

**CLEAN WATER ACT
SECTION 319 NONPOINT SOURCE POLLUTION CONTROL PROGRAM
INTERIM FINAL REPORT**

**SAN PITCH RIVER
WATERSHED TMDL PROJECT
IMPLEMENTATION PLAN – ONGOING**

BY

**SANPETE CONSERVATION DISTRICT
UTAH ASSOCIATION OF CONSERVATION DISTRICTS
5 SOUTH MAIN
Ephraim, UT 84627**

November 2013

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

State (UDAF) Contract #s: 04-1264, 05-1645, 06-1025, 07-1031, 08-1217, and 09-1060
Grant #s: C9998187-03, C9998187-04, C9998187-05, C9998187-06, C9998187-07, and
C9998187-08

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EXECUTIVE SUMMARY

Project Title: San Pitch River Watershed TMDL – Implementation Plan – Ongoing

GRTS # 0318; UDAF contract # 04-1264 (Fiscal Year 2003)

Start Date: 5/19/2003	Completion Date: 11/24/2008
Total Budget.....	<u>\$188,833</u>
Total EPA 319 Grant.....	<u>\$113,300</u>
Total Expenditures of EPA Funds.....	<u>\$113,300</u>
Total 319 Match.....	<u>\$75,533</u>

GRTS # 0406; UDAF contract # 05-1645 (Fiscal Year 2004)

Start Date: 9/1/2004	Completion Date: 9/30/2009
Total Budget.....	<u>\$333,333</u>
Total EPA 319 Grant.....	<u>\$200,000</u>
Total Expenditures of EPA Funds.....	<u>\$200,000</u>
Total 319 Match.....	<u>\$133,333</u>

GRTS # 0508; UDAF contract # 06-1025 (Fiscal Year 2005)

Start Date: 9/1/2005	Completion Date: 9/30/2010
Total Budget.....	<u>\$375,000</u>
Total EPA 319 Grant.....	<u>\$225,000</u>
Total Expenditures of EPA Funds.....	<u>\$225,000</u>
Total 319 Match.....	<u>\$150,000</u>

GRTS #; UDAF contract # 07-1031 (Fiscal Year 2006)

Start Date: 9/1/2006	Completion Date: 12/31/2011
Total Budget.....	<u>\$291,874</u>
Total EPA 319 Grant.....	<u>\$175,124</u>
Total Expenditures of EPA Funds.....	<u>\$175,124</u>
Total 319 Match.....	<u>\$116,750</u>

GRTS #; UDAF contract # 08-1217 (Fiscal Year 2007)

Start Date: 9/1/2006	Completion Date: 12/31/2011
Total Budget.....	<u>\$255,000</u>
Total EPA 319 Grant.....	<u>\$153,000</u>
Total Expenditures of EPA Funds.....	<u>\$153,000</u>
Total 319 Match.....	<u>\$102,000</u>

GRTS #; UDAF contract # 09-1060 (Fiscal Year 2008)

Start Date: 9/1/2006

Completion Date: 9/30/2013

Total Budget.....	<u>\$196,667</u>
Total EPA 319 Grant.....	<u>\$118,000</u>
Total Expenditures of EPA Funds.....	<u>\$118,000</u>
Total 319 Match.....	<u>\$78,666</u>

Project Grand Total as of 9/30/2013

Total Budget.....	<u>\$1,640,707</u>
Total EPA 319 Grants	<u>\$984,424</u>
Total Expenditures of EPA Funds.....	<u>\$984,424</u>
Total 319 Match.....	<u>\$656,282</u>

SUMMARY ACCOMPLISHMENTS:

This is a series of projects with several individual landowners to implement the San Pitch River Water Quality Management Plan. The match came from landowner contributions both monetary and in-kind labor.

FY 2003 and FY2004 Projects

Projects included 5650 feet of streambank restoration, 716 acres of upland improvement, 1063 acres of pasture improvement, 245 acres of sprinkler irrigation to replace flood and irrigation, 2075 ft of high pressure 15” line to replace the Graveyard Ditch to eliminate flooding problems, reconstructing 1 corral to reduce manure runoff and purchase of a rangeland drill by the Sanpete Conservation District to be used for range and pasture improvement, and an education program to inform the public of potential pollution sources to the watershed.

A total of 15 projects were completed using 319 program funds in the FY 03 and FY 04 Funding years.

Using the STEPL model for most projects, and the Utah Animal Feedlot Runoff Risk Index Worksheet for the corral reconstruction, we estimate an annual reduction of 418.0 Lbs/yr of N, 179.9 Lbs/yr of P, 1135.1 Lbs/yr of BOD and 148.8 Tons/yr of sediment from the San Pitch River.

FY 2005 Projects

Project implementation for FY 05 included four stream restoration projects for a total of 5,728 feet of streambank stabilization, riparian fencing, and grazing management; two pasture improvement projects including reseeding and grazing management on 200 acres; two irrigation projects that converted 57 acres of flood irrigation to center pivot irrigation; and four irrigation projects converting 167 acres of flood irrigation to wheel line sprinkler irrigation.

The estimated total load reductions achieved from implementation during FY 2005 is estimated at 1,699 lbs/yr nitrogen, 347 lbs/yr phosphorus, and 196 tons/yr sediment.

FY 2006 Projects

Projects included 6,280 feet of stream bank restoration/stabilization; 7,480 feet riparian fence, 4 pasture improvement projects including reseeding and grazing management on 311 acres; 2 corral relocation projects moving corals off the San Pitch River; 1 irrigation project that converted 27 acres of uncontrolled flood irrigation to gated pipe; and 5 irrigation projects converting 197 acres of flood irrigation to wheel line sprinkler irrigation. The estimated total load reductions achieved from implementation during FY 2006 is estimated at 16246 lbs/yr nitrogen, 475 lbs/yr phosphorus, and 397 tons/yr sediment.

