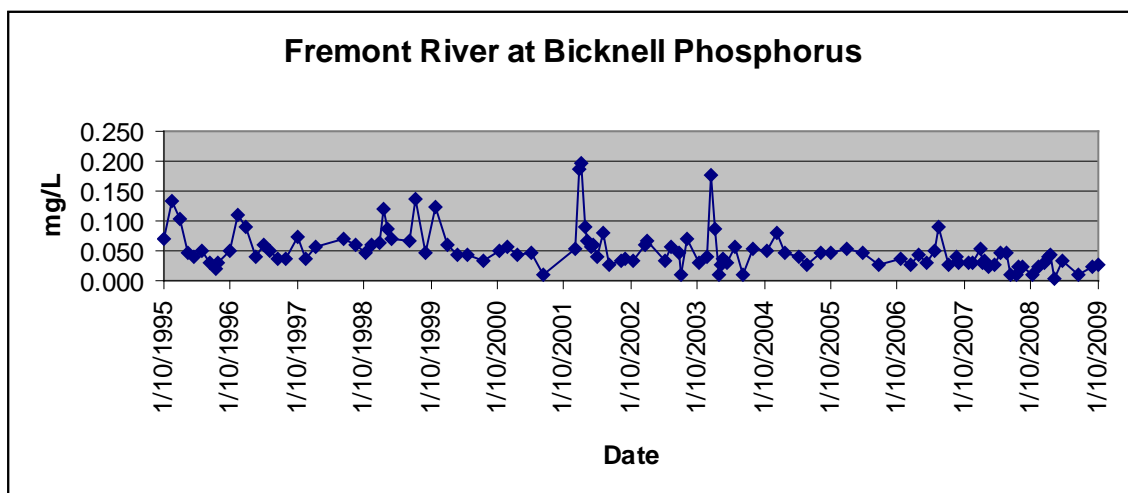
The runoff from several of these farms drained directly into the Fremont River. The Division of Water Quality (DWQ) has long-term water quality monitoring stations (WQS) across Utah. Though no additional monitoring stations were set up for this particular project, data collected from the closest downstream station were assessed to determine if the objectives of these projects were met. The parameters analyzed include total phosphorous (TP), nitrogen (N), and total dissolved solids (TDS). No bacteria monitoring was conducted at any of these monitoring stations so it is unknown if this project reduced the fecal coliform loading into the Fremont River.

The closest downstream monitoring station is the Fremont River at Bicknell, located approximately 7 miles downstream of the projects. It is STORET number 4954380. There is a robust data set for this sampling location because it has been monitored long term by the Division of Water Quality for many years. Data collected between 1995 and 2009 were analyzed for this report.

No monitoring site was established upstream of this feedlot, so an above and below site comparison can not be made. Data from 1995-2001 (pre project) were compared to data from 2003-2009 (post project) to determine if statistically significant differences could be detected between the mean concentrations of the parameters before and after the BMP implementation.

**Parameter Mean Concentrations (mg/l)**

	TP (mg/l)	N (mg/l)	TDS (mg/l)
4954380, Pre 2002 (1995-2001)	0.065	0.05	335
4954380, Post 2002 (2003-2009)	0.038	0.03	301

