SECTION 319 NONPOINT SOURCE POLLUTION CONTROL PROGRAM
UPPER BEAR RIVER WATERSHED RESTORATION PROJECT
FINAL REPORT

Upper Bear River Watershed Restoration Project-Norm Weston-FY-06

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

Sub-Grant #07-0895

Executive Summary

The Bear Lake Regional Commission has been actively engaged in implementing Best Management Practices on Thomas Fork Creek in Idaho for over 10 years. This project is the second streambank stabilization project completed on the Bear River by the Regional Commission in Utah. The project is located in the northeast corner of Utah in Rich County. Project construction was initiated in November of 2007 and completed on September 15, 2008. Several site visits with technical personnel were conducted before this date. Best Management Practices were applied along 2,100 linear feet of degraded streambank on the Bear River to address sediment, nutrients and dissolved oxygen concentrations in the water column. This location of the Bear River is identified in the adopted TMDL with limiting dissolved oxygen concentrations. Approximately 268,800 cubic feet of soil was excavated and removed to upland areas while over 100 bales of straw were staked into the toe of the slope and over 2400 linear feet of exclusionary fencing was erected. The project cost $ 34,000 and match dollars amounting to $22,812 accounting for 40% of the total project. Most of the match requirement was met by the landowner. Outreach activities included a tour of the project upon completion, a press release in the local newspaper and anticipation of an additional tour in the spring of 2008. Overall, the project was implemented on time but cost more than anticipated largely due to weather factors.

Introduction

The original proposal identified the need to rehabilitate 2,000 linear feet of riparian area that had been significantly impaired along the Bear River in Rich County, Utah. This proposal was submitted during fiscal year 2006. Budgetary constraints required the proposal be tailored to a smaller funding amount. Communication with the landowner indicates that valuable agriculture land is being lost at a rate of about 5 feet per year as a result of unstable streambank conditions. The property is owned by Norm Weston and is located between Sage Junction and Woodruff Narrows Dam. The segment of river between Sage Junction and Woodruff Narrows Dam is 59 river miles in length. This stretch of Bear River has been identified as not meeting its beneficial uses. The State of Utah has compiled a list of all water quality impaired streams across the state (303(d) list) and has determined that the Bear River over this segment does not meet beneficial uses due to dissolved oxygen concentrations in the water column. The TMDL

was prepared by Cirrus Ecological of Logan, Utah and was completed around 2006. TMDL development along this segment has received a high priority by the Utah Division of Water Quality. This project implemented Best Management Practices through prescribed bioengineering practices that address erosion of streambanks and the introduction of sediment and nutrients to the Bear River. Practices that would directly address the problems evident on the Bear River include:

1) Bank shaping
2) Revegetation of the riparian area utilizing native stands and grasses
3) Exclusionary fencing of the riparian with limited access gates

The purposes of this project are threefold, namely:

1) reduce non-point source pollution entering the Bear River that might further impair beneficial uses
2) reduce the loss of valuable agriculture land through implementation of BMP's.
3) help the state achieve water quality standards for this segment of river.

These purposes will have numerous positive impacts on the area including:

-preservation of agricultural land
-Reduced sediment and nutrient loading in the Bear River
-Increased dissolved oxygen concentrations/decreased temperature
-Nutrient uptake by stabilized riparian zone
-Enhanced fisheries habitat
-Preventative action through stakeholder involvement.

Similar treatments have been implemented on Thomas Fork Creek with encouraging results. Thomas Fork is a tributary of the Bear River Located 40 miles downstream of the proposed project and presents many of the same obstacles as found on the Bear River. Nearly vertical streambanks and the absence of riparian vegetation have resulted in excessive contributions of sediment and nutrients and have resulted in listing on the State of Idaho 303(d) list of impaired waters and a priority waterbody for treatments outlined in the State Agricultural Water Quality Plan. The Bear Lake Regional Commission has worked closely with local landowners on the Thomas Fork to address a specified need to reduce the sediment and nutrients entering the creek. With financial assistance from the State of Idaho 319 program and landowner cooperation, over 15,000 linear feet of treatments have been applied to the streambanks of Thomas Fork. Active monitoring has provided evidence that significant reductions have been achieved through implementation of BMP's

