



Section 319 Non-Point Source Pollution Control Program

Watershed Project Final Report

Middle Bear

By

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Grant #

UDAF Contract # 07-1028
UDAF Contract # 09-1033

UACD Job # 659
UACD Job # 115-08

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1.0 EXECUTIVE SUMMARY

Projects in the Middle Bear Watershed have been going on the ground for over ten years. Previously, Cache Valley had several different 319 contracts in various sub watersheds. For the ease of reporting and project tracking, it was decided that it would be more efficient to finish out those contracts and develop one large grant for the entire Middle Bear River Watershed. This report represents the first funding year of the Middle Bear River Watershed Grant.

Water quality improvements under the Middle Bear Watershed Grant began in October 2006. The need for funding arose as more attention was given to how much various agricultural practices within the Cache Valley impacted water quality within the Middle Bear watershed. Due to the large number of dairies and animal feeding operations within the Middle Bear River watershed, the majority of grant funds have been spent on water quality improvements within these types of operations.

The primary goals of this grant have been to reduce nutrient and sediment loading from animal feeding operations (AFOs) located directly on, or adjacent to, the Bear River and its tributaries, and riparian area enhancements to further reduce sediment and nutrient runoff. These goals have largely been accomplished through the implementation of the following Best Management Practices (BMPs):

- installation of animal waste storage facilities
- relocating animal feeding operations
- providing off-stream watering facilities for livestock
- installing water conveyance pipeline
- fencing off and vegetating of critical riparian areas
- improving efficiency of irrigation systems in areas with high erosion rates
- informing and educating the community about non-point source pollution
- promoting improving water quality improvements within the watershed

Most projects in the Middle Bear River Watershed have focused on improving storage and management of animal waste, as well as removing livestock from streambanks 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 kept livestock away from waterways and reduced nutrient and sediment loading. Several thousand feet of cross fencing have been installed to initiate rotational grazing on fragile pasturelands. The installation of improved irrigation systems has also reduced runoff and soil erosion.

The primary informational and educational activities for Middle Bear projects have been the distribution of educational materials such as fact sheets and manure management planners. Public meetings were held regarding the availability of financial assistance to local producers. There has also been a big push to educate the general public regarding pollutions from storm drain pollution. There has also been a natural resource field day established called Mountains to Wetlands Wild. These field days focus on watersheds including water quality, wildlife, and soils.

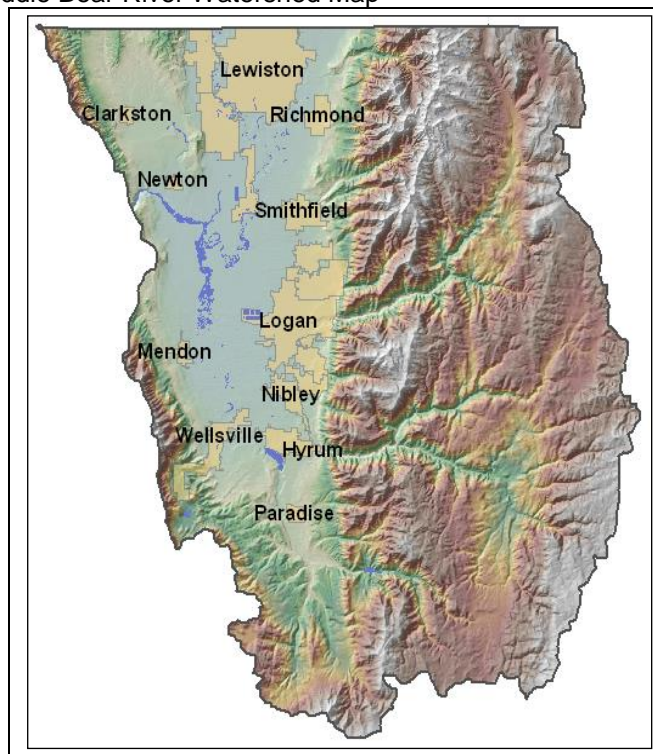
The above goals were achieved through several resilient partnerships. The Blacksmith Fork and North Cache Conservation Districts have been very vocal in their support of projects that target water quality and they have continually encouraged local producers to make water quality a priority within their operations. The Utah Division of Water Quality has been a strong supporter in this cause through supplying monitoring equipment and lab analysis support. Many of the BMP's installed within these projects have come from producer contracts with the Natural Resources Conservation Service (NRCS), who provided planning and engineering support. Utah State University Extension has worked side by side with the conservation districts and NRCS to provide technical support and outreach education in an effort to raise awareness of the impacts that agricultural practices has on water quality.

Middle Bear Project Funding	
Start Date: October 1, 2006 Completion Date: September 30, 2013	
Total Budget by Funding Year:	
FY 2006	
• 319	\$37,500
• Required Match	\$25,000
Total:	\$62,500
FY 2008	
• 319	\$220,500
• Required Match	\$147,000
Total:	\$367,500
Total FY 2006 & 2008 Budget Combined:	
• 319	\$258,000
• Required Match	\$172,000
Total:	\$430,000
Total EPA Funds Spent:	\$258,000
Total 319 Match Accrued:	\$172,000
Total Expenditures:	\$431,033

2.0 BACKGROUND

The Middle Bear Watershed Project includes all of the waterways within Cache Valley, starting from the Idaho-Utah border and extending down to the south boundary of Cache County (see Figure 1). This project includes the Utah portion of the Middle Bear watershed and the entirety of the Middle Bear-Logan watershed. The Middle Bear-Logan Watershed comprises the drainage areas of several major tributaries of the Bear River, which flow from east and south into the shallow waters of Cutler Reservoir. The Middle Bear Watershed has a drainage area of 888 square miles. The annual average flow into the Bear River increases from 1094 cfs to 1518 cfs as it enters Cutler Reservoir. The Logan River, Blacksmith Fork River and Little Bear River are primarily responsible for this increase as all three converge and enter the reservoir.

Figure 1: Middle Bear River Watershed Map



As previously mentioned, Cutler Reservoir is the lowest receiving waterbody in the Middle Bear River and acts as a catch can for the entire watershed. As required by 26-11-6 of the Utah Code Annotated 1953, Utah state waters are classed to protect against controllable pollution. The Middle Bear River from Cutler Reservoir to the Idaho State line has been identified as a “High Priority” watershed, 303d list Unified Assessment Category IA. The designated uses for the main stem Bear River in this section are 2B, 3B, and 4 (see Table 1).

Table 1: Beneficial Use Classifications

- | |
|--|
| <p>2B - Protected for boating, water skiing, and similar uses excluding swimming.</p> <p>3B - Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.</p> <p>4 - Protected for agricultural uses including irrigation to crops and stock watering.</p> |
|--|

The Utah Department of Water Quality found the Middle Bear River and its tributaries to be only partially supporting their designated beneficial use as a warm water fishery due to sediment and nutrient loading. High sediment loads in the Middle Bear impair fisheries and diminish the river's ability to support macro-invertebrates and other aquatic life. Sediment accumulates in the river during spring runoff, during summer storm events, and in canal return flows.

Nutrient contamination causes additional excessive algal growth and turbidity in the deeper, slower flowing water of the Middle Bear. Warm water with higher biological productivity can result in lower oxygen concentrations and stress to the aquatic community. Oxygen levels often decline to harmful concentrations during the nighttime, particularly during the summer when flows are low and temperatures are highest. Nutrients associated with poor land management are most likely to enter during spring runoff or storm events.

In 2010, the Environmental Protection Agency approved the Cutler Reservoir Total Maximum Daily Load (TMDL) which listed the pollutants of concern as excess total phosphorus and low dissolved oxygen. TMDLs have also been approved for the Little Bear and Spring Creek, both of which are tributaries of Cutler Reservoir.

As a result of the EPA approved TMDLs, more attention has been given to various agricultural practices within the Cache Valley that have impacted water quality within the Middle Bear and Middle Bear-Logan watersheds. Currently, there are approximately 30 livestock operations located directly on or adjacent to the Bear River and its tributaries, with an estimated 6,000 animal units producing nearly 85,000 tons of animal manure per year. These operations include livestock feed productions, hog feed operations, dairy operations, and grazing. Due to their proximity to water, animal waste from these operations has a high potential to be washed directly into the Bear River and Cutler Reservoir during spring snowmelt and rainstorm events. Agricultural land used to support these operations also run the risk of introducing nutrients through over application of manure and through mismanaged irrigation practices.

This project sought to address the primary sources of sediment, phosphorus and nitrogen loading in the Middle Bear and to build on the successes of prior cost-shared efforts to reduce non-point source (NPS) pollution. NRCS and the local conservation districts have been working with 18 of the AFOs to design and implement projects to reduce runoff and nutrient loading. These 18 AFO projects needed 319 funding to cover recent cost increases and unforeseen expenses that have arisen during project implementation. In the past, 319 funds have been used to help with additional projects and costs associated with implementing Environmental Quality Improvement Program (EQIP) funds. This has been vitally important to the success of these projects. This project will also use 319 funds to stabilize and vegetate additional segments of the river corridor and support landowner cooperation in reducing overland erosion from grazing lands. The implementation of Best Management Practices (BMPs) for all projects will continue to increase the integrity of the Bear River. By demonstrating various types of BMPs to area producers and stakeholders, NRCS and the conservation districts encourage them to adopt and implement similar activities to address their own water quality problems. To inform and encourage the public, the Blacksmith Fork and North Cache Districts will conduct tours of project sites and publish articles about improved conservation in local papers and the Cache Conservation News.