FY 2007 Projects

Projects included 6,400 feet of stream bank restoration/stabilization including 8,060 feet riparian fence. Projects completed include reapplication/repair of Ed Jessen' FY 2006 River project (completed), the Al Erikson and Ed Jessen River projects (nearing completion), and the Kevin Turpin River Restoration project (completed). Two pasture improvement projects including reseeding and grazing management on 47 acres on the M. Kyle Christensen pasture improvement/riparian project (completed) and the Journey Blazing New Trails irrigation/pasture project (nearing completion). Irrigation efficiency improvement projects include the Gunnison and Mayfield Irrigation projects (near completion), one Irrigation project that converted 120 Acres of low efficiency irrigation to a high efficiency pivot system.

The estimated annual total load reduction achieved from implementation of the FY 2007 grant is estimated at 6,973 lbs/yr nitrogen, 2,411 lbs/yr phosphorus, and 8,017 tons/yr sediment.

The FY 2007 grant also included two I&E expenditures; the annual Watershed Education Day held for 4th grade students that live within the watershed and a producer dinner. 424 students attended the Education Day. The Watershed Stewardship group also held a producer of the year dinner where the water quality conservation efforts of an individual were highlighted and different projects were showcased. 28 of people attended the producer dinner. We also purchased a camera to document before and after photos of projects, conduct photo point monitoring, and to demonstrate effectiveness of projects to other/new cooperators. Promotional Hats were purchased to help raise awareness in the community about the program.

FY 2008 Projects

Projects included 1250 feet of stream bank restoration/stabilization, including 1,000 feet riparian fence, two wheeline systems, replacing less efficient flood irrigation practices, two pasture projects and I&E including promotional items a watershed tour and a 4th grade

watershed education day. This does not include projects finished this year that were reported in the last report. Projects completed include the Al Erikson and Ed Jessen River projects (started in the 08-1217 grant), Kory Turpin River Restoration Project, and the Kevin Turpin River Restoration project (reapplication). Two pasture improvement projects including reseeding and grazing management on 188 acres on the Larson Farms pasture improvement project and the Doug Jacobson pasture project (reapplication). Irrigation efficiency improvement projects include the Al Erikson Irrigation project that converted 30 Acres of low efficiency flood irrigation on the river banks, to a higher efficiency wheeline system, and a 10 acre wheeline on Doug Taylors place replacing a less efficient flood irrigation system.

The estimated annual total load reduction achieved from implementation of the FY 2008 grant is estimated at 1,016 lbs. /yr. nitrogen, 188 lbs. /yr. phosphorus, 95 tons/yr. sediment, and a BOD reduction of 2,120 lbs. / yr.

The FY 2008 grant also included 5 I&E expenditures; the annual Watershed Education Day held for 4th grade students that live within the watershed and a producer dinner. Over 500 students attended the Education Day. The Watershed Stewardship group also held a Watershed Tour/dinner where a few different river restoration projects were showcased. Promotional Hats/sweatshirts were purchased to help raise awareness in the community about the program.

1.0 INTRODUCTION

Several water bodies within the San Pitch River Watershed are currently not meeting their designated beneficial uses due to total dissolved solids concentrations. A total Maximum Daily Load (TMDL) analysis was submitted to the EPA on April, 2003 and approved in November 18, 2003. In addition the upper San Pitch River is designated as a 3A Coldwater fishery, and has been identified by the Utah Division of Water Quality as having high concentrations of total phosphorus, requiring further evaluation. This project addressed the primary sources of dissolved solids and other pollutant sources which have been identified through TMDL development and reporting.

The Sanpete Conservation District is the lead project sponsor. The District is empowered by the State of Utah to devise and implement measures for the prevention of non-point water pollution. The District is able to enter into contracts, receive and administer funds from agencies and contract with other agencies and corporate entities to promote conservation.

The San Pitch River Watershed Stewardship Group (Local Work Group) has brought together citizens who are concerned about the future condition of the San Pitch River. A Watershed Coordinator has been hired to work with the Watershed Stewardship Group and implement the San Pitch River Water Quality Management Plan.

The San Pitch River from U-116 crossing above Moroni to its confluence with the Sevier River has been identified as a “High Priority” watershed, 303(d) list Unified Assessment Category IC.

The middle and lower San Pitch River (excluding its tributaries) were found by Utah Department of Environmental Quality (DEQ) Division of Water Quality (DWQ) to be partially supporting their designated beneficial use for agriculture because of high total dissolved solids concentrations (TDS). TDS is delivered to the river year-round and is derived from both natural runoff and irrigation return flows. High TDS water impairs crop plants ability to take up water and concentrates in the soil where eventually it may become too saline for crop growth. A Total Maximum Daily Load (TMDL) analysis was submitted to the EPA in April, 2003 and approved on November 18, 2003.