Ultimately, this project will result in an improved riparian area and water column through implementation of BMP's. These BMP's will result in a reduction of sediment and nutrients and increased dissolved oxygen. Re-shaped banks will result in approximately, 250,000 ft^3 of soil retained in place. Effects of the project are expected to reduce sediment and nutrient concentrations by 5% and improvements to dissolved oxygen by reducing the temperature of the stream by 2 degrees along the stretches described for treatment. Likely the reduction in stream temperature will not be observed for several years or, until riparian vegetation has been re-established.

The Bear River Watershed encompasses parts of three states (Figure 1). The total river length is approximately 500 miles. The watershed (basin) covers about 7,580 square miles, with approximately 35% of the area in Idaho, 45% in Utah and 15% in Wyoming. Mountains, high plateaus, and broad valleys provide contrasting topography which in turn influences uses, ownership, and vegetation. Rangeland, cropland, timberland, wetlands and minerals make up the majority of the list of available land based resources. This project is located in hydrologic unit code 1060101 of the Upper Bear Subwatershed of Rich County, Utah (Figure 2). Lattitude/longitude coordinates identifying the project location are 41º 43' 10.98" N latitude - 111º 04' 53.76" W longitude. The Bear River in this region is highly sinuous, low gradient and the bed material is primarily silty clay, or, a Rosgen B6 stream classification. Soils in this area resemble wetland soils under a flooded irrigation schedule. Strong organic matter at the surface with noncohesive silty clay several feet below characterize the soil profile in this region.

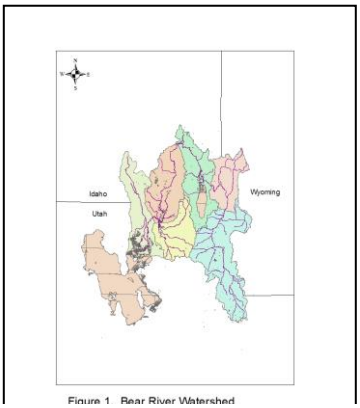

Figure 1. Bear River Watershed

Figure 2. location of proposed streambank stabilization project

Historically, this stretch has been inhabited by Bonneville Cutthroat Trout. Populations of this species have been on the decline in this area as a result of habitat degradation. This species has been petitioned for listing as a sensitive species while the Leatherside Chub has been identified by the State of Utah as a sensitive species.

The stretch of the Bear River proposed for rehabilitation under this request is 2,000 feet in length. Passive erosion has increased the angle of the streambank and eliminated historic riparian vegetation.

Hydrologically, the Bear River achieves maximum runoff during the spring and early summer as a result of snow melting off higher elevations. Summer brings occasional thunderstorms with high intensity/short duration precipitation events. Over a period of 49 years documented recordings of the Bear River near this location have produced peak flows of 3,500 cubic feet per second with a low flow of 2 cubic feet per

second. Median flow in the Bear River near Randolph is 81 cubic feet per second. These flows were calculated over a period of record from 1943 to 1992.

The Bear River flows into Bear Lake which straddles the border of Utah and Idaho. The lake measures eight miles wide by twenty miles long and has a surface area of 110 square miles at high lake level. Bear Lake has been labeled as the jewel of the Rocky Mountains due the "carribean blue" color of the water. It is an oligotrophic lake and home to four endemic species of fish: Bonneville Cisco, Bonneville Whitefish, Bear Lake Whitefish and Bear Lake Sculpin.

This segment of the Bear River is on the 303(d) list of impaired waters for low dissolved oxygen. The State of Utah lists this reach as partially supporting beneficial uses. Beneficial uses along this reach are cold water aquatic life.