3.0 GOALS

3.1 FY06

The primary goals of this grant have been to reduce nutrient and sediment loading from animal feeding operations (AFOs) located directly on, or adjacent to, the Bear River and its tributaries, and riparian area enhancements to further reduce sediment and nutrient runoff. These goals have

largely been accomplished through the implementation of the following Best Management Practices (BMPs):

- installation of animal waste storage facilities
- relocating animal feeding operations
- providing off-stream watering facilities for livestock
- installing water conveyance pipeline
- fencing off and vegetating of critical riparian areas
- improving efficiency of irrigation systems in areas with high erosion rates
- informing and educating the community about non-point source pollution
- promoting improving water quality improvements within the watershed

3.2 FY08

As with the FY06 grant, the primary goals of the FY08 grant have been to reduce nutrient and sediment loading from animal feeding operations (AFOs) located directly on, or adjacent to, the Bear River and its tributaries, and riparian area enhancements to further reduce sediment and nutrient runoff. The implementation of the following Best Management Practices (BMPs) assisted in meeting these goals:

- installation of animal waste storage facilities
- relocating animal feeding operations
- providing off-stream watering facilities for livestock
- installing water conveyance pipeline
- fencing off and vegetating of critical riparian areas
- improving efficiency of irrigation systems in areas with high erosion rates
- informing and educating the community about non-point source pollution
- promoting improving water quality improvements within the watershed

These goals were met with great success, as will be highlighted during the remainder of this report.

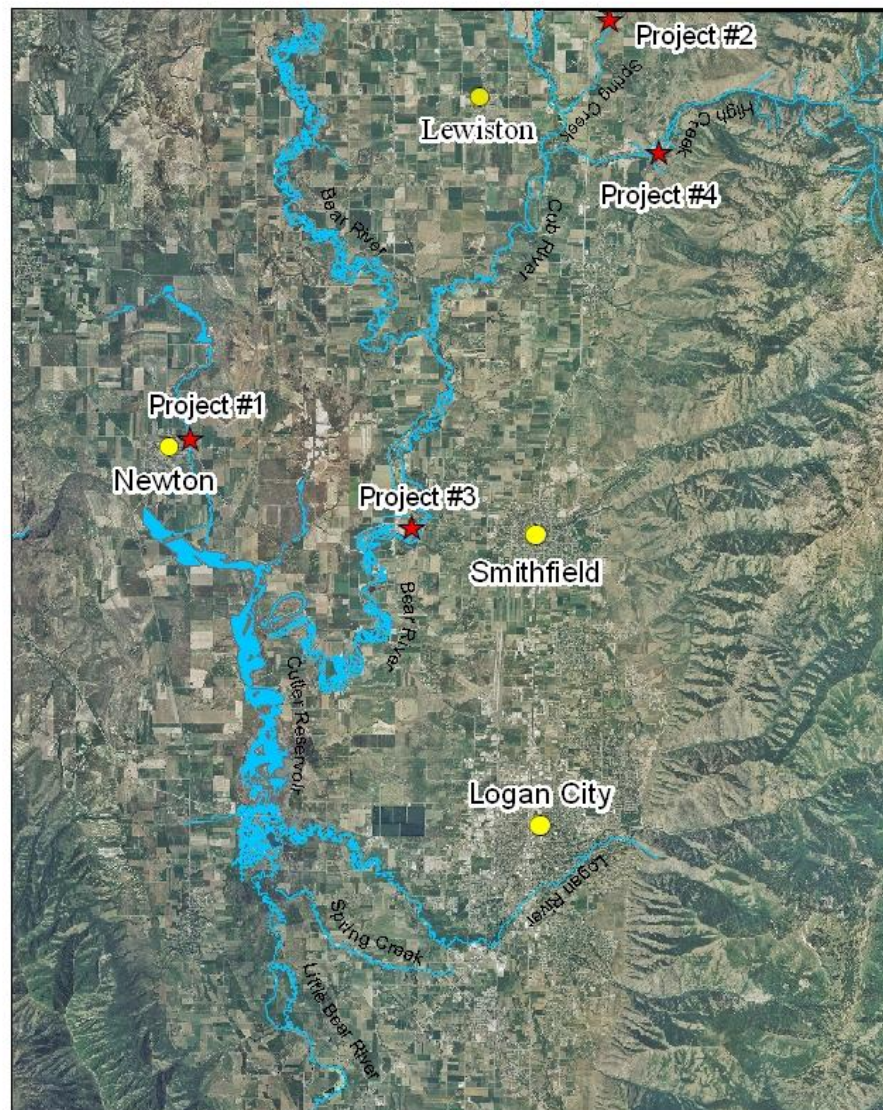
Along with the stated goals of this project, there was an unspoken goal that we hoped to be accomplished. It was hoped that through the implementation of water quality improvement projects within the Middle Bear project area, that local producers and landowners would embrace the idea of responsible stewardship within their operations in regards to protecting water quality. It was acknowledged that with this mentality would act as the best ambassadors to those who had apprehensions to implement projects of their own. It was believed that personal testimony from their peers would help move others to action.

When reviewing the tasks of this grant it is evident that progress is being made concerning water quality and that the testimony of others played a role in project implementation. Six additional AFOs were assisted in implementing animal waste management systems on their operations than what was originally planned. Success was not only measured by the number of projects implemented but was also measured by the way attitudes were changed. It was fully agreed that things are starting to head in the right direction and that more and more support is being given to the protection and enhancement of water resources within the Middle Bear project area.

4.0 MAPS

4.1 FY06

Middle Bear River Project Location Map



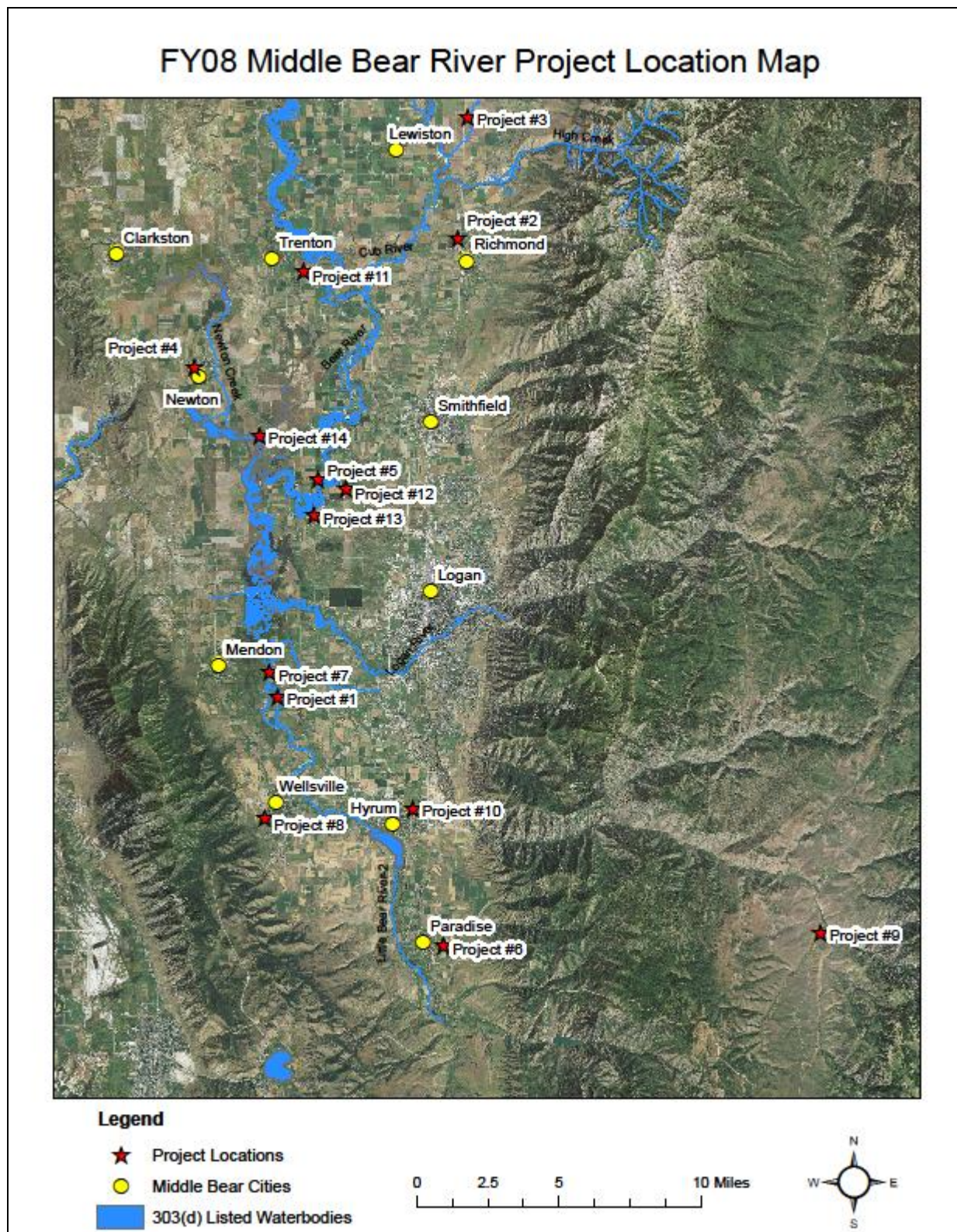
Legend

- ★ Project locations
- Major Cities
- 303(d) Listed Waterbodies

0 1 2 4 6 8 Miles



4.2 FY08



5.0 ACTIVITIES

5.1 FY06

GOAL 1: Identify animal feeding operations in the Middle Bear River Watershed to implement and demonstrate containment, proper application and utilization of animal manures using Best management Practices (BMPs) with comprehensive Nutrient Management Plans (CNMPs).