1.1. Water body information

The San Pitch River Watershed boundary is defined by the United States Geological Survey (USGS) Hydrologic Accounting Unit (HUC) #16030004. The majority of the water in the river originates as snowmelt from the Wasatch Plateau to the east. The tributaries draining the San Pitch Mountains to the west and north are not a significant source of spring snowmelt but do contribute flows during isolated storm events. The foothills of the Wasatch Plateau are an important area for groundwater recharge in the basin and have been identified as sensitive areas for groundwater protection. The valley-bottoms from Moroni, south to Gunnison Reservoir, are predominantly wet meadows in the region of groundwater discharge. Hydrologic modification of natural flows results in several dry dams along the middle San Pitch River and nearly all the flow of its tributaries are used for flood or sprinkler irrigation or stored in one of several reservoirs. All the snowmelt from the larger tributaries like Twelvemile and Sixmile Creeks is stored in Ninemile and Gunnison Reservoirs and diverted to sprinkler systems outside the basin

to the south. As a result, the middle and lower San Pitch River collects a combination of irrigation return flow and groundwater recharge and such is heavily impacted from salinity originating in soils and groundwater. GRTS # 0318AG (UDAF contract #04-1264), GRTS # 0406AG (UDAF contract #05-1645), and GRTS #0508AG (UDAF contract 05-1025) each represent one year of funding for an on-going San Pitch River Watershed TMDL Project Implementation Plan.

1.2. Map

See the attached map of the San Pitch Watershed Appendix I.

1.3. Land Use

The primary land use along the Upper San Pitch River is agriculture which includes grazing pasture, animal feeding operations, hay land, and turkey production. Grazing is primarily unrestricted in the stream channel and has resulted in streambank erosion and habitat degradation. Although much of the area is under sprinkler irrigation, flooding is common and can contribute sediment and animal waste when fields are flooded. In addition to turkey waste, corrals located on or near live water, are also a source of phosphorus in the upper watershed. The city of Fairview has recently installed a micro-filtration plant; however, urban-development in the surrounding foothills is utilizing on-site septic systems.

1.4. Water Quality Problems

In the middle and lower San Pitch River, the main beneficial use is for agriculture including irrigation and livestock watering. Irrigation water use is impaired when high concentrations of TDS impair the ability of plants to absorb water from soils. As noted above, there are several causes and sources of salinity loading to the San Pitch River. A TMDL study submitted to the DWQ has identified the main sources of TDS as a combination of natural geology, soils, erosion, flood irrigation and return flows. The TMDL recommends a load reduction of ~12% in the river upstream from Gunnison Reservoir. Areas of concern include pastureland and wet meadows in the central valley, which are flood-irrigated and result in leaching of salts into the San Pitch River. In addition, dewatering the stream channel concentrates the return flow and groundwater resulting in higher concentrations of TDS. Upland erosion from range dominated by shrubs like greasewood, contributes sediment laden with salts to the river. In an attempt to address all sources of TDS, this project includes a wide range of demonstration projects such as upland range improvement to reduce erosion, pasture improvement and seeding to vegetate saline soils and moderate return flows, conversion of flood irrigation to more efficient irrigation practices, and stream bank restoration to reduce erosion of bank materials containing salts.

The upper San Pitch River and its tributaries have beneficial uses which include agriculture as well as Coldwater fishery. Data collected at the U116 crossing indicated there are exceedances of the total phosphorus criteria and therefore require further study to determine whether impairment exists for the fishery. The San Pitch River watershed is a major dairy and turkey producer. Although, phosphorus loads were not assessed in the scope of the TMDL, livestock waste is often a major contributor to nutrient loading and cultural eutrophication. In addition, the

combination of land application of manure and uncontrolled flood irrigation (a practice common in the area) can also contribute to TDS loads. The Sanpete County Conservation District and the San Pitch River Watershed Stewardship Group has developed an ongoing watershed restoration action strategy to address all sources of non-point source pollution. The Stewardship Group has hired a watershed coordinator to assist in this planning process and to guide restoration activities while developing a comprehensive restoration process that will meet the needs for years to come. The Group has identified a number of areas of concern; willing cooperators are being identified to initiate the implementation process. Therefore, this implementation plan represents an attempt to address all sources of non-point source pollution within a five year strategy plan and beyond, which will require incremental funds for additional projects as priority areas and cooperators are identified

2.0 PROJECT GOALS, OBJECTIVES AND ACTIVITIES

The overall project goals are to: Implement a suite of projects to address multiple categories of non-point source pollution in the San Pitch watershed by: reducing TDS loads by improving irrigation systems and irrigation water management; reducing the amount of phosphorus entering the watershed from animal feeding operations; improving the stability of the stream channels and enhancing the riparian corridor to reduce sediment, TDS, and phosphorus loading; improving upland and pastureland management practices to reduce sediment, salinity, and nutrient runoff; improving water quality by reducing sediment loads from the twelve mile canyon slides; and informing and educating the community concerning non-point source pollution and the importance of managing natural resources within the watershed. These projects are the first phase of implementation activities planned for the watershed which will continue on an incremental basis for the foreseeable future. In addition, the watershed planning process will receive the support of a watershed coordinator to provide technical assistance to the San Pitch River Watershed Stewardship Group in developing its watershed plan and future implementation activities to address water quality problems. The hiring of a watershed coordinator has been funded through a statewide 319 proposal to acquire funding for a number of coordinators, one of which is currently working full-time in the San Pitch River Watershed. If NRCS is not available for project design, projects will be bid out to other engineering companies for design.

The San Pitch River Water Quality Management Plan and TMDL identify the primary sources of point and non-point sources of TDS pollution in the San Pitch River Watershed. The allocation analysis identifies several potential sources and their corresponding load contributions. These are as follows: Background – 6,898 tons/yr. (20%); Groundwater – 10,228 tons/yr. (29%); Johnson Springs – 450 tons/yr. (1%); Eroded sediment – 4,788 tons/yr. (14%); Flood Irrigation return flows – 12,647 tons/yr. (36%); Moroni WWTP – 318 tons/yr. (<1%); Sprinkler return flow – negligible. Load reductions for TDS will be targeted in the middle San Pitch River as per the recommendation of the TMDL which requires a reduction of about 4,000 tons/year TDS during the irrigation season in order to meet water quality standards. Implementation activities funded through this project are chosen in order to achieve the greatest load reduction possible by locating individual projects in priority source areas identified in the TMDL.