The Bear River, which flows north through Rich County, Utah, includes a diversity of topographic features which provide for a range of other features. The county is 654,080 acres with 26% being administered by the Bureau of Land Management, and 7% administered by the U.S.D.A. Forest Service. Land ownership is currently divided by state and private entities. Private ownership consists of 55% of the land while the State of Utah retains ownership of 10%. The remainder of the land is tied to rights-of-way, and urban centers.

Water quality problems in the watershed are a result of chemical, biological and physical/habitat alterations. Elevated concentrations of sediment and nutrients such as nitrogen and phosphorus are found in the watershed and lead to eutrophication of the waterbody. Dissolved oxygen is listed as the constituent of concern to the Bear River along this stretch as outlined in the State of Utah 303(d) list. Concentrations of dissolved oxygen in the water have direct impacts on other water quality characteristics, aquatic invertebrates, and fish species. Reduced levels of dissolved oxygen can be associated with degraded physical conditions and habitat. Renewal of the riparian corridor as outlined in this proposal would combat the increased nutrient concentrations and reduced dissolved oxygen levels by providing cover, enhancing the uptake of nutrients, and shading the water. These treatments would also contribute to the enhancement of fisheries habitat and encourage the return of the Bonneville cutthroat trout.

Rich County is a composite of six basic topographic areas. Stretching from north to south along the entire western perimeter of the county, the Wasatch Mountains are the dominant element elevationally and topographically in the county. Long, smooth topped ridges extend in an easterly direction from the high forested summit ridge of the Wasatch Range, and enclose smooth sided, predominantly sage-covered canyons. These drainages, several of which contain perennial streams, ultimately empty into the Bear River and its' wide, flood plain. The Bear River Valley forms the second major land element in the county. Extending from south to north, this green agricultural corridor is abruptly enclosed on its eastern edge by the strong vertical walls of the Crawford Mountains. These mountains provide the high elevation of the county at7,900 feet, while the surface of Bear Lake establishes the low elevation at 5,923.65 a.s.l. Bear Lake

is a receiving water for the Bear River after it has passed through the States of Idaho and Wyoming after leaving Utah. Bear Lake forms a fourth major landscape element of the county. Less noticeable, but important, elements form the remaining two topographic units in the county. A highlands dry farm area, lies in the northeast portion of the county and is dissected by numerous drainages emptying to both west and east. Two unique visual entities, Black Mountain and Lake Ridge, dominate this area, and afford major views of the surrounding region. The second lies at the southern end of the county. Composed of numerous sage covered canyons and high plateau rangelands, this area is dominated by McKay Ridge running east to west, and by Neoponset Reservoir, and important waterfowl nesting and migration area. The climate is one of long cold winters punctuated by short warm summers. The growing season is short and typically falls between 80 and 100 days. Low temperatures during the winter average 4° F with a high temperature averaging 80° F during the summer months.

Quantity, timing, and type of precipitation vary throughout the area. Mean annual precipitation ranges from less than 10 inches in the valley areas to more than 40 inches at the upper elevation. Most precipitation to the area falls during the winter months in the form of snow, while summer brings intermittent thunderstorms, which provide minor amounts of water.

Precipitation distribution, both temporal and spatial, influence vegetative growth in the region. Vegetative growth depends heavily on spring snow melt and early spring storms. Within the region of interest, grasses have been planted that contribute to the overall agricultural community. Alfalfa, pasture and small grains are the predominant agricultural vegetation with other rhizominous wetland grasses and forbes such as equisetum sp. are prolific near areas too wet to harvest or graze.

The western front of the Crawford Range is composed of many immense triangular, steeply-dipping slabs of light-colored rocks that are commonly called flatirons. These outstanding features were produced during the thrust faulting which caused the uplift of the entire Crawford Range. Other geologic feature of economic interest are the phosphoria formations where significant quantities of phosphorus have been mined. Other similar deposits consist of fluorine, uranium, vanadium, selenium, chromium, nickel, zinc and molybdenum.