Objective 1: Develop one or two animal waste systems to ensure total containment of animal manure and reduce pollutants entering the Middle Bear River drainage.

Task 1- Select and identify project cooperators

Actual Output: One cooperator was selected for funding. The operation was an animal feeding operation located on Clarkston Creek in the Newton area. To meet state water quality standards, a fence and berm were installed 30 feet from the river. The project met NRCS standards.

Task 2- Develop Animal Waste Management (AWM) systems using BMPs and CNMPs

Actual Output: CNMPs were developed for both projects and are still being implemented with NRCS incentive payments.

Task 3- Implement pollution reduction projects

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

Objective 1: Develop one or two projects to reduce sediment and nutrient loading to the river through improved function of the stream bank and riparian area.

Task 4- Select and identify project cooperator

Actual Output: Two project were selected on the High Creek drainage and the Middle Bear River.

Task 5- Develop streambank and riparian improvement plan using BMPs and bioengineering principles (like willow revetment, grassed waterways, etc).

Actual Output: Both projects originally began as a 319 projects, but EQIP and AMA funds were also acquired to help with cost share. The watershed coordinators in cooperation with NRCS conservation planners were able to produce a design and plans for both projects.

Task 6- Implement Projects

Actual Output: Both Projects were successful implemented. On the High Creek project both sides of the creek were restored using rock structures, as well as vegetative planting. The project covered approximately 1,200 river feet from start to finish. However, when the EQIP payment was issued it ended paying 100% of the project cost. Therefore, no 319 funds were needed.

The Middle Bear River project helped install a little over a half mile of fence along the Bear River in the Amalga area. The fence met NRCS standards, and has helped remove cattle from the riparian area. This has helped stabilize stream banks, and reduce nutrient loading from animal waste.

GOAL 3: Improve cropland, upland, and pasture management practices to reduce sediment and nutrient runoff to the river and its tributaries.

Objective 1: Implement a reduction in nonpoint source pollution, sediment and nutrients, from improved upland/ pastureland with improved management.

Task 7- Select and identify project coordinators

Actual Output: It was decided that the best project to eliminate erosion in the watershed was helping a landowner convert from flood irrigation to sprinkler irrigation. The fields had a steep slope and bordered Spring Creek in the North end of the valley. Highly concentrated return flows were entering directly into the creek while irrigating.

Task 8- Develop cropland/ upland/ pastureland management plans using BMPs

Actual Output: An irrigation water management plan was written for the cooperators. This plan informed the cooperators when they should apply, as well how much water they should apply to their fields. These plans help eliminate runoff from leaving the fields.

Task 9- Implement projects

Actual Output: Sprinkler systems were installed on 200 acres in Cove, Utah.

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 streambanks, and properly managed uplands/pasture lands.

Task 10- Conduct animal waste system design and proper manure application tour.

Task 11- Conduct riparian area/ streambank and pastureland/ upland tour.

Actual Output: Tours were conducted with remaining funds in other contracts. The money from this contract was used to fund two different public outreach projects. One was a mini-water conference that dealt with water quality and quantity issues in the area. Approximately 250 people attended this conference. The funds were also used to help fund Grill Your District. This was a luncheon that highlighted conservation projects that have been implemented throughout the watershed, and allowed producers and the general public to meet project planners. 150 people attended this activity.

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

Task 12- Develop fact sheets and newspaper articles.

Actual output: One fact sheet/ pamphlet was purchased from the National Association of Conservation Districts to help educate fourth graders. These pamphlets touched on water quality, what a watershed is, and what they can do to help protect their local watershed. These were distributed to 2,000 students during a natural resource field day that was sponsored by other agencies such as: Utah State University Extension, the Bear River Migratory Bird Refuge, the Utah Division of Wildlife Resources, and the local school districts.

The remaining funds were used to develop small nutrient management handbooks. These books were designed to help landowners track the manure they apply on their fields. It also educates them on how to take soil tests, what the nutrient concentrations should be in the soil, and when they can and cannot apply. 300 of these were printed, and handed out to local cooperators at the mini-water conference.

Articles are constantly being published in local newsletters, and papers concerning the water quality issues in Cache Valley.

Goal 5: Provide administrative services to project sponsors documenting matching contributions, tracking individual project progress, coordinating team efforts, and generating reports and data in a timely manner.

Objective 1: Provide administrative services

Task 13- Track match and prepare reports.

Actual Output: Tracking was completed by UACD, while annual and final reports were completed by the local watershed coordinator.

5.2 FY08

Goal #1: Reduce nutrients entering waterways from Animal Feeding Operations (AFOs).

Objective 1: Assist two AFO producers in the Middle Bear project area, to implement and demonstrate proper containment and application of animal manures using Best Management Practices (BMPs) with Comprehensive Nutrient Management Plans (CNMPs). By using the STEPL Model, NRCS data estimates that two projects combined could potentially reduce 9347 lb/year of nitrogen and 1969.0 lb/year of phosphorus. 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: Develop two animal waste management (AWM) systems for AFO producers in the Middle Bear project area.

Planned Output: Each of the two AFOs will have their own designed AWM plan. NRCS and District staff will design plans during 1st contract year.

Actual Output: Two AWM systems were designed for AFO producers in the Middle Bear project area, one in Wellsville (Project #8) and one in Hyrum (Project #10).

319: \$0

Match: \$0

Total: \$0

Task 2: Implement the above AWM systems for AFO producers in the Middle Bear project area.

Planned Output: Both AWM system projects will be implemented. Implementation will begin after the design phase and should occur during the 2nd and 3rd years of the contract. Landowners will implement projects; NRCS, in conjunction with the Farm Bill Program, and UACD staff, will advise, review and certify project implementation.

Actual Output: Both AWM system projects were implemented. Project #8, the Wellsville AFO animal waste management system, consisted of preventing animal waste from leaving their operation and entering a canal that runs adjacent to their property. 319 funds in the amount of \$1,833.58 were used to install 270 feet of pipeline for the purpose of transporting animal waste to their waste storage facility (manure bunker). In addition to the pipeline, 3 waste storage facilities, 1620 feet of irrigation water conveyance pipeline (used to bury the canal), one pumping plant, and a nutrient management plan for 196 acres of cropland were put in place to address animal waste management. See figures 20-23 in Section 12.2 of this report for project photos.

Project #10, the Hyrum AFO animal waste management system, consisted of installing animal waste storage facilities. Pre- installation conditions were resulting in large amounts of manure leaving the operation and entering several small waterways that were in close proximity to the Blacksmith Fork River. Manure bunkers (solid and liquid) were installed to contain animal waste until it could be applied to their fields. 319 funds from this contract, in the amount of \$26,855.00 went towards the construction of the manure bunkers, along with \$3,145.00 from the FY10 319 grant. Additionally, 341 feet of fence, a 165 foot long diversion, one pumping plant, 2143 feet of irrigation water conveyance pipeline, and a nutrient management plan for 119 acres were implemented. See figures 27-28 in Section 12.2 of this report for project photos.

319: \$28,688.58 Match: \$19,125.72 NRCS: \$287,902.10 Total: \$335,716.40

Objective 2: Assist remaining 18 AFO's in the Middle Bear project area to implement and demonstrate proper containment and proper application of animal manures using Best Management Practices (BMPs) with Comprehensive Nutrient Management Plans (CNMPs). By using the STEPL Model, NRCS data estimates that an average AFO in the Middle Bear project area could have the potential to reduce between 5,359.4 to 9,881 lb/year of nitrogen and between 1,105.3 to 2,280.6 lb/year of phosphorus per operation. 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 3: Select one or two project sites/cooperators.

Planned Output: Talk with UACD, NRCS, local conservation districts, and local producers in an effort to identify cooperators who are in need of addressing animal waste management on their operations to improve water quality.

Actual Output: After communicating with UACD, NRCS, local conservation districts, and local producers, eight AFO's in the Middle Bear project area were identified as needing and wanting assistance in implementing proper containment and application practices in regards to animal waste within their operations. These projects were in Mendon, Richmond, Newton, Benson (3 projects), Trenton, and Paradise.

319: \$0 Match: \$0 Total: \$0

Task 4: Develop AWM systems.

Planned Output: AWM plans. NRCS and District staff will design plans during 1st contract year.