Work is ongoing to complete a watershed management plan that will address all potential pollution problems. Upon implementation the available data suggested that the station at the U116 road crossing (494675) exceeded the total phosphorus criteria in 26% of samples, whereas upstream of Fairview at 494679 there are none. In addition, daily total phosphorus loads at 494675 exhibited a tenfold increase over the upstream site (494679), increasing from 0.28 kg/day to 2.92 kg/day. In addition, the Stream Visual Assessment Protocol was completed on ~18 miles of the river and bank erosion estimates were made using the Stream Erosion Condition Index. Ten segments were assessed and erosion rates ranged from as little as 50 kg/year/mile to 8,800 kg/year/mile with a total of 94,000 kg/year in bank material entering the stream between sites 494675 and 494679. The watershed plan identifies all related resource issues, prioritizes problem areas, and targets projects to address nutrients in the upper watershed to protect the 3A Coldwater fishery.

Goal #1: Assist animal feeding operations in the San Pitch River watershed to implement and demonstrate containment, proper application and utilization of animal manures using Best Management Practices.

FY 03 PIP Task #1- Implement 1 Animal Waste System - No progress was made because resources were targeted to other tasks.

FY 04 PIP Task #1- Implement 1 Animal Waste System – No progress was made because resources were targeted to other tasks.

FY 05 PIP Task #1 – Implement 2 Animal Waste Systems - No progress was made on this task due to the lack of cooperator participation. The watershed group was not successful in recruiting cooperators for this task during project sign ups. The funds allocated for this task were shifted to other goals with adequate participation.

Goal #2: Improve stability of the stream channel and enhance the riparian corridor to reduce sediment nutrient loading to the river and its tributaries. Reduce approximately 7,000 kg/year in sediment from stream bank erosion.

FY 03 PIP Task #2 – Streambank Restoration – Ross Terry completed 2150 feet and Scott Mower completed 2500 feet, for a total of 4650 feet of stream restoration.

FY 04 PIP Task #2 – Streambank Restoration – Completed remainder of Ross Terry Stream project for an additional 1000 feet of stream restoration.

FY 05 PIP Task #2 – Streambank Restoration –

- i. Completed stream restoration projects for the Lazy JW Ranch (1908 feet of streambank stabilization and 71 acres prescribed grazing)
- ii. Gary Richards (1,920 feet of streambank stabilization and 17.3 acres prescribed grazing)
- iii. Ed Jessen, and Guy Farley for an additional 1,900 feet of streambank and 20 acres of livestock exclusion.

Goal #3: Improve pasture condition and implement management practices to protect well heads and help reduce runoff and sources of salinity as well as to identify critical species habitat.

FY 03 PIP Task #4 – Pasture Improvement – Jay Olsen seeded 1000 acres and Terry Mahoney seeded 30 acres, for a total of 1030 acres of pasture seeding.

FY 04 PIP Task #3 – Pasture Improvement – Doug Jacobson completed 45 acres and Flo Mitchell completed 33 acres for a total of 78 acres of pasture seeding.

FY 05 PIP Task #3 – Pasture Improvement – Ray B. Christensen implemented 120 acres of pasture seeding and prescribed grazing and Dee Jorgenson implemented 80 acres of pasture planting and prescribed grazing.

Goal #4: Improve upland management practices to reduce sediment and nutrient runoff to the river and its tributaries. Upland erosion was identified in the TMDL as 14% of the total load of TDS to the San Pitch River. Reducing this erosion by 20% will reduce loading by approximately 950 tons per year.

FY 03 PIP Task #3 – Brush Management (Uplands) – Dick Christensen completed 390 acres.

FY 04 PIP Task #4 – Brush Management (Uplands) – Dick Christensen completed 246 acres and Doug Jacobson completed 80 acres for a total of 326 acres of brush treatment.

FY 05 PIP Task #4 – Brush Management (Uplands) – No progress was made on this Goal. The watershed group was not successful in recruiting project cooperators for this goal and the allocated funds were shifted to other Goals within the grant with adequate participation.

Goal #5: Replace flood irrigation with efficient and effective irrigation practices to reduce water usage and runoff from saline soils. Reducing flood irrigation return flows in the middle San Pitch River by 25% will result in reduction of approximately 3200 tons/year TDS.

FY 03 PIP Task #5 – Irrigation Management – Jim Cheney replaced flood irrigation with wheelines on 58 acres.

FY 04 PIP Task #5 – Irrigation Management – Ed Jessen replaced flood irrigation with wheelines on 30 acres, Craig Oberg replaced flood irrigation with wheelines on 79 acres, Scott Mower replaced flood irrigation with a big gun on 17 acres, Tim Blackham replaced flood irrigation with wheelines on 54 acres and Robert Garlick replaced flood irrigation with a big gun on 7 acres, for a total of 187 acres of flood irrigation replaced by sprinklers on critical lands adjacent to the river system.

Also the Graveyard Ditch Co. replaced 2075 feet of ditch with high pressure 15” pipe to eliminate flooding and erosion problems.