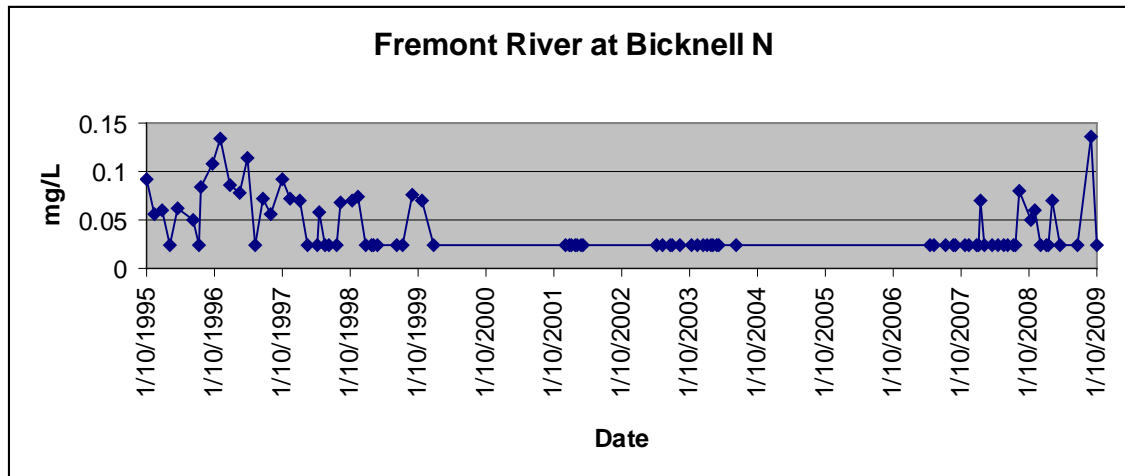


**Graph 1: Total Phosphorus Concentrations in Fremont River at Bicknell.**



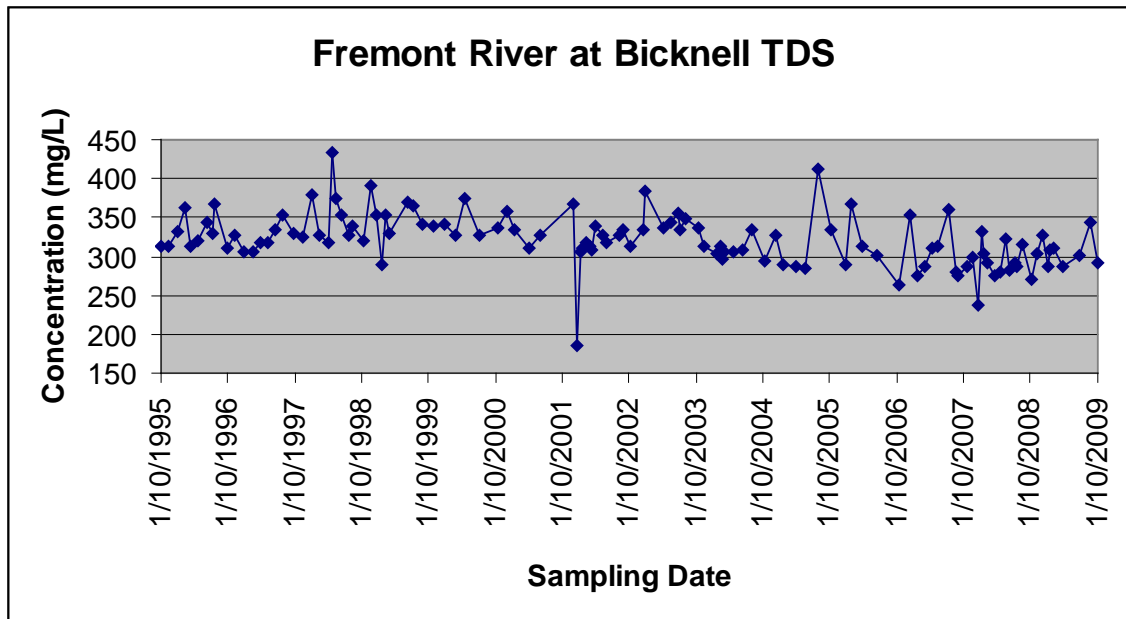
The majority (89%) of total phosphorus concentrations at this site are above the Utah pollution indicator value of 0.05 mg/L. Of the 125 samples the mean TP concentration is 0.051 mg/L, with the values ranging from 0.01- 0.196 mg/L. Note that non-detects were assigned the value of 0.01 mg/L, which is half of the detection limit. One sample was eliminated from the data set because it was greater than three standard deviations from the mean. Based on t-test calculations with a resulting p-value of 0.272, there is no significant difference between the pre (0.065 mg/L) and post (0.038 mg/L) project TP mean concentrations.