Soils of the county have been divided into six generalized units based on features held in common. The soil type within the project location is classified as wet meadow. This soil type is commonly found along the valley floor at elevations between 5,930 a.s.l. and 6,400’ a.s.l. with slopes between 0-3%. Soils consist of fine silts and clays with little organic matter.

The economy of the watershed is reliant upon agriculturally based activities. Cattle ranching is among the single greatest economic activities due to the abundance of lush meadow grasses in the area and proximity to upland grazing sites. Other industries such as mining and forestry are part of the economic base of Rich County. Recreation is

fast becoming an integral part of the economy of Rich County in and around Bear Lake. Lodging income due to recreation around the lake increases by roughly 33% each year.

Agricultural practices in the area are primarily related to grazing animals. Grazing cattle is the most prevalent and consist of 85% of the production while sheep make up the remaining 25%. Animal feed comes from meadow hay and planted crops. Meadow hay is produced annually without assistance from landowners. Alfalfa and hay are planted on a seven year rotation. Grains are planted for three years consecutively between alfalfa rotations. Flood irrigation is the most common irrigation method. 75% of the farmland in Rich County is flood irrigated while 25% is piped to the desired location. Irrigation season is highly dependent upon precipitation events during the year. Typically, landowners start irrigating prior to May 1 and finish in early September. The Bear River provides a significant source of water for many irrigators. Management practices allowing direct access for livestock have degraded much of the Bear River through Rich County. Cut banks are often vertical and void of riparian vegetation while point bars in the system have healthy willow and river birch communities.

The beneficial uses of the water resources include: irrigation, fisheries, recreation, and power generation downstream.

Project Goals, Objectives, and Management

Objective 1.
Obtain funding and permits prerequisite to rehabilitation of riparian corridor along the Bear River.

Task 1.
Provide funds for Bear Lake Regional Commission to coordinate site inventory with Utah Association of Conservation District and NRCS to evaluate channel morphology and refine broad rehabilitation techniques. Acquire necessary permits and authorization. Permits required for this project include a stream alteration permit from the Army Corp of Engineers.

This task will involve site visits with vegetation and restoration specialists from the Utah Association of Conservation Districts and NRCS. Pertinent information will be collected relative to the site. Suitable design for the area will be developed based on discussion with UACD specialist. Submission of permit requests and authorization from the proper State and Federal Agencies prior to starting work.

Outputs.
Completed and submitted application for stream alteration

Cost: $755

Task 2.
Provide funds for to implement of streambank stabilization techniques and reintroduce riparian corridor vegetation. Soft-touch techniques will be explored as site specific treatments are developed. This task will include the following elements:

- Collection of necessary vegetation and construction equipment to staging area on site.
- Earthwork, bank shaping to reduce bank angle from vertical to 2.5:1 to 3:1 slope. Approximate volume removed to upland sites- 268,800 ft^3
- Revetment placement, banks will be stabilized using a combination of willow wattles and willow clumps and baffles.
- Re-vegetation of streambanks, banks will be re-vegetated using native seed mix, willow plantings and transplanted vegetation from healthy communities on site.
- Exclusionary fencing to keep cattle off rehabilitated sites

Outputs

- 2,100 feet of bank shaping to 2.5:1 to 3:1 slope
- 2,100 feet of revetments using willow wattles, baffles and clumps
- 2,100 feet of revegetation including a mix of site specific seed mix, willow plantings and native grass transplants.
- 2,400 linear feet of fencing

Cost: $26,000

Objective 2. Administration
Develop and implement a project evaluation, administration, coordination and stewardship program that determines the effectiveness of the proposed activities and promotes long term care.

This task will be required for grant management. It will involve the writing of progress reports, grant oversight and fiscal management. Coordination with the Bear River Water Quality Task Force, Bear River Basin Advisory Group, Soil Conservation District and TMDL development from the three states.

Task 3.
Provide funds to support Bear Lake Regional Commission staff to develop and implement a project administration program. Mid-year and annual progress report will be submitted to document the progress of the project. A final report will be submitted and all reports will be written according to EPA guidelines.