Actual Output: Eight animal waste management plans were developed. These AFOs were in Mendon (Project #1), Richmond (Project #2), Newton (Project #4), Benson (Project #5, #12, #13), Trenton (Project #11), and Paradise (Project #6). 319 funds in the amount of \$4,183.40 went towards the work that UACD engineering provided in the developing of these plans.

319: \$4,183.40

Match: \$2,788.93

Total: \$6,972.33

Task 5: Implement projects.

Planned Output: Two projects implemented. Implementation will begin after the design phase and should occur during the 2nd and 3rd years of the contract. Landowners will implement projects; NRCS, in conjunction with the Farm Bill Program, and UACD staff will advise, review and certify project implementation.

Actual Output: Eight projects were implemented in Mendon, Richmond, Newton, Benson (3 projects), Trenton, and Paradise.

Project #1, the Mendon AFO AWM plan, consisted of preventing animal waste from entering the Little Bear River at a beef feedlot. It was determined that manure storage would be needed in order to meet state water quality standards. This is when 319 funds in the amount of \$16,970.02 were used to construct a solid animal waste storage facility to hold waste from 50 beef bulls. The landowner also installed a 600 feet long diversion, a 120 foot long fence, a 615 foot long pipeline, and two watering troughs as part of their AWM plan. See figures 1-3 in Section 12.2 of this report for project photos.

Project #2, the Richmond AWM plan, consisted of preventing animal waste from entering the Cub River. The 319 portion of this AWM plan came in the amount of \$9,543.21 and was used to go towards helping install a liquid waste evaporation pond and a 923 foot long safety fence around it. Items that were also installed, but not cost shared on with 319 funds include 3 solid waste storage facilities, 700 feet of fencing to prevent access to a the Cub River, 1,250 feet of pipeline to transfer animal waste, and a pump to transport it. See figures 4-5 in Section 12.2 of this report for project photos.

Project #4, the Newton AWM plan, consisted of helping a small feedlot on Newton Creek meet state water quality standards. It was determined that in order for proper animal waste management, a 338 foot long diversion and a 130 foot long fence, installed on the downslope side of a corral was needed to prevent overland flow of nutrients into Newton creek. Also, 173 feet of pipeline and 2 watering facilities were needed to exclude livestock from the creek. Funds in the amount of \$803.41 from this 319 grant went towards the diversion. See figures 8-11 in Section 12.2 of this report for project photos.

Project #5, the first Benson AWM plan, consisted of installing a methane digester on a hog farm located on the Bear River. 319 funds in the amount of \$20,305.00 were used to go towards this installation. The producer also installed a solid waste storage facility and a pumping plant to transport animal waste from the hog pens to the methane digester. See figures 12-13 in Section 12.2 of this report for project photos.

Project #6, the Paradise AWM plan, was a very simple and straightforward design. All that was needed to assist the producer in proper management of animal waste was for the installation of 2 solid waste storage facilities. 319 funds in the amount of \$839.00 from this grant went towards their installation. See figures 14-16 in Section 12.2 of this report for project photos.

Project #11, the Trenton AWM plan, was designed for an AFO that needed to improve their operations in regards to state water quality standards. Their 319 contract totaled \$40,546.00, of which \$27,383.00 went towards the construction of a lined liquid animal waste storage pond. The remaining \$13,163 went towards the installation of two solid waste storage facilities, a manure transfer pump, a 525 foot long animal waste transfer pipeline, and a 1,313 foot long fence. They also had a nutrient management plan on 88 acres. See figures 29-31 in Section 12.2 of this report for project photos.

Project #12, the second Benson AWM plan, assisted an AFO that milks 350 cows, to protect water quality. Their plan called for the abandonment of a heifer corral that was decrepit and a risk to water quality within Hopkins Slough, which runs adjacent to the operation. 319 funds in the amount of \$7,200 were used towards this corral abandonment. In addition to this abandonment, a new corral and animal waste storage facility was built on another piece of their property, off of Hopkins Slough, that allowed improved manure management. See figures 32-33 in Section 12.2 of this report for project photos.

Project #13, the third Benson AWM plan, called for improvements to be made on an already existing waste storage facility on a beef feedlot that is adjacent to the Bear River. This facility had severe cracks in the floor and walls, which allowed liquids to escape and drain directly into the Bear River. 319 funds in the amount of \$6,000.00 went towards the tearing out of the old facility in order for the new facility to be built to suitable standards. See figures 34-37 in Section 12.2 of this report for project photos.

319: \$102,206.64 Match: \$68,137.76 NRCS: \$315,278.95 Total: \$485,623.35

Goal #2: Reduce sediment and nutrients entering into waterway from unstable streambanks and impaired riparian corridors through the use of various Best Management Practices (BMPs).

Objective 1: Improve the stability of the stream channel and enhance the riparian corridor of waterways bordering/within the properties of Schiess and Wilson. STEPL Model estimates predict that an average streambank project in Cache Valley could potentially reduce sediment by 90.3 tons/year. 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 6: Develop project plans using BMPs and bioengineering principles (willow revetment, grassed waterways, etc.).

Planned Output: Two streambank improvement project plans. Design work will be performed by NRCS, in conjunction with the Farm Bill Program and District staff in spring of the first contract year.

Actual Output: Two streambank improvement project plans were developed using BMPs and bioengineering principles. They were located on the Little Bear River (Project #7) and on the headwaters of the Blacksmith Fork River (Project #9). Design work will be performed by NRCS, in conjunction with the Farm Bill Program and District staff in spring of the first contract year.

319: \$0

Match: \$0

Total: \$0

Task 7: Implement projects.

Planned Output: Two projects implemented. Projects will be implemented by landowners between the fall of the first contract year through the spring of the second contract year. NRCS, in conjunction with the Farm Bill Program, and District staff will advise, review and certify project implementation.

Actual Output: Two projects were implemented by landowners to improve the stability of the stream channel and enhance the riparian corridor within the Middle Bear project area. One on the Little bear River and one on the headwaters of the Blacksmith Fork River.

Project #7, the Little Bear River riparian zone improvement project, took place on a beef grazing operation in the Mendon area. The landowner used 319 funds in the amount of \$4,934.95 towards installing a 3,357 feet long fence to keep cattle out of the riparian area, and the planting of 350 bare root trees and 560 dormant willows along 3,720 feet of the stream bank to vegetate, protect and stabilize the streambank. See figures 17-19 in Section 12.2 of this report for project photos.

Project #9, the Blacksmith Fork streambank improvement project, involved the fencing of 4.2 miles of streambank on the headwaters of the Blacksmith Fork River. This is a stand-alone 319 project that is targeted at riparian zone restoration and water quality improvement. The project also included a grazing management plan to reduce grazing impacts within the upper watershed. Additionally, three springs were developed and pipelines were installed in order to take water to three watering facilities now that livestock are restricted from the river. 319 funds from this grant in the amount of \$33,756.26 have gone towards this project. Additional BMPs that have been installed include willow and bare root tree planting, which was cost-shared on through the FY10 319 grant. See figures 24-26 in Section 12.2 of this report for project photos.

319: \$38,691.21 Match: \$25,794.14 NRCS: \$5,827.59 Total: \$70,312.94

Objective 2: Improve the stability of stream channels and enhance riparian corridors of additional waterways. STEPL Model estimates predict that an average streambank project in Cache Valley could potentially reduce 43.3 tons/year of sediment. 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 8: Select project sites and cooperators to work with.

Planned Output: Talk with UACD, NRCS, local conservation districts, and local landowners in an effort to identify projects that will improve the stability of stream channels and enhance riparian corridors of waterways within the Middle Bear project area.

Actual Output: After communicating with UACD, NRCS, local conservation districts, and local producers, several projects were identified as having potential to improve water quality through streambank stabilization and riparian zone enhancement. However, at that point in the grant, the majority of funds had been allocated and spent on the above mentioned projects, and as a result, only one of the projects was able to be funded. This was a shoreline stabilization and riparian restoration project at the confluence of Clay Slough and Cutler Reservoir in the Benson area.

319: \$0 Match: \$0 Total: \$0

Task 9: Develop streambank and riparian improvement plan using BMPs and bioengineering principles (willow revetment, grassed waterways, etc.).

Planned Output: One or two streambank improvement project plans. Design work will be performed by NRCS, in conjunction with the Farm Bill Program and District staff, in spring of the first contract year.

Actual Output: A shoreline stabilization and riparian restoration project in Benson (Project #14) was planned. This plan was designed through the help of UACD engineering and incorporated the use of BMPs and bioengineering principles.

319: \$0

Match: \$0

Total: \$0

Task 10: Implement projects

Planned Output: One or two projects implemented. Landowners will implement projects between the fall of the first contract year through the spring of the second contract year. NRCS, in conjunction with the Farm bill Program, and District staff will advise, review and certify project implementation.