FY 05 PIP Task #5 – Irrigation Management -

- iv. Graveyard Ditch – Completed the remaining project tasks from FY04.
- v. Quedell Jensen – Completed 27 acres of land leveling and installation of gated pipe to eliminate irrigation surface runoff to the San Pitch River.
- vi. Doug Taylor – Implemented 34 acre center pivot irrigation system and supporting infrastructure.
- vii. Shelby Taylor – Implemented 23 acre center pivot irrigation system and
- viii. Seeley Irrigation Project – Implemented centralized irrigation regulating reservoir, irrigation water conveyance system, and sprinkler irrigation systems for the following cooperators.
 - 1. Seeley Family Trust - Converted 93 acres flood irrigation to wheel line sprinkled irrigation
 - 2. Steven Seeley – Converted 38 acres flood irrigation to wheel line sprinkled irrigation.
 - 3. Matt Briggs – Converted 16 acres flood irrigation to wheel line sprinkler irrigation.
 - 4. Lynn Hunter - Converted 20 acres flood irrigation to wheel line sprinkler irrigation.

Goal #6: Implement corral improvement projects to reduce manure runoff to surface water. Although unacceptable conditions have been identified along the river with regard to corral location and conditions, specific loading estimates will be made on a case-by-case basis. It is anticipated that project will result in full containment of manure and runoff to the river and its tributaries.

FY 03 PIP Task #6 – Corral Improvement/Relocation – Scott Mower project was started.

FY 04 PIP Task #6 – Corral improvement/relocation – Scott Mower finished reconstruction of his corral. Before the project, live water was flowing through the corral and then directly into the San Pitch River. Water was piped and troughs were installed that fully contained the manure runoff. Using the UAFRRI model it is estimated that Total Nitrogen was reduce by 182 lbs./yr., Total P Loading by 89 lbs./yr. and total BOD loading by 663 lbs./yr.

FY 05 PIP Task #6 – No progress was made on this Goal due to the lack of cooperator participation. Funds allocated to this goal were used to fund projects in other Goals with adequate participation.

Goal #7: Inform and educate the community concerning non-point source pollution and the importance of maintaining and improving water quality within the waters

FY 03 PIP Task #7 – I &E Activities – Tour posters, Newspaper ads and Radio spots were purchased as well as ads soliciting 319 projects.

FY 04 PIP Task #7 Conduct two tours to demonstrate projects. – Two tours were conducted on the 12 Mile slide area and associated problems. A coalition was formed which ultimately resulted in the Utah State Legislature appropriating money to study solutions.

FY 04 PIP Task #8 Develop Brochures, Fact Sheets, Tours, signs and a radio spots. High school and Fourth grade education day was held in the spring of 2007. Fourth Grade Education Day was held in the spring of 2008, 2009 and 2010 for both the North and South Sanpete School Districts. Over 400 students, along with their teachers and aides have attended each year. The students are bused to the Snow College Activity Center where they are instructed in different aspects of watershed management by individuals from the US Forrester Service, Rural Water, Rural Development, Water Conservancy, Utah Division of Wildlife Resources, NRCS, the Utah Department of Agriculture and Food and Division of Water Quality.

FY05 PIP Task # 8 - I & E funds from this grant were also allocated to the fourth grade education days described above in the FY04 Task #8.

Goal #8: Purchase a seeding drill to help implement pasture improvement and management projects.

FY 04 PIP Task #9 – Purchase a rangeland drill - A rangeland drill was purchased by the Sanpete Conservation District and is being used by landowners to improve irrigated pasture and rangeland. Goal #8 is completed.

FY 2006 Goals

Goal #1: Improve stability of the stream channel and enhance the riparian corridor to reduce sediment, salt and nutrient loading.

FY 06 PIP Goal #1 – Streambank Restoration –

- i. Kevin Turpin 2,400 feet of streambank restoration
- ii. Ed Jessen 4626 feet of riparian fence
- iii. Guy Farley 1907 feet of riparian fence
- iv. Kyle Christensen 590 feet of riparian fence

Goal #2: Improve pasture condition and implement management practices that help to improve and protect well head area's to reduce runoff and sources of salinity.

FY 06 PIP Goal#2 – Pasture Improvement –

- i. Ray B. Christensen installed 1735 feet of pasture cross fencing
- ii. Kyle Christensen implemented 7 acres of pasture seeding and prescribed grazing
- iii. Windy Meadows Ranch implemented 60 acres of seeding and prescribed grazing
- iv. Reed Christensen implemented 54 acres of pasture seeding and 2946 feet of cross fencing

Goal #3: Improve upland management practices to reduce sediment and nutrient runoff to the river and its tributaries.

FY 06 PIP Goal#3 – Brush Management (Uplands) –

Brush Management (Uplands) – No progress was made on this Goal. The watershed group was not successful in recruiting project cooperators for this goal and the allocated funds were shifted to other Goals within the grant with adequate participation.

Goal #4: Install irrigation management systems and implement water conservation practices to reduce salt laden return flows.

FY 06 PIP Goal#4 – Irrigation Management –

- i. Quedell Jensen converted 27 acres of uncontrolled flood to gated pipe surface irrigation
- ii. Matt Briggs – Converted 16 acres flood irrigation to wheel line sprinkler irrigation.
- iii. Seeley Family Trust - Converted 93 acres flood irrigation to wheel line sprinkled irrigation
- iv. Gayle Seeley – Converted 38 acres flood irrigation to wheel line sprinkled irrigation.
- v. The Journey Blazing New Trails – converted 40 acres of flood irrigation to wheeline sprinkler irrigation

Goal #5: Inform and educate the community about NPS pollution and maintaining and improving water quality within the watershed.

FY 06 PIP Goal#5 – I&E –

Fourth Grade Education Day was held in the fall of 2011.