Output
a) management of the grant

b) coordination activities
c) mid-year, annual and final reports

Cost: $3,178

Objective 3. Monitoring.

Task 4.
Provide funds to develop and implement a project monitoring program that will determine the effectiveness of the program in meeting the projects objectives. A visual monitoring program will be established on the Bear River to visually document (photo points) the stabilization of the Bear River streambanks as a result of project implementation. This will be conducted before, during and after construction for a period covering the growing season with photos taken every six months. In addition, stream transects will be established to quantitatively document the banks stability. Load reductions for the project will be presented from model results. The model used will be selected from those models approved by EPA for the purpose of estimating load reductions through implementation of BMP's. Bear River waters flow into the Bear River which flows into Bear Lake. Bear Lake Regional Commission conducts annual monitoring of Bear Lake to evaluate current water quality conditions in the Lake and maintain a current water quality database to track trends on this regional resource, which is designated as a "Special Resource Waterbody" by the State of Idaho Legislature. Monitoring costs on Bear Lake will be claimed as match for this project to evaluate impacts of the Thomas Fork and Bear River to these receiving waters of the Lake.

Output
Final report with load reductions and documentation of photo points and stream transects.

Cost: $3,100

Objective 4. Information and Education

Task 5.
Provide funding to establish an environmental stewardship program. This task includes two activities:
1) Provide coordination with other water quality and planning and coordination work in the watershed
2) Press release to local newspaper

Outputs
1) Press release to local newspaper
2) Coordination with other water quality activity and planning in the basin

Cost: $967

Monitoring Plan and Results

An adequate monitoring plan should accompany any implementation project as a tool to evaluate the success or failure of the project. Much can be learned from a well planned monitoring project in terms of what went well and what did not. Adjustments can be made and future projects made better.

A monitoring plan was proposed in the original project implementation plan to evaluate the efficacy of the proposed treatments on water chemistry and channel morphology above and below the project. Water chemistry parameters to be tested included: total suspended sediment, nitrogen, and phosphorus. Physical components to be tested included: dissolved oxygen, conductivity, pH and temperature. Surveys of the stream cross-section were proposed at several locations along the length of the project. Photo points were also proposed as a method of monitoring the progression of the project over a period of time.

After review by the Utah Division of Water Quality stream monitoring section they determined the monitoring proposed in the original project implementation plan would yield little if any beneficial information. Given the limited spatial extent of the project there would be little discernable change in the water chemistry.

The surveyed cross-sections were also abandoned on the basis of safety. Much of the year, Bear River flows are sufficient that wading across the current subjects a person to dangerous situations where drowning is a real possibility.

Photopoints were collected at several locations along the length of the project before, during and after construction. As can be seen from the following pictures.

Load reductions associated with implementation of Best Management Practices were produced using an EPA approved model. STEPL was used to estimate the amount of pollutants reduced from the successful implementation of Best Management Practices along a severely degraded stretch of the Bear River. Load reductions were as follows:

Nitrogen	856.7 lbs/year
Phosporus	165.9 lbs/year
Sediment	1968.1 tons/year

Figure 3. Photo taken midpoint along the length of the project prior to treatment implementation.

Figure 4. Photo taken midpoint along the length of the project looking west with treatments in place minus fencing wire.

Figure 5. Photo taken at the upstream end of the project looking west with no treatments implemented.

Figure 6. Photo taken at the upstream end of the project looking west with most treatments in place minus deformable revetments and fencing.

Figure 6 a) Upstream location of project, late summer 2010.

Figure 6 b) At the upstream end, looking upstream (southeast), summer 2010.

Figure 6 c) Remnants of hay bale used for bank stabilization, summer 2010.

Although, photo points were the only documented monitoring method used in this project there were a number of other observations that were made on this project and similarities to previous projects. Each of the BMP's implemented we used because they perform a particular function. The overall goal of this project was to employ treatments that would have the greatest cost/benefit ratio with the hope of improving water quality and cessate the loss of valuable agriculture land to the rancher.