**Graph 2: Nitrogen Concentrations in Fremont River at Bicknell.**



Of the 87 nitrogen samples collected from 1995-2009 the mean concentration is 0.042 mg/L, with the values ranging from 0.025-0.137 mg/L. The pre project mean concentration was 0.06 mg/L, while the post project mean concentration was 0.03 mg/L. One outlier was eliminated from the data set. Based on t-test calculations with a resulting p-value of 0.022, there is a statistically significant difference between the pre (0.05 mg/L) and post (0.03 mg/L) project nitrogen concentrations.





**Graph 3: TDS concentrations in Fremont River at Bicknell.**

Total dissolved solids concentrations at this site are all well below the Utah standard of 1,200 mg/L. Of the 120 samples collected, the mean TDS concentration is 320 mg/L, with the values ranging from 186-458 mg/L. Three outliers were eliminated from the data set. Based on t-test calculations with a resulting p-value of  $1.606 \times 10^{-6}$ , there is a statistically significant difference between the pre (335 mg/L) and post (331 mg/L) project TDS concentrations. Anova calculations gave a similar p-value of  $1.61 \times 10^{-6}$ , supporting the hypothesis that there is a pre and post project difference.

Based on the data for this site located approximately 7 miles downstream of Loa valley where the projects were installed, it appears that concentrations of nitrogen and TDS have decreased in the years following the BMP implementation. Ideally, much of that reduction is a true result of the work that was completed. However, this monitoring site is a significant distance downstream of the projects, with considerable spring water inputs in between. It is impossible to draw any solid conclusions without above and below sites that better bracket the project sites. It is worth noting that the state of Utah experienced extreme drought conditions for the years of 2000-2004, followed by a much wetter than average 2005. It is possible that the drought induced reduction in the flow of the Fremont River may also be responsible for the decrease in concentrations seen post project.

#### **4.3.2 Biological**

The amount of sediment and nutrients entering the Fremont River is expected to decrease as a result of these projects, leading to a decrease in algal blooms and improvement in dissolved oxygen conditions for organisms such as macro-invertebrates and fish. DWQ began assessing stream biological health several years with the Utah Comprehensive Assessment of Stream Ecosystems (UCASE). This assessment involves sampling a variety of streams each fall and recording

measurements of physical habitat, substrate, fish and macro-invertebrate communities, and other biological indicators. The results from the UCASE program are being used by the DWQ for beneficial use assessment and to determine BMP effectiveness. One analysis of these results compare the stream macro-invertebrate populations expected in reference conditions with the populations observed in the sampling site. The ratio of observed to expected organisms can be used as an indicator of benthic community health. If only 60 percent of the expected population is observed ( $O/E = 0.6$ ) at a particular site, the site is considered to be impaired and does not support the aquatic beneficial use. The results of the UCASE for the Fremont are presented in the following table. Each of the sample locations was assessed pre project in both 2006 and 2007. The sites are listed in upstream to downstream order. The Fremont River above the USGS gage is upstream of all of the streambank restoration work. DWQ plans to return to each of these locations for additional assessing in upcoming years.

#### UCASE Results for the Fremont River

STORET	Location	Year	Observed/ Expected	Assessment
4954381	Fremont River above USGS gage	2006	0.94	GOOD
		2007	0.80	FAIR
4954382	Fremont River at Maxfield Ranch	2006	0.94	GOOD
		2007	0.80	FAIR
4954385	Fremont River at Red River Ranch	2006	0.86	FAIR
		2007	0.82	FAIR
4954390	Fremont River at U12 xing	2006	1.16	GOOD
		2007	1.01	GOOD