FY 06 PIP unspecified Goal#6– Corral Improvements / Relocation –

- i. Ed Jessen moved a 30 head cattle feedlot off the San Pitch River
- ii. Affel Erikson Relocated a 50 head cattle feedlot off a spring that drained directly in to the San Pitch River less than 300 feet from the feed lot

FY 07

- Goal #1: Improve stability of the stream channel and enhance the riparian corridor to reduce sediment nutrient loading to the river and its tributaries. Reduce approximately 7,000 kg/year in sediment from streambank erosion. There were 4 riparian BMP's implemented including; Ed Jessen's reapplication work on the river project implemented in FY06 that had some substantial damage from the 2011 spring flood, completion of the Kevin Turpin streambank stabilization project, and initial work on the Affel Erikson and Ed Jessen stream restoration project.

- Goal #2: Improve pasture condition and implement management practices to protect well heads and help reduce runoff and sources of salinity as well as identify critical species habitat. Two pasture projects were implemented with this grant. Kyle Christensen finished up his pasture/riparian project and the Journey Blazing New Trails finished their project.
- Goal #3: Improve upland management practices to reduce sediment and nutrient runoff to the river and its tributaries. upland erosion was identified in the TMDL as 14% of the total load of TDS to the San Pitch River. Reducing this erosion by 20% will reduce loading by approximately 950 tons per year. We did not receive any applications for upland management/improvement projects for the FY 07 Grant. Therefore this goal was not achieved there were no upland BMP's installed.
- Goal #4: Replace flood irrigation with efficient and effective irrigation practices to reduce water usage and runoff from saline soils. Reducing flood irrigation return flows in the middle San Pitch River by 25% will result in reduction of approximately 3,200 tons/year TDS. Four irrigation projects were implemented using this grant: Journey Blazing New trails finished their pasture/irrigation project converting flood irrigation to wheelline sprinkler, the 3 Bar J Ranch installed a center pivot replacing worn-out hand line sprinklers and low efficiency big gun sprinklers, Gunnison and Mayfield Irrigation companies built Sediment ponds to settle out fine sentiment from their irrigation water, which reduces the sediment load returned to the river
- Goal #5: Inform and educate the community concerning non-point source pollution and the importance of maintaining and improving water quality within the watershed. The Watershed Group Held a 4th grade education day to educate the community about water quality and other natural resource priorities. We also held a dinner to educate local land owners about the 319 program to increase interest in the program.

FY 08

- Goal #1: Improve stability of the stream channel and enhance the riparian corridor to reduce sediment nutrient loading to the river and its tributaries. Reduce approximately 7,000 kg/year in sediment from stream bank erosion. There were 4 Riparian Projects that this grant helped fund, the Kory Turpin Project that was a continuation of Kevin Turpin's Project, a little reapplication of Kevin Turpin's project where a couple of the structures had been washed around, and the completion of the Ed Jesson and Al Ereksen River Projects a load reduction estimated 156,489 kg of sediment a year was achieved
- Goal #2: Improve pasture condition and implement management practices to protect well heads and help reduce runoff and sources of salinity as well as identify critical species habitat. As complimentary management components to Goals 3 and 4, load reductions are cited below. Pasture projects are listed with goal 3 below no well head protection projects were implemented.
- Goal #3: Improve upland management practices to reduce sediment and nutrient runoff to the river and its tributaries. Upland erosion was identified in the TMDL as 14% of the total load of TDS to the San Pitch River. Reducing this erosion by 20% will reduce loading by approximately 950 tons per year. Two pasture projects were implemented, Doug Jacobson's pasture reapplication from the 05 grant where a portion of the seeding did not take and was re applied this year, and Mike Larson's pasture project establishing pasture grasses along the river and some riparian fencing, a load reduction of an estimated 93 tons/year was achieved

- Goal #4: Replace flood irrigation with efficient and effective irrigation practices to reduce water usage and runoff from saline soils. Reducing flood irrigation return flows in the middle San Pitch River by 25% will result in reduction of approximately 3200 tons/year TDS. Two irrigation projects were implemented replacing flood irrigation with wheeline irrigation Doug Taylor, and Al Ereksen, Load Reductions estimates of 864 Lbs./year N and 129 Lbs./year P
- Goal #5: Inform and educate the community concerning non-point source pollution and the importance of maintaining and improving water quality within the watershed. The 4th grade Watershed Education day was held at Snow Collage with great success there were even more students in attendance this year than in years past.

3.0 LONG TERM RESULTS IN WATER QUALITY AND WATERSHED

The San Pitch River Watershed Water Quality Improvement Plan outlines a series of specific actions and management strategies to improve the natural resource condition of the San Pitch Watershed. Once implemented these recommendations are expected to reduce the introduction of salinity, sediment, and phosphorus into the San Pitch River each year. This would result in improved water quality and fisheries, and aquatic wildlife, riparian and upland habitat, recreation, groundwater quality, storm water, weeds and pests, sensitive species, effects of urban development, source water protection, and agricultural productivity.

4.0 BEST MANAGEMENT PRACTICES (BMPS) DEVELOPED AND/OR REVISED

4.1. FY 2003 & FY2004

Best Management Practices were implemented to meet the goals and objectives outlined in section 2.0 above. This has resulted in significant improvement of the San Pitch River.