Several weeks transpired after the completion of the bank shaping and seeding activities. During this time, there were a number of late season rain events that provided much needed moisture to the soil. It was interesting to note that in a short time after the completion of the treatments and the rain event, there were grasses growing along the base of the bales and at some locations along the bank.

Although the Bear Lake Regional Commission has implemented a number of streambank stabilization projects in the past, it never occurred that bank shaping provided more than a stable slope for seed to germinate. By shaping the bank back to a more stable slope and removing excess soil, sunlight is being provided to seeds that were shaded most of the year prior to soil excavation. Life giving sunlight is now being cast on both seeds and planted willows much earlier in the year and earlier in the day during the summer months. They are also receiving a greater portion of moisture than pre-construction. Bankshaping has now created a void where blowing and drifting snow can accumulate and used later as water.

Coordination Efforts

Over the course of the project numerous agencies and organizations collaborated on the final design of the project and outreach efforts. During the initial design of the project technical assistance from the Utah Association of Conservation Districts and Natural Resource Conservation Service was sought. Numerous site meetings were conducted and design alternatives pursued. Both agencies provided input and feedback and appropriate installation of proposed Best Management Practices to achieve the greatest results.

Outreach efforts have included a number of avenues of information dissemination. A tour was conducted on October 9, 2008 to show the Bear Lake Regional Commission board the final product. Other outreach efforts include a power point presentation to the Bear River Water Quality Task Force. The task force is an ad hoc organization coordinating and providing technical feedback for water quality projects in the Bear River Basin.

Shortly before the project was completed, a preliminary review was conducted by the Utah State Engineers Office. Personnel from the engineers' office conducted a site visit and reviewed the treatments implemented for consistency with known methodologies. Another visit will be conducted in the spring season after winter snows have melted and the site is visible and treatments can be evaluated after being subjected to snow melt and other site conditions.

Lessons learned

Although this project took just over a month to complete, a number of lessons were learned that could be applied to other projects. Technical service personnel recommended the use of deformable revetments during project development. Justification for this technique was based on the lack of appropriate geologic material within close proximity of the project that could be used for rip-wrap and the lack of geologic material naturally occurring as part of the morphological composition of the soil.

While constructing the straw bale revetments the longevity of the bales came into question. Bales in and of themselves are not a durable product. Under natural circumstances the bales decompose and disintegrate leaving little or no protection for the disturbed sites. Concern was expressed by those implementing the bales whether or not they would even maintain their integrity to the first high water event.
If the bales are intact after the first high water event, then there is no question as to their usefulness. Only a few short weeks after the bales had been in place, it was observed that grasses were growing out of the interface where the bale meets the exposed soil. Modifications had to be made to standards for deformable structure retention. Deformable revetments retention required posts to be driven through the bales in the river. Several 6 inch diameter posts were shattered while pounding them in place due to the clay layer underlying the bank and composing the riverbed. Also, pounding grade stakes into the small bales on the edge of the bank proved to be exhausting and heavy handed. An alternative was to pound the grade stakes into each end of the bale parallel to the edge of the bale.

Ultimately, future monitoring of the project will provide better information about the utility and effectiveness of the treatments implemented. The Bear Lake Regional Commission will continue to monitor the project over the coming months to evaluate the effectiveness of new treatments.

Future Activity Recommendations

There are many miles of eroding streambank along the Bear River between Sage Creek Jct. and Woodruff Reservoir. It would be the recommendation that emphasis be placed on the benefits of streambank stabilization projects to improve water quality.

Project Methodology

Project implementation consisted of a mix of previously used treatments and a number of treatment not considered by the Bear Lake Regional Commission. Treatments applied at this location include: bank shaping, willow planting, re-seeding, deformable revetments, and exclusionary fencing.

Bank shaping consists of removing excess soil and grass mat at the top of the bank. Heavy equipment is used to excavate the soil to a 2.5:1 slope measured from the surface of the water at the edge of the bank. Excess soil is placed in a dump truck and removed to upland sites and placed strategically to improve pastureland. At this location,

approximately 268,800 cubic feet of soil were removed and placed as fill in upland locations.