Actual Output: Project #14, a shoreline stabilization and riparian restoration project in Benson, was designed and implemented at the confluence of Clay Sough and Cutler Reservoir in a way that meets NRCS specifications and standards even though it was funded as a standalone 319 project. Funds in the amount of \$1,897.81 from this 319 grant, along with \$1,751.85 from the FY10 Middle Bear grant went towards its implementation. This design called for the restoration of 310 feet of shoreline due to erosion cause by wind driven waves coming off of Cutler Reservoir. This erosion was responsible for reduced water quality due to increased sediment introduction to the waterbody. The project consisted of sloping back the bank to allow vegetation planting, the installation of footer rocks (2 ft. diameter) that were anchored 1 foot below lake bed, and the placement of rock riprap that was stacked on top of the footer rocks. Rock riprap extends 1-2 feet above high water mark in order to break up wave action and protect restored shoreline. Vegetation was established by hand planting 360 bare root trees and by broadcasting a mix of native grasses. Also, a 400 feet long fence was installed to protect the riparian area. See figures 38-39 in Section 12.2 of this report for project photos.

319: \$1,897.81

Match: \$1,265.21

Total: \$3,163.02

Goal #3: Reduce impacts from adjacent land activities, such as fertilization and grazing, by implementing best management practices (BMPs) and establishing whole management systems (e.g., pest and nutrient management).

Objective 1: Work with producers to improve pasture and/or crop management to reduce erosion and nutrient runoff. By using the riparian calculator provided by Nancy Mesner, USU Extension Water Quality Specialist, predict that each project could potentially reduce nitrogen by 385.0 lb/year and phosphorus by 68.8 lb/year. 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 11: Develop management plan using BMPs.

Planned Output: 1 management plan developed. Design work will be performed by NRCS, in conjunction with the Farm Bill Program, and District staff in spring of the first contract year.

Actual Output: A management plan was developed for a producer in the Cove area (Project #3), which was aimed at crop and water management to address the severe erosion that they were experiencing on some of their crop fields.

319: \$0

Match: \$0

Total: \$0

Task 12: Implement project.

Planned Output: Implement the project. Landowners will implement project during the 2nd contract year; NRCS Farm Bill Program and District staff will advise, review and certify project implementation.

Actual Output: Project #3, the crop and water management plan, was successfully implemented. Previous to developing this plan, the producer flood irrigated on land that was bordering Spring Creek in the Cove area. These fields consisted of rolling hills with several gullies that would rapidly erode and transport sediments in the creek whenever they irrigated. In an effort to reduce this erosion, 319 funds in the amount of \$21,782.36 went towards the installation of a sprinkler irrigation system (wheel lines) that improves irrigation efficiency and reduces the amount of water being applied within a given time. This system allows more water to infiltrate into the soil and allows for less water to run off the fields and transport sediments. A nutrient management plan was also put in place to help the producer test their soil each year as a way to not over apply nutrients and to reduce the risk of degrading water quality. See figures 6-7 in Section 12.2 of this report for project photos.

319: \$21,782.36

Match: \$14,521.57

Total: \$36,303.93

Objective 2: Implement BMPs for other adjacent land activities to establish whole management systems such as pest and nutrient management. BMPs could include practices such as fencing, hay and pasture plantings, critical area plantings, filter strips, animal waste containment, off site watering and any other practices listed in the NRCS planning field guide that helps to improve water quality. Estimates made using the riparian calculator provided by Nancy Mesner, USU Extension Water Quality Specialist, predict that each project could potentially reduce nitrogen by 385.0 lb/year and phosphorus by 68.8 lb/year. 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 13: Select project sites.

Planned Output: Talk with UACD, NRCS, local conservation districts, and local landowners in an effort to identify projects that will establish whole management systems such as pest and nutrient management on upland/pastureland and/or crop land within the Middle Bear project area.

Actual Output: At this point, funds had run out for this 319 grant. Therefore, Task 13 was not completed.

319: \$0

Match: \$0

Total: \$0

Task 14: Develop upland/pastureland and/or crop management plan using BMPs.

Planned Output: 1 or 2 upland/pastureland management plans. Design work will be performed by NRCS, in conjunction with the Farm Bill Program, and District staff in spring of the first contract year.

Actual Output: At this point, funds had run out for this 319 grant. Therefore, Task 14 was not completed.

319: \$0

Match: \$0

Total: \$0

Task 15: Implement projects.

Planned Output: 1 or 2 projects implemented. Landowners will implement project during the 2nd contract year; NRCS Farm Bill Program and District staff will advise, review and certify project implementation.

Actual Output: At this point, funds had run out for this 319 grant. Therefore, Task 15 was not completed.

319: \$0

Match: \$0

Total: \$0

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) animal waste system designs and proper manure application; 2) functioning riparian areas, stable streambanks, and properly managed uplands/pasture lands.

Task 16: Plan and carry out an animal waste system design and proper manure application tour.

Planned Output: Plan and carry out one tour. USU Extension, UACD, District staff and the landowner will jointly plan this tour, which they will conduct either near project completion or shortly after.

Actual Output: Two tours were planned and carried out with assistance from UACD to introduce local producers and landowners to recent animal waste system projects that were completed within the Middle Bear project area. These tours were held on separate days in the fall in order to accommodate the harvest schedule of the producers and each tour had 20-25 participants. Funding for both tours was provided by UACD and the local conservation districts, therefore, no 319 funds were used for this task. Each of the tours visited projects where new solid and liquid animal waste facilities had been installed and a discussion was had in regards to what constitutes as acceptable and responsible means to store animal waste when it cannot be applied to fields. At each tour stop, pre project conditions were described and BMPs that were installed were showcased. Due to several requests from local producers, one of the tours also visited several operations outside of the project Middle Bear project, just over the state border, in to Idaho. The purpose of these stops was to introduce producers to mechanical separators and composting facilities. Several producers have interest in installing similar systems on their own operations as a way to compost manure and reuse it as bedding material on their dairies. Both tours were very successful and were talked about at multiple events afterwards. Due to the great turnout and feedback, more tours are to be planned in the near future.

319: \$0

Match: \$0

Total: \$0

Task 17: Plan and conduct riparian area/streambank and pasture/upland tour.

Planned Output: Plan and carry out one tour. USU Extension, UACD, District staff and the landowner will jointly plan this tour, which they will conduct either near project completion or shortly after.

Actual Output: Two tours were planned and carried out with assistance from UACD to introduce local producers and landowners to recent riparian area/streambank restoration projects that were completed within the Middle Bear project area. Funding for the first tour was provided by UACD and the local conservation districts, while the second tour was funded by Utah State University as part of a required class that used completed projects a part of a class assignment, therefore, no 319 funds were used for this task. Both of the tours included stops at riparian area/streambank restoration projects. Pre project conditions were described and BMPs used to treat the resource concerns were shown. As a result of the first tour, two new riparian projects are currently being designed and will be funded through the FY10 319 grant currently active in the Middle Bear project area.

319: \$0

Match: \$0

Total: \$0

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

Task 18: Provide information and outreach opportunities.

Planned Output: Produce fact sheets, newspaper articles, and educational workshops. USU Extension, UACD, and NRCS in conjunction with the Farm Bill Program, will collaborate on the content. USU Extension and UACD will jointly produce and disseminate them.

Actual Output: Two fact sheets were developed and distributed in an effort to share general and technical information with producers and area stakeholders. The first fact sheet described the types of water quality improvement projects that have been installed in the Middle Bear project area and also explained the different types of funding that was available to the public to help cost share on projects. The second fact sheet was designed to target the general public and to raise awareness of proper PPCPs (pharmaceuticals and personal care products) disposal.

In addition to these fact sheets, four newsletter articles were written for the local conservation districts newsletters. These articles focused on the various ways that producers and landowners could address practices within their operations that would improve water quality. They also discussed different funding opportunities that are available to them to help share in the cost of installing these improvements. In all of these articles, contact information was given of the local watershed coordinator as a way to get help in identifying potential projects.

In addition to the fact sheets and newsletters, several other undertakings were made as a way to inform, educate, and involve the public in regards to water quality. First, the Logan Mini Water Conference was held as a one day event to educate and inform local producers, landowners, and the general public on water issues being faced on the local level. Presentations ranged from water quality to water rights. It was very well received and it was agreed that it should be continued on an annual basis. 319 funds in the amount of \$300.93 went towards the carrying out of this event.

Second, as a joint effort with NRCS, UACD, local conservation districts, and USU Extension, an event advertised as the "Grill Your District" is held on a yearly basis. At the event, the public is invited to come and have a free barbeque lunch and get to know the various agencies and groups that are within their community who work to protect and conserve natural resources. Information booths are staffed and fact sheets and handouts are made available to help raise awareness and increase education. It is also viewed as an opportunity to recognize and appreciate the cooperators and producers who are actively working with these agencies towards conservation of natural resources. 319 funds in the amount of \$134.37 went towards the carrying out of this event in 2010 and \$45.64 in 2013.

Third, the purchase of hats, gloves, and jackets was made to be used as a way to raise awareness of past, present, and future efforts that are made within the Middle Bear project area to improve water quality through non-point source project implementation. 319 funds in the

amount of \$2,478.34 went towards the purchase of 9 dozen hats with the Middle Bear watershed logo with the words "Helping Improve Water Quality" and 50 pairs of work gloves with the words "Working for Water Quality". These items have been, and will continue to be used at outreach events, when working with producers, and on projects with landowners, as well as on the recommendation of the Middle Bear Advisory Committee and local conservation districts.

319 funds in the amount of \$824.99 went towards the purchase of 9 heavyweight winter Carhartt jackets that will be used as recognition awards to be presented to individuals that have implemented outstanding non-point source water quality improvement projects within the Middle Bear project area. These awards will be given out at the Logan Mini Water Conference, the Grill Your District barbeque, and Annual UACD Zone Banquet.