4.1.1. Project Descriptions, Locations, and Load Reduction Estimates

Table 4-1. List of FY2003 and FY2004 Cooperators (Refer Cooperator Number to charts and Maps)

Cooperator	Project	Fiscal Year
1 – Scott Mower	Stream Restoration	03
2 – Ross Terry	Stream Restoration	03&04
3 – Jay Olsen	Pasture	03
4 – Terry Mahoney	Pasture	03
5 – Dick Christensen	Uplands	03&04
6 – Jim Cheney	Irrigation	03
7 – Scott Mower	Corral	03
8 – Doug Jacobsen	Uplands	03&04

9 – Flo Mitchell	Pasture	03&04
10 – Ed Jessen	Irrigation	04
11 – Craig Oberg	Irrigation	04
12 – Scott Mower	Irrigation	04
13 – Robert Garlick	Irrigation	04
14 – Tim Blackham	Irrigation	04
15 – Graveyard Ditch Co.	Irrigation	04 & 05

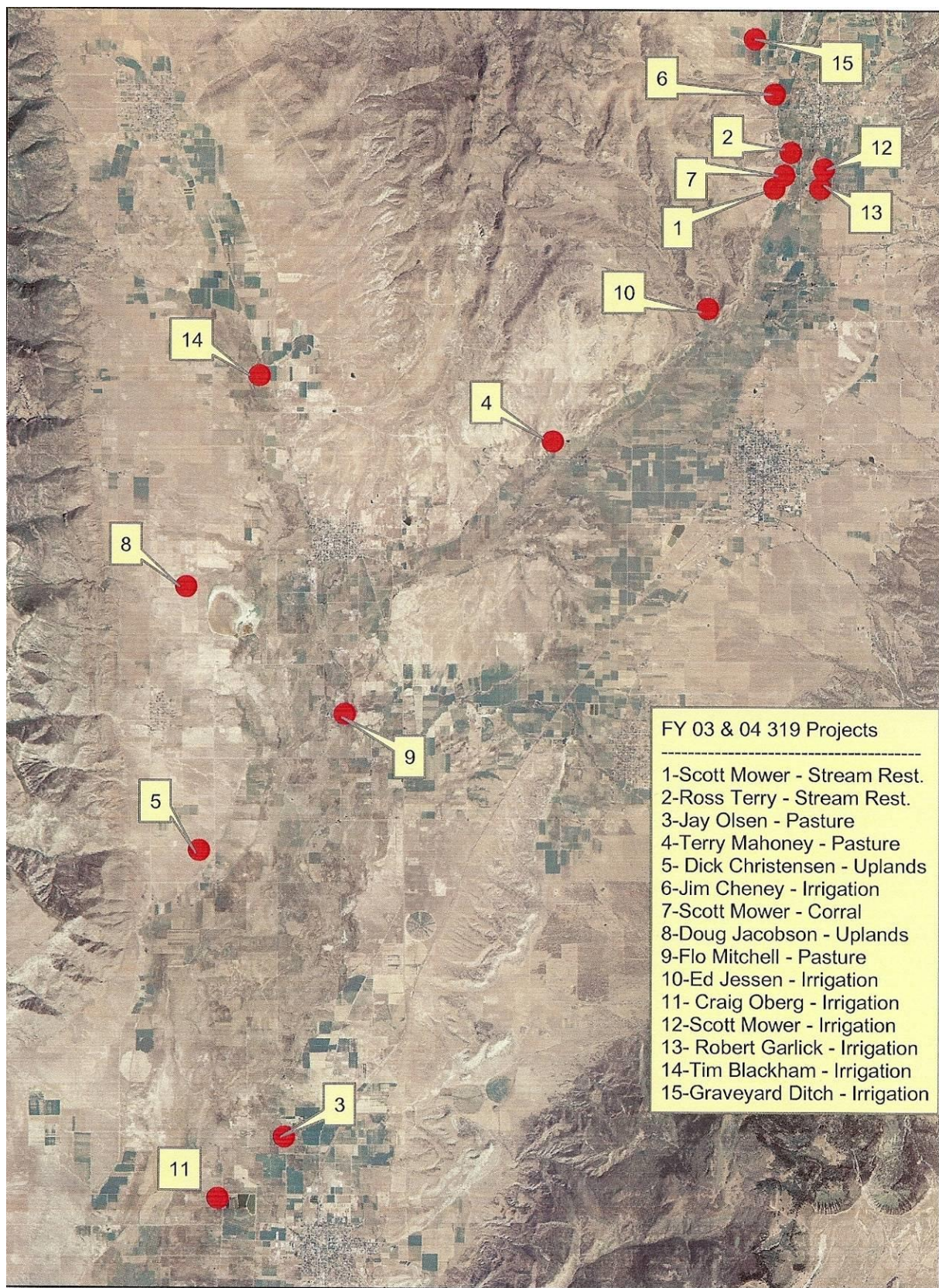


Figure 4-1. FY03 & 04 NPS Implementation Project Locations.

Table 4-2. Best Management Practices implemented using the NPS 319 FY03 funds contained in UDAF contract #04-1264:

<u>Best Management Practice Used</u>	<u>Number Installed</u>	<u>Units</u>	<u>Cooperator(s)</u>
580 Stream bank Protection	4650	Feet	1,2
382 Fence	8778	Feet	1,2,34
430 Irrigation pipeline	2639	Feet	1,6
614 Watering Facility	7	Each	1,5,7
356 Dike	61	CY	1
587 Structure for water control	1	Each	6
516 Stock water pipeline	6092	Feet	1,3,5
533 Pumping plant for water control	1	Each	6
442 Irrigation system (wheel-line)	58	Acres	6
512 Pasture planting	1030	Acres	3,4
550 Range Planting	240	Acres	5
314 Brush Management (pres. Burning)	150	Acres	5
595 Pest Management	33	Acres	9
324 Deep Tillage	33	Acres	9