The Utah Division of Wildlife Resources (UDWR) initiated fish distribution surveys in the Fremont River in 2005 and 2006. The primary purpose was to determine the current status and distribution of Bluehead sucker (*Catostomus discobolus*), flannel mouth sucker (*Catostomus latipinnis*), and roundtail chub (*Gila robusta*). These three species have recently been included in an area-wide conservation plan because of declines in their distribution and abundance. All fish species present in the sampled reaches were recorded. Brown trout, rainbow trout, mountain sucker, Utah chub, mottled sculpin,

redside shiner, speckled dace and Utah suckers were all observed. Those surveys were conducted approximately 10 miles downstream of the restoration work so it is difficult to draw any correlations between fish populations and habitat and water quality improvements. Unfortunately, Utah DWR abandoned plans to set up long term fish monitoring stations along the Fremont in the summer of 2010. Several of the stations would have been in the Bicknell Bottoms area where the projects were implemented. DWQ had hopes of using those survey results to look for trends in populations that may have been a result of project implementation.

#### **4.3.3 Physical/Habitat**

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 dwelling organisms will improve. Water temperatures could possibly decrease due to better shading along the river. The UCASE results speak to this in that physical conditions are scored along the reach.

#### **4.4 Other Monitoring**

Natural Resources Conservation Service (NRCS) was responsible for conducting a project implementation check. Utah Association of Conservation Districts (UACD) continues to follow-up with the project cooperators to ensure proper management practices are maintained and to resolve any problems encountered. Recently three UACD employees visited each implementation site and verified that each project is built to satisfaction and being used as required.

#### **4.5 Results of BMP Operation and Maintenance Reviews**

One of the Best Management Practices (BMPs) for the Fremont River project focused on excluding animal access to the river and its tributaries. BMPs include fencing, improved watering systems, stream bank restoration and re-vegetation, and feedlot relocation projects. Managing manure and nutrient 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.

### **5.0 COORDINATION EFFORTS**

The Fremont River Conservation District (District) provided oversight of project development, planning, implementation, approval, creation of fact sheets, administration and reporting. The following specific duties were transferred, as per Memoranda of Understanding, to the following agencies:

- Fremont River Conservation District: approval
- Natural Resources Conservation Service: technical assistance, follow-up
- Department of Environmental Quality: oversight, 319 grant management
- Utah Association of Conservation Districts: administer contract, implementation, education, reporting, technical assistance

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

### **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 Department of Agriculture and Food (UDAF): I&E, technical assistance
- Utah Association of Conservation Districts (UACD): Administration, contracting, staff and technical support

### **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 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

## **6.0 SUMMARY OF PUBLIC PARTICIPATION**

On August 5, 2003, a summer tour was sponsored by the steering committee. The group spent the day in UM creek area to observe and discuss the effects of excluding livestock from the streams by fencing. See the article of this event in the appendix. The 2004 Utah Conservation Field Day featuring projects in the Fremont River Watershed was held on July 29, 2004. One of the tour stops that day was at Mack Morrell's cattle feed lot. His original corrals were located on the banks of the Fremont River, and were relocated away from the river using 319 funds from an earlier demonstration project. This project and Paul Jacobs project reported in this final report were the first two animal waste management projects completed. They have been very effective as demonstration projects. Since that time, 17 additional animal waste projects have been completed, all of which were feedlot facilities near the Fremont River, with the potential to pollute the stream. These projects were completed using funding other than 319 dollars, mostly NRCS EQIP funds.

## **7.0 ASPECTS OF THE PROJECT THAT DID NOT WORK WELL**

At this time all aspects of the projects are working very well. All practices are functioning as designed and the owners are satisfied.

## **8.0 FUTURE ACTIVITY RECOMMENDATIONS**

The Division of Water Quality (DWQ) will return to the streambank restoration project sites in several years to do post project UCASE and see if any improvements in conditions can be seen as a result of the BMP's.