A fourth undertaking was the sponsorship and participation of the 2013 Bear River Celebration. This is an annual event that brings together over 600 children and their parents together where wildlife, plants, and water are the main focus. A booth was staffed where a presentation was given on water quality and how the community can work together to reduce pollutants from entering our waterways. A second part of the booth included a coloring and stamping table at which kids could decorate a picture of a river with trees, bugs, and fish to show what they felt a healthy and happy river should look like. 319 funds in the amount of \$500.00 went towards the sponsorship of the event.

The only other 319 funds that were used out of the Information and Education portion of this grant were in the amount of \$25.49 in June 30, 2010.

319: \$4309.76

Match: \$2873.17

Total: \$7182.93

Goal #5: Provide administrative services to project sponsors.

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

Task 19: Track match

Planned Output: Document match continuously for the duration of project. UACD staff will coordinate this effort.

Actual Output: Match records were documented continuously for the duration of project. UACD staff coordinated this effort.

319: \$18,740.24

Match: \$12,493.49

Total: \$31,233.73

Task 20: Prepare reports.

Planned Output: Compile and submit semiannual, annual, and final reports. UACD staff will prepare this information according to state and EPA guidelines.

Actual Output: Annual and final reports were compiled and submitted as a way to document project progress and effectiveness.

319: \$0

Match: \$0

Total: \$0

6.0 PARTNERS

6.1 FY06 and FY08

The North Cache and Blacksmith Fork Conservation Districts are the sponsors for the Cache County Local Work Group and have been the leading sponsors. These Districts provided oversight of cooperator selection, volunteer work, and information sharing generated by this project. The Local Work Groups directed the Utah Association of Conservation Districts and NRCS to oversee project development, planning, implementation, approval, creation of fact sheets and educational materials, administration, and reporting. The following specific duties were transferred, as per Memoranda of Understanding, to the following agencies:

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

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

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

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
- Utah Division of Wildlife: I&E educational efforts

The following federal agencies made key contributions to the project:

- EPA: Financial assistance, Clean Water Act Section 319
- USDA: Coordination with NRCS
- NRCS: Technical planning, design, and oversight
- USFWS: I&E educational efforts.

The project also benefited from contributions by the following organizations:

- PacifiCorp: Volunteer hours and project implementation
- Boy Scouts: Volunteer hours

Recently there has been a large effort to help people understand the effects of urban runoff in the Middle Bear River Watershed. Several volunteers, including the Boy Scouts of America and student organizations from Utah State University, have helped place storm drain markers throughout the valley. Approximately 800 markers have been placed in various cities in the watershed.

An education program named Watersheds to Wetland Wonders has also been initiated. This program focuses on educating local 4th graders in the valley about living in a watershed, and what we can do to help improve water quality and wildlife habitat. While the USFWS has headed up the project, several different agencies have come on board, including USU Extension and the Utah Division of Wildlife resources. This grant helped purchase some of the materials that focus on water quality, and the project is scheduled to continue indefinitely.

7.0 COMPLICATIONS

7.1 FY06 and FY08

As with all projects of this magnitude, challenges arose during the course of these grants. However, these challenges were expected and adaptations were made in order to accomplish the overall goals. Some challenges could have been planned for better, while others were unavoidable. One of the biggest challenges was keeping producers and landowners on schedule when implementing BMPs and meeting project deadlines. Another challenge came as some producers had a tendency to revert to their old ways when it came to making management choices. Getting producers to trust their soil sample results and to not over apply manure to fields when it was not needed is always a difficult thing. It has only been when they truly understand the importance of water quality within that they make better choices and maximize the effectiveness of the BMPs implemented within their operations. It is our hope that these cooperators will continue to maintain their projects, and discover the benefits that they can provide for them.

8.0 RECOMMENDATIONS

8.1 FY06 and FY08

We would hope that future projects would adhere more closely to the proposed PIP. While the project implemented will have an impact on water quality, we feel that following the proposed PIP more closely will help address the water quality issues identified by local and state agencies. It is also felt that specific projects should be chosen before grant funds are received in order to have a timelier implementation schedule.

Also, more in-depth training on nutrients and how proper application can affect crop yield may provide better motivation for tighter management on behalf of producers and landowners. In some cases, receiving a cost share to make improvements on AFOs doesn't seem enough of a motivator to maintain their projects.

9.0 ENVIRONMENTAL RESULTS

9.1 FY06

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 Lower Bear River and its tributaries as part of its long-term water quality monitoring efforts.



Figure 1: Fencing and Berm after revegetation, Facing south (Project #1)



Figure 2: Fence and berm, Facing North. (Project #1)

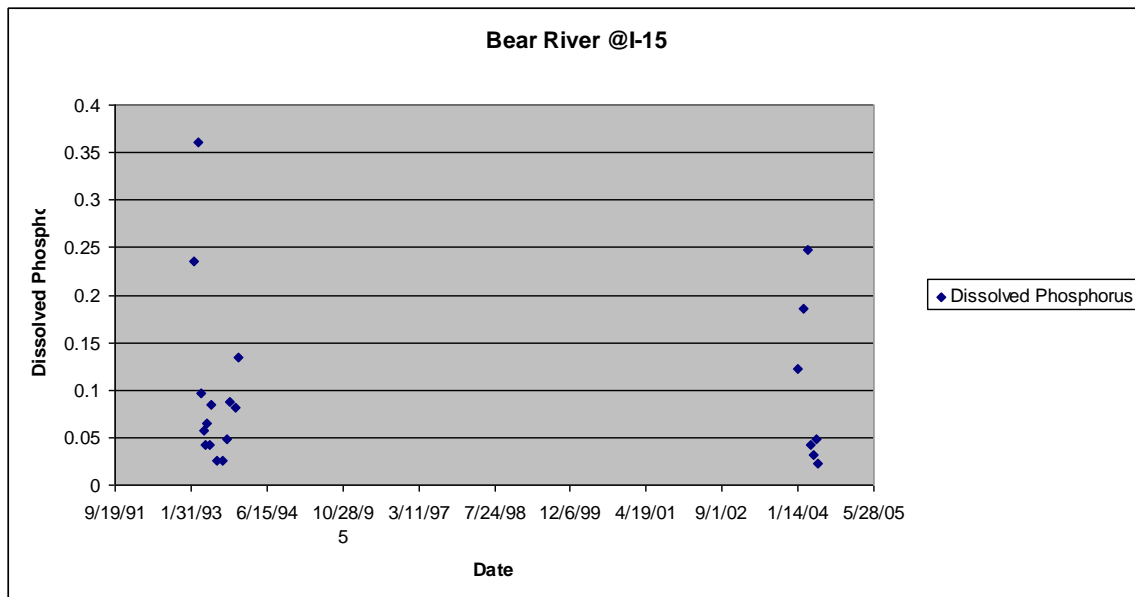


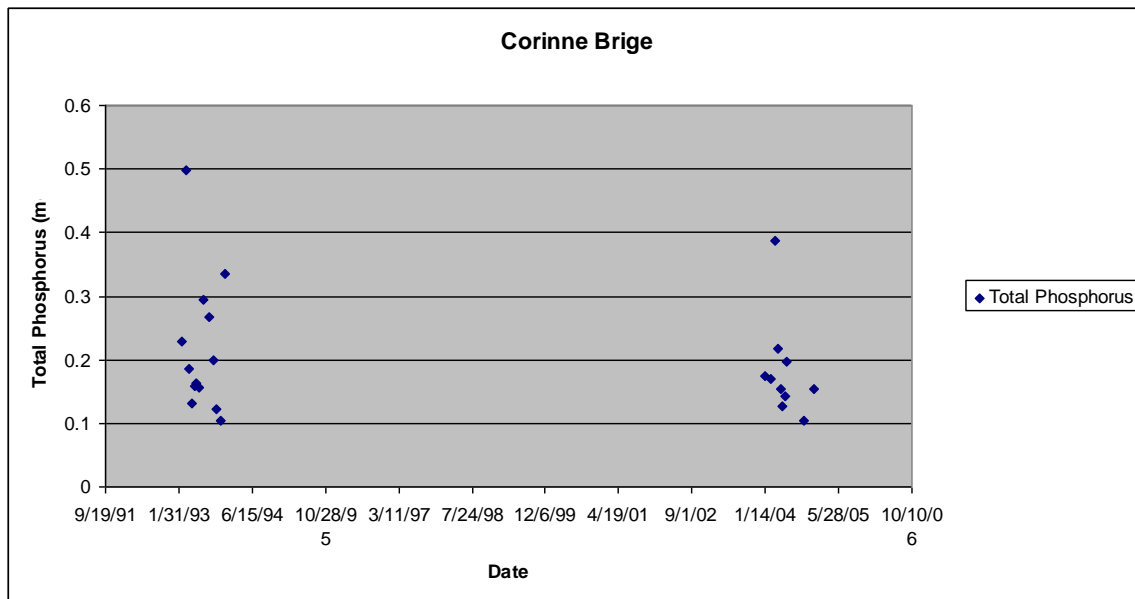
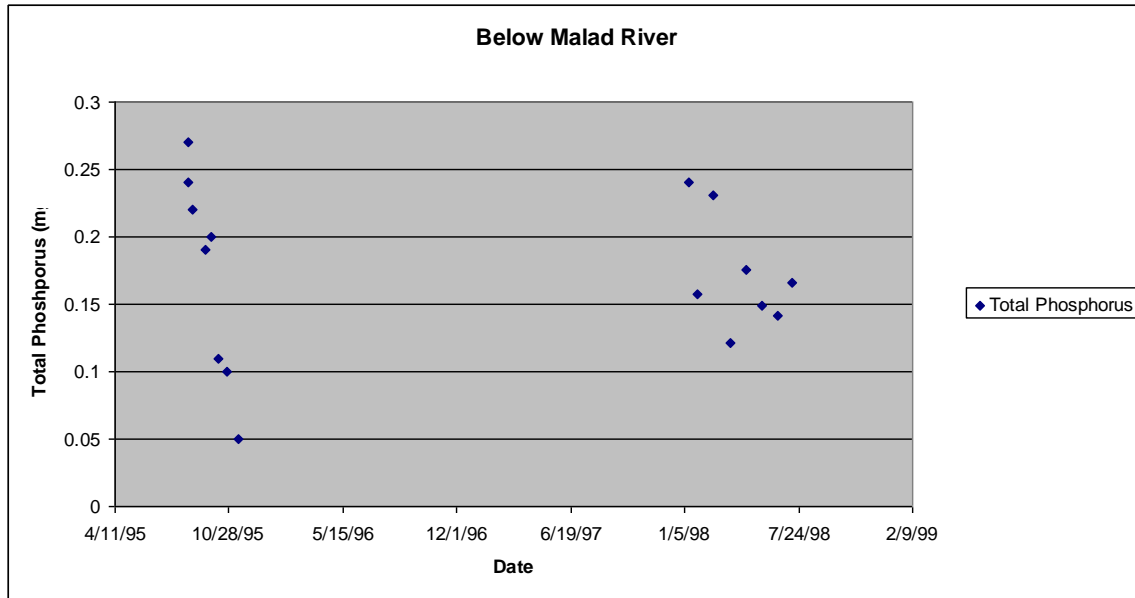
Figure 3: Riparian fencing (Project #3)