Several years ago the landowner lost a significant amount of pastureland as a result of a nearby irrigation ditch breaching a dike. Weeks of heavy irrigation weakened a dike that crumbled and spilled 10 cfs of water across his pastureland eventually creating an expanse 40 feet wide and 12 feet deep. Much of the overburden soil from this project was used to fill this void. Soil deposited at this location to fill the void reconnected two pastures and enhanced travel through the field (Figure 13).

Figure 13. View of the depression where overburden was deposited

Willows are a highly robust vegetative treatment that have wide applicability and a range of survival rates. At this location willows were planted at 6 inch spacing for five hundred feet. Willow plantings were placed by excavator were planted at 20 intervals where stock was available. In total, about 1000 willows were planted by hand and 8 willow clumps were planted along the project.

Native grass seed is used to accelerate cover on disturbed soil areas. Grass seed was spread by hand along each of the disturbed areas along the project. Seed was not only broadcast along the newly created riparian zone but also those areas where excess soil was used as fill material. The seed mix is specifically suited to arid locations where the soil matrix contains significant clay content. Sheep fescue, riparian wheatgrass and crested wheatgrass are contained in the mix.

Additional deformable structures were implemented for erosion control along the length of the project. Over 100 bales of straw were placed end to end along the toe of the slope to reduce erosion. Bales were staked into the ground using 48" grade stakes to prevent movement of the bales during high flow events on the river.

Overall, it is anticipated that the treatments implemented will be successful at improving water quality conditions at this location. Reseeding, bankshaping and willow planting techniques have been used by the Bear Lake Regional Commission at other projects with great success. The deformable structures were new and will be monitored as to their ability to control erosion and enhance vegetation growth in the area.

All treatments were installed according to NRCS standards and specifications.

All expenses related to the project have been kept and are accounted for through the Bear Lake Regional Commission. The following tables compare the estimated costs from the original approved project implementation plan to the actual expenses.

		Original PIP	Actual Expenses
Objective 1 Construction			
Task 1	Permits	$1,000	$755
Task 2	Construction	$26,750	$26,000
Objective 2 Administration			
Task 3	Administration	$2,500	$3178
Objective 3 Monitoring			
Task 4	Photopoints	$3,500	$3100
Objective 4 Information and Education			
Task 5	Outreach	$1,000	$967
Total		$34,000	$34,000

Table 1. Comparison table of original estimates and actual expenses incurred during the implementation of project tasks.

There were several tasks that changed during the time of the proposal submittal and the approved project implementation plan that should be clarified. Any category that was not fully spent was moved to the construction category.

Originally, monitoring was going to cost $2,000 and consisted of water chemistry samples and surveyed cross-sections of the river channel. Because those items were not approved and we were on site anyway, the $2,000 for monitoring was lumped in with construction. The other categories that were not spent were also lumped into the construction category.

Justification for this transfer is simple. The cost of running construction equipment has risen dramatically in the last two years and as a result, costs associated with construction needed to be supplemented. These transfers were approved verbally by Mike Reichert over the phone as they were discovered.

Conclusion

Overall, the project was completed successfully when all the factors were considered. Treatments only deviated upon request by the governing technical assistance body which made recommendations and supporting guidance on implementation. Budgets were adhered to with as much precision as possible. Treatments were implemented according to NRCS specifications. There is some question as to the ability of the straw bale revetments to withstand elevated flushing flows during the spring of the year. Outreach efforts were all accomplished according to requirements.

Often success of a project isn't in the number of linear feet completed but rather the satisfaction of the landowner and interest by the neighbors. Other landowners have taken an interest in the project and seem interested in the benefits to water quality.

Working with the State of Utah has been a satisfactory experience and one that reinforces their commitment to water quality. It has been a highly enjoyable experience

and we hope to continue our working relationship with the state engineers office, the association of conservation districts and the division of water quality.