## 9.0 APPENDICES

### 1. Summary of UACD contracts

Project	UDAF contract #	From	To	EPA	Match	Total	Projects	EPA Remaining
FR FY03	03-1758	8/02/02	10/18/06	\$100,000	\$68,364.31	\$168,364.31	4	\$0
FR FY04	05-0867	8/30/04	3/08/07	\$100,000	\$66,155.87	\$166,155.87	5	\$0
FR FY06	06-1024	11/14/05	12/11/08	\$100,000	\$78,429.69	\$178,429.69	5	\$0
FR FY07	07-1027	10/25/06	11/18/11	\$100,000	\$69,445.00	\$169,445.00	1	\$0
<b>Totals:</b>				<b>\$400,000</b>	<b>\$282,394.87</b>	<b>\$682,394.87</b>	<b>15</b>	<b>\$0</b>

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## 2. Utah Animal Feedlot Runoff Risk Worksheet:

## \*Utah Animal Feedlot Runoff Risk Index Worksheet

**Landowner:** Paul Jacobs  
**Location:** Bicknell  
**Planner:** M Turner  
**Date:** March 31, 2010

**Weather Station:** Richfield Radio  
**HUC:** 14070003  
**Precipitation:** 8.6

<b>Lot Description:</b>	Dirt			
<b>Planning Scenario:</b>	Before	After	Before	After
<b>Lot Size (Sq. Ft.):</b>	40,000	70,000		
<b>Surface Type:</b>	Dirt	Dirt		
<b>Animal Type:</b>	Beef (Feeder)	Beef (Feeder)		
<b>No. of Animals:</b>	240	240		
<b>Avg. Weight:</b>	650	650		
<b>Days Confined:</b>	150	150		
<b>Sq.Ft./Animal:</b>	166.7	291.7		
<b>Feedlot Features</b>				
<b>Runoff Containment</b>	40	5		
<b>Distance to Water</b>	8	0		
<b>% Slope</b>	0	0		
<b>Vegetation</b>	4	1		
<b>Clean H<sub>2</sub>O Diversion</b>	4	2		
<b>Index and Risk Level</b>				
<b>Index:</b>	56.0	8.0		
<b>Risk Level:</b>	Medium	Very Low		
<b>Manure Management and Conservation Practices</b>				
<b>Haul/Scrape Frequency</b>	Annually	Annually		
<b>Practices to be implemented</b>	Build new corrals away from the water with four new watering troughs			
<b>Loading Calculations</b>				
<b>Fresh Manure (tons)</b>	689	689		
<b>Total N Available (lbs)</b>	3,990	3,990		
<b>Total P Available (lbs)</b>	1,917	1,917		
<b>Total BOD<sub>5</sub> Available (lbs)</b>	17,503	17,503		
<b>Precipitation Factor</b>	0.68	0.68		
<b>Lot Surface Factor</b>	0.90	0.90		
<b>Risk Factor</b>	0.40	0.00		
<b>Total N Loading (lbs)</b>	983	0		
<b>Total P Loading (lbs)</b>	472	0		
<b>Total BOD<sub>5</sub> Loading (lbs)</b>	4,310	0		

\*Individual high risk features should be evaluated and conservation practices applied where possible. All runoff from a 25-year, 24-hour storm event must be contained on the lot.

## Practices that might be implemented:

Move Lot	Install Dike	Install Filter Strip
Regrade Lot	Install Diversion	Roof Runoff System
Build Storage	Increase Sq.Ft./Animal	Change Hauling Frequency
Increase Storage		

Filename: UM Creek tour minutes 8-5-03

**Fremont River Watershed Summer Tour**  
**U.M. Creek Watershed – Excluding Livestock from the creek**  
**August 5, 2003**  
**10:00 am**

Seventeen interested people met at the Fish Lake Forest Service Building on Aug. 5, 2003 at 10:00 am. to attend this tour, (see attached roll for names and organizations). The people boarded a state owned van provided by Dept. of Environmental Quality and several personal vehicles and drove from Loa to the Johnson Reservoir dam site camping area. The route followed the course of the Fremont River upstream to the reservoir.