Figure 3: Riparian fencing (Project #3)

As seen in the data below, there has been little if any change in the amount of pollutants entering into the river. However, often times it has been found that it can take at least ten 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.





The implementation of BMPs such as berms, fencing, proper manure application, and nutrient and pest management has allowed the animal feeding operation to contain and use animal waste more effectively. They are able to apply and incorporate nutrient 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.

To help estimate the effectiveness of the feedlot repairs or replacements we used the Utah Animal Feedlot Runoff Index worksheet. This worksheet estimates the amount of nutrients taken out of the system through the implementation of BMPs. The following table shows these calculations:

Project	Risk before	Risk after	Nitrogen Reduction (lbs/year)	Phosphorous Reduction (lbs/year)	BOD Reductions (lbs/year)
#1	High	Low	2,748	448	11,521

To help estimate the effectiveness of stream bank work and fencing the STEPL Load calculator were used. This model uses the universal soil loss equation combined with local information to calculate the nutrients and sediments prevented from entering waterbodies when certain BMPs are implemented.

As animals are removed from the corridor and stream banks are stabilized the amount of nutrients in the system will continue to decrease. With this decrease in nutrients other water quality standards will also improve such as dissolved oxygen. As a result, conditions for other living organisms such as macroinvertebrates and fish should increase.

It is anticipated that 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. Additionally, water temperatures could possibly decrease due to better shading along the river.

Best Management Practices (BMPs) for the Middle Bear River projects have focused on excluding animal access to the Bear River and its tributaries, stream bank stabilization, and cropland management. BMPs include fencing, improved irrigation 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.

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.

Natural Resources Conservation Service (NRCS) is responsible for conducting a project implementation check for all projects implemented with EQIP funds. Utah Association of Conservation Districts (UACD) continues to follow-up with cooperator to make sure proper management practices are implemented and to resolve any problems for all projects. Recently UACD and USU Extension employees have visited each implementation site and verified that each project is built to satisfaction and being used as required.

9.2 FY08

To help estimate the effectiveness of BMPs implemented on the AFO projects (Tasks 2 and 5) and the erosion reduction project (Task 12), the Utah Animal Feedlot Runoff Risk Index (UAFRI) worksheet was used. This worksheet takes into account operational practices before and after BMP implementation, and estimates nutrient load reductions as a result of nutrients taken out of the system through the implementation of these BMPs. The following table shows the load reductions of each of these projects:

Project	Risk Before	Risk After	Nitrogen Reduction (lbs./year)	Phosphorous Reduction (lbs./year)	BOD Reductions (lbs./year)
Wellsville AFO – Project #8	High	Low	141	28	501
Hyrum AFO – Project #10	High	Low	2,280	456	8,108
Mendon AFO – Project #1	High	Low	399	372	1,354
Richmond AFO – Project #2	High	Low	114	23	406
Newton AFO – Project #4	High	low	3,849	1,850	16,885
1st Benson AFO – Project #5	High	low	72	195	830
Trenton AFO – Project #11	Medium	Low	47	10	169
2 nd Benson AFO – Project #12	High	Low	3,429	560	14,381
3rd Benson AFO – Project #13	High	low	152	46	780
Paradise AFO – Project #6	Medium	Low	141	28	501
Cove Water Management – Project #3	High	low	13	28	24

For the streambank and riparian enhancement projects (Tasks 7 and 10), several methods were incorporated to measure BMP effectiveness. Where possible, before and after pictures were taken to observe changes over time. Also, the Spreadsheet Tool for Estimating Pollutant Loads (STEPL) was used estimate the nutrient, BOD, and sediment loading reduction after the implementation of BMPs along a stream length. The following table shows these loading reductions:

Project	Nitrogen Load Reduction (lbs./year)	Phosphorus Load Reduction (lbs./year)	BOD Load Reduction (lbs./year)	Sediment Load Reduction (tons/year)
Little Bear River – Project #7	125	48	250	78
Blacksmith Fork – Project #9	189	72	378	103
Cutler Reservoir – Project #14	45	22	892	22

10.0 DELIVERABLES AND FINANCES

10.1 FY06

GOAL OBJECTIVE TASK	PLANNED OUTPUT	PLANNED AMOUNT	ACTUAL AMOUNT	COMPLETION DATE
Goal 1: Objective 1: Develop one or two animal waste systems to ensure total containment of animal manure and reduce pollutants entering the Middle Bear River drainage.				
Task 1: Identify and Select AFO project cooperators to implement BMPs and CNMPs	Select projects	1-2	1	02/06

Task 2: Develop conservation plan, design and, CNMP	Develop AWM systems and plans	1-2	1	06/08
Task 3: implement projects	Earthen berms	384 ft	384 ft	02/07
	Fencing	600 ft	600 ft	07/02- 08/02
	Feedlot abandonment	4 acres	4 acres	07/02- 09/09
	Developed CNMPs	556 acres	556 acres	
Goal 2: Objective 1: Develop one or two projects to reduce sediment and nutrient loading to the river through improved function of the stream bank and riparian area.				
Task 4- Select and identify project cooperator	Select projects	1-2	1	01/07
Task 5- Develop streambank and riparian improvement plan	Develop plans	2	2	02/07
Task 6- Implement Projects	Fence	4100 ft	4127 ft	02/07
	Stream bank and shoreline protection	2000 ft	2400 ft	11/09
	Critical area planting	.03 acre	1 acre	11/09
Goal 3: Objective 1: Implement a reduction in nonpoint source pollution, sediment and nutrients, from improved upland/ pastureland with improved management.				
Task 7- Select and identify project coordinators	Select projects	1	1	06/08

Task 8- Develop cropland/ upland/ pastureland management plans	Irrigation Water management plan	1	1	08/09
Task 9- Implement projects	Sprinkler Irrigation System	200 acres	200 acres	08/09
Goal 4: 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.				
Task 10- Conduct animal waste system design and proper manure application tour.	Tour	1	0	
Task 11- Conduct riparian area/ streambank and pastureland/ upland tour.	Tour	1	0	
	Conferences/ Outreach Days	2	2	05/10- 10/10
Goal 4: Objective 2: Share general and technical information with producers and area stakeholders.				
Task 12- Develop fact sheets and newspaper articles.	Fact sheets	2	2	05/10
	Articles	2	10	03/07-10/10
Goal 5: Objective 1: Provide administrative services				

Task 13- Track match and prepare reports.	Tracking		Completed	10/10
	Reporting		Completed	10/10

10.2 FY08

TASK	DELIVERABLES	319/NPS FUNDING	ADDITIONAL FUNDING	TOTAL
Task 1: Develop two animal waste management (AWM) systems aimed to reduce nutrients entering waterways.	2 AWM systems developed. Project #8 and Project #10.	\$0	\$0	\$0
Task 2: Implement AWM systems developed in Task 1.	2 AFOs successfully implemented systems. Projects #8 and #10.	319: \$28,688.58	Match: \$19,125.72 EQIP: \$287,902.10	\$335,716.40
Task 3: Select projects aimed at reducing nutrients from entering waterways.	8 AFOs were selected. Projects #1,2,4,5,6,11,12, and 13.	\$0	\$0	\$0
Task 4: Develop AWM systems for projects in Task 3.	8 AWM systems developed for AFOs. Projects #1,2,4,5, 6,11,12, and 13.	319:\$4,183.40	Match: \$2,788.93	\$6,972.33
Task 5: Implement AWM systems developed in Task 4.	8 AFOs successfully implemented systems. Projects #1,2,4,5, 6,11,12, and 13.	319:\$102,206.64	Match: \$68,137.76 EQIP: \$315,278.95	\$485,623.35
Task 6: Develop project plans aimed at reducing sediments and nutrients entering waterways from unstable streambanks/riparian corridors.	2 project plans developed. Projects #7 and #9.	\$0	\$0	\$0
Task 7: Implement projects developed in Task 6.	2 landowners successfully implemented projects. Projects #7 and #9.	319:\$38,691.21	Match: \$25,794.14 EQIP: \$5,827.59	\$70,312.94
Task 8: Select additional projects aimed at reducing sediments and nutrients entering waterways from unstable streambanks/riparian corridors.	1 project was selected. Project #14.	\$0	\$0	\$0

Task 9: Develop project plans for projects selected in Task 8.	1 project was developed. Project #14.	\$0	\$0	\$0
Task 10: Implement projects developed in Task 9.	1 landowner successfully implemented their project. Project #14.	319:\$1,897.81	Match: \$1,265.21	\$3,163.02
Task 11: Develop management plans aimed at reducing impacts to water quality from land activities.	1 management plan developed. Project #3.	\$0	\$0	\$0
Task 12: Implement plans developed in Task 11.	1 management plan successfully implemented. Project #3.	319:\$21,782.36	Match: \$14,521.57	\$36,303.93
Task 13: Select additional projects aimed at reducing impacts to water quality from land activities.	0 projects selected due to funds running out.	\$0	\$0	\$0
Task 14: Develop management plans for projects selected in Task 13.	0 projects developed due to funds running out.	\$0	\$0	\$0
Task 15: Implement projects developed in Task 15.	0 projects implemented due to funds running out.	\$0	\$0	\$0
Task 16: Plan and carry out a tour aimed to inform and educate producers on animal waste management systems.	2 tours planned and carried out.	\$0	\$0	\$0
Task 17: Plan and carry out a tour aimed to inform and educate producers on streambank and riparian corridor improvement projects.	2 tours planned and carried out.	\$0	\$0	\$0
Task 18: Provide information and outreach opportunities.	2 fact sheets produced, 4 newsletter articles written, 2 events held (Logan Mini Water Users Conference and Grill Your District)	319:\$4,309.76	Match: \$2,873.17	\$7,182.93
Task 19: Track match.	Matching documented by UACD	319:\$18,740.24	Match: \$12,493.49	\$31,233.73
Task 20: Prepare reports.	Annual and Final reports completed by Watershed Coordinator	\$0	\$0	\$0

PROJECT TOTALS:		319: \$220,500	Match: \$147,000 EQIP: \$609,008.64	\$976,508.64
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11.0 CONCLUSIONS

11.1 FY06 and FY08

In conclusion, as increased attention has come to how various agricultural practices within the Middle Bear project area impacts water quality, these 319 grants have proved to be critical to producers and landowners. These 319 funds have gone a long ways in making improvements and in recruiting additional funds. For example, the FY08 grant alone generated a 1 to 3.4 ratio, meaning that for every \$1 of 319 funds that went into a project, an additional \$3.40 was put into the project as well.

There is still much to do in the Middle Bear project area in terms of non-point source pollution improvement projects. Many great partnerships have come about as a result of these projects and will be vital in the future. Great interest has come from the projects implemented with the FY06 and FY08 grants and as a result, multiple projects are currently in the development stages. The efforts that have been made to inform, educate and inspire stakeholders to make water quality a priority within the Bear River watershed have been fruitful but can still be improved upon. Information and education will play a major role in the future and are believed to be the key to permanent change.

12.0 ATTACHEMENTS

12.1 FY06

1. ERI, Nov. 1995. Ecosystem Research Institute, with Bear River RC&D. *Lower Bear River Water Quality Management Plan*. Report prepared for Department of Environmental Quality and Department of Water Quality.

2. Summary of UACD contracts

Project	UDAF contract #	From	To	EPA	Match	Total	Projects	EPA Remaining
MBR FY06	07-1028	10/01/06	10/5/10	\$37,500	\$25,000	\$62,500	4	\$0
Totals:				\$37,500	\$24,999.99	\$62,500		\$34,316.88

12.2 FY08 PROJECT PHOTOGRAPHS



Figure 1: Project #1. Post-project picture shows the berm and fence that were installed to prevent runoff from the feedlot from entering the Little Bear River. The fence also acts to protect the riparian area and streambanks.



Figure 2: Project #1. An off-site watering facility needed now that livestock are excluded from the Little Bear River.



Figure 3: Project #1. This picture shows the installation of the berm that was installed to contain runoff.



Figure 4: Project #2. This picture shows the installation of the liquid waste evaporation pond and the safety fence. Liquid waste is now prevented from entering the Cub River.



Figure 5: Project #2. This picture shows the solid animal waste facilities that were installed as part of the AWM system.



Figure 6: Project #3. This picture shows the irrigation system that was installed on the rolling terrain to reduce erosion from flood irrigation.



Figure 7: Project #3. Spring Creek is located at the end of this field. Previous to this project, sediments from flood irrigation runoff reached the creek frequently.



Figure 8: Project #4. This pre-project picture shows the corrals that Newton Creek flows through. Newton Creek flows at the bottom of the slope out of the view of the picture.



Figure 9: Project #4. This picture shows the berm that was installed to prevent runoff from entering Newton Creek.



Figure 10: Project #4. This picture shows the fence that was installed to keep livestock off of the berm and out of the riparian area on Newton Creek.



Figure 11: Project #4. This picture shows another angle of the berm that prevents runoff from entering Newton Creek.



Figure 12: Project #5. 319 funds went towards the installation of this methane digester, which is an animal waste storage facility with a rubber lid to capture methane.



Figure 13: Project #5. This picture shows the building that houses the generator that is run by methane from the digester.



Figure 14: Project #6. This picture shows the original solid waste storage facility for the operation. It was undersized and allowed liquids to runoff uncontained.



Figure 15: Project #6. Pre-project picture shows the liquids that were uncontained by the undersized bunker.



Figure 16: Project #6. Post-project picture shows the increased storage area for solid animal waste. A new solid waste storage facility was built and the old solid waste storage facility is now used to contain liquids.



Figure 17: Project #7. Livestock induced erosion on the Little Bear River in Mendon.



Figure 18: Project #7. Volunteers planting willow cuttings on the Little Bear River in Mendon.



Figure 19: Project #7. A total of 3,720 feet of fencing was installed on the Little Bear River in Mendon to remove livestock from the riparian area as part of this riparian habilitation project.



Figure 20: Project #8. Pre-project conditions allowed runoff to enter a canal and leave their operation.



Figure 21: Project #8. Before project implementation, manure ran uncontrolled into a canal located adjacent to the operation.



Figure 22: Project #8. A new animal waste facility now allows for proper storage and management. Manure no longer enters the canal.



Figure 23: Project #8. The portion of the canal that is directly down slope from the operation is now piped, thus preventing animal waste contamination.



Figure 24: Project #9. Livestock induced erosion on headwaters of Blacksmith Fork River.



Figure 25: Project #9. 4.2 miles of fencing were installed on headwaters of Blacksmith Fork River to eliminate livestock from riparian area.



Figure 26: Project #9. Three livestock watering facilities were installed due to restricted access to the Blacksmith Fork River.



Figure 27: Project #10. Pre-project conditions were allowing large amounts of manure to enter waterways that led to the Blacksmith Fork River.



Figure 28: Project #10. A proper AWM system allows for complete containment and storage of animal waste until it can be utilized.



Figure 29: Project #11. Before project installation, this area served as solid storage as well as liquid storage. Liquids would leave this area and run down the ditch along the road.



Figure 30: Project #11. This picture shows the pipeline that was installed to transport liquids to the new liquid waste evaporation pond.



Figure 31: Project #11. This picture shows the finished liquid waste pond where all liquids from the dairy are delivered.



Figure 32: Project #12. Post-project picture shows the new feed lane and stalls that were installed. Proper manure collection and storage helps to protect water quality.



Figure 33: Project #12. Post-project picture shows the new solid animal waste storage facility that assists in manure management.



Figure 34: Project #13. Pre-project conditions allowed manure to enter the Bear River due to a faulty manure bunker.



Figure 35: Project #13. 319 funds paid to remove the faulty portion of a manure bunker.



Figure 36: Project #13. This is the location where liquids escaped from the faulty bunker.



Figure 37: Project #13. This is the location where a new bunker will be installed. EQIP funds will be used to install this bunker.



Figure 38: Project #14. Eroded shoreline of Clay Slough at Cutler Reservoir before project implementation.



Figure 39: Project #14. Post-project condition of shoreline at Clay Slough. Shoreline is sloped and vegetated.