Fremont River Watershed Workgroup Chairman called the meeting to order and asked everyone to introduce themselves. He then invited Paul Pace Farm Service Agency County Executive Director to present information about the development and accomplishments of the workgroup. Carl Adams and Harry Judd of the Utah State Division of Water Quality expressed their thoughts relative to the recently completed Fremont River Watershed Water Quality Plan focusing on the Total Maximum Daily Load, (TMDL) aspects. A discussion was held about the importance of the local people being involved in projects that impacted the Fremont River Watershed. Curtis Robbins of the Fish Lake National Forest presented an overview of the livestock exclusion project on a tributary of the Fremont River, U.M. Creek. This project will fence livestock off the creek from its beginnings and through Black and Water Flats. A discussion was held relative to the necessity for this project. The issues that arose were the whether the riparian condition of the stream really was impaired enough to warrant this action and that the Forest Service should have been involved with the Fremont River Soil Conservation District and the Fremont River Watershed Group early in the planning stages of this project.

After the presentations and discussion a lunch was provided by the Fremont River SCD through the Information and Education portion of the Fremont River Watershed Non-Point Source contract. After this short break the group traveled to Water Flat along U.M. Creek and stopped where the creek crosses the road. Curtis and Robbins and Bob Campbell of the Fish Lake National Forest presented information they felt was important to justify the livestock enclosure. Riparian values such as water depth, width, temperature and stream bank characteristics were included. The temperature of the water was taken at this location and found to be in the desired range.

The group then traveled to Black Flat and looked at the riparian conditions there. It was noted that the east side of the stream had all of the desirable features of a fully functioning riparian area. The west side of the stream showed some evidence of erosion and plants that weren't as desirable for holding stream banks in place. It was also noted that this particular area was where all of the vehicular, human and livestock crossed the stream so negative impacts and some not-fully-functioning characteristics were likely to happen.

It was noted that livestock watering facilities were planned to be developed off of U.M. Creek to compensate for them not being able to drink out of the creek once the exclusionary fencing was completed.

**ANNUAL UTAH CONSERVATION FIELD DAY**

Thursday, July 29, 2004

Wayne County, Utah

7:00 AM – 3:00 PM

**THEME:** IMPLEMENTING WATER QUALITY PROJECTS IN THE  
FREMONT RIVER WATERSHED**PLACE:** Wonderland Inn, Junction Hwys 12 & 24, Torrey, Utah (E. of downtown)**COSTS:** \$20.00 Pre-registration (must be received by Monday, July 19th)  
Registration after Deadline \$25.00**REGISTRATION & SPONSORSHIP INCLUDES:**

Breakfast Buffet, Dutch Oven Dinner, Breaks, and Bus Transportation

**SPONSORS:** Utah Soil Conservation Commission, and  
Fremont River Soil Conservation District**AGENDA**

7:00 – 8:00 Registration & Breakfast Buffet at Wonderland Inn  
 8:00 – 8:10 Welcome & Introductions  
 8:10 – 8:40 Local Customs & Culture  
 8:40 – 8:50 Board Buses  
 9:30 – 9:50 Capitol Reef Nat'l Park Interpretive Presentation  
 10:00 Board Buses for Water Quality Tour

- Corral Re-location Presentation
- Canal-Berm Presentation
- Canal Piping Presentation

1:10 PM Arrive at Loa/Turner Park for Dutch Oven Dinner  
 2:20 Load buses  
 2:45 Arrive at Wonderland Inn Parking Lot

**FOR MORE INFORMATION CALL: David Pace at: (435) 896-8566**

Send bottom section with pre-registration

**UTAH CONSERVATION FIELD DAY – Fremont River Watershed - 7/29/04**

<b>NAME:</b> _____	<b>SPOUSE:</b> _____
<b>ADDRESS:</b> _____	
<b>PHONE:</b> _____	
Make Checks To: FREMONT RIVER SCD	Amount Enclosed.
Send To: Fremont River SCD, c/o David Pace	\$ _____
340 N. 600 E., Richfield, Utah – 84701	\$ 20 per person

See back for motel info