Table 4-3. Pollutant Load Reductions by practice using the NPS 319 FY 03 Funds contained in UDAF Contract 04-1264:

<u>Pollutant</u>	<u>BMP</u>	<u>Annual X BMP life (yrs) =</u>	<u>Total Reduction</u>	<u>Unit</u>	<u>Cooperator(s)</u>
N	(784) Feedlt. Runf.	182.0 X 30 =	5460	Lbs.	1
N	(442) Spkr. Irrigatiion	27.4 X 30 =	822	Lbs.	6
N	(580) Stream Rest.	70.3 X 30 =	2109	Lbs.	1,2
N	(512) Pasture Impr.	15.5 X 30 =	465	Lbs.	3,4
N	(550) Upland Impr.	51.2 X 30 =	1536	Lbs.	5
Sub Total =		346.4	10,392		
P	(784) Feedlt. Runf.	89.0 X 30 =	2670	Lbs.	1
P	(442) Spkr. Irrigatiion	10.5 X 30 =	315	Lbs.	6
P	(580) Stream Rest.	27.1 X 30 =	813	Lbs.	1,2
P	(512) Pasture Impr.	6.0 X 30 =	180	Lbs.	3,4
P	(550) Upland Impr.	19.7 X 30 =	591	Lbs.	5
Sub Total =		152.3	4,569		
BOD	(442) Spkr. Irrigatiion	54.7 X 30 =	1641	Lbs.	6
BOD	(784) Feedlt. Runf.	663.0 X 30 =	19890	Lbs.	1
BOD	(580) Stream Rest.	140.6 X 30 =	4218	Lbs.	1,2
BOD	(512) Pasture Impr.	31.1 X 30 =	933	Lbs.	3,4
BOD	(550) Upland Impr.	102.4 X 30 =	3072	Lbs.	5

		Sub Total =	991.8		29,754	
Sed	(784) Feedlt. Runf.	0 X 30	=	0	Tons	1
Sed	(442) Spkr. Irrigatiion	17.1 X 30	=	513	Tons	6
Sed	(580) Stream Rest.	38.2 X 30	=	1146	Tons	1,2
Sed	(512) Pasture Impr.	9.6 X 30	=	288	Tons	3,4
Sed	(550) Upland Impr.	37.7 X 30	=	1131	Tons	5
		Sub Total =	102.6	3078		

Table 4-4. Total Load Reductions using UDAF contract #04-1264 Funds (Fiscal Year 2003):

	<u>303(d) Assessment</u>	<u>Pollutant</u>	<u>Annual Load Reduction</u>	<u>Life/Yrs</u>	<u>Total</u>
San Pitch River	N	346.4 Lbs/yr	30	10,392 Lbs	
San Pitch River	P	152.3 Lbs/yr	30	4,569 Lbs	
San Pitch River	BOD	991.8 Lbs/yr	30	29,754 Lbs	
San Pitch River	Sediment	102.6 Tons/yr	30	3,078 Tons	

Table 4-5. Best Management Practices implemented using the UDAF contract #05-1645 (FY-04) funds:

<u>Best Management Practice Used</u>	<u>Number Installed</u>	<u>Units</u>	<u>Cooperator(s)</u>
580 Stream bank Protection	1000	Feet	2
382 Fence	9919	Feet	2,8
430 Irrigation pipeline	3260	Feet	10,11,12,13,14,15
614 Watering Facility	1	Each	5
587 Structure for water control	1	Each	15
516 Stock water pipeline	30	Feet	5
533 Pumping plant for water control	4	Each	10,11,12,14
442 Irrigation system (wheel-line)	187	Acres	10,11,12,13,14,15
512 Pasture planting	78	Acres	8,9
314 Brush Management (plowing)	326	Acres	5,8
595 Pest Management	35	Acres	9
324 Deep Tillage	45	Acres	8
642 Well	1	Each	5
042 Seeding	324	Acres	5,9

Table 4-6. Pollutant Load Reductions by practice using the NPS 319 FY 04 Funds contained in UDAF Contract 05-1645:

<u>Pollutant</u>	<u>BMP</u>	<u>Annual</u> X <u>BMP life (yrs)</u> =	<u>Total Reduction</u>	<u>Unit</u>	<u>Cooperator(s)</u>
N	(580) Stream Rest.	32.7 X 30 =	5460	Lbs	2
N	(512) Pasture	.5 X 30 =	822	Lbs	9
N	(550) Uplands.	6.5 X 30 =	2109	Lbs	5
N	(550) Uplands	30.5 X 30 =	465	Lbs	8
N	(442) Sprinkler Irrig.	1.4 X 30 =	1536	Lbs	11,12,13,14
Sub Total =		71.6	2148		
P	(580) Stream Rest.	12.6 X 30 =	378	Lbs	2
P	(512) Pasture	.2 X 30 =	6	Lbs	9
P	(550) Uplands	2.5X 30 =	75	Lbs	5
P	(550) Uplands	11.8 X 30 =	354	Lbs	8
P	(442) Sprinkler Irrig.	.5 X 30 =	15	Lbs	11,12,13,14
Sub Total =		27.6	828		
BOD	(580) Stream Rest.	65.4 X 30 =	1962	Lbs	2
BOD	(512) Pasture	.9 X 30 =	27	Lbs	9
BOD	(550) Uplands	13.1 X 30 =	393	Lbs	5
BOD	(550) Uplands	61.0 X 30 =	1830	Lbs	8
BOD	(442) Sprinkler Irrig.	2.9 X 30 =	87	Lbs	11,12,13,14
Sub Total =		143.3	4299		
Sed	(580) Stream Rest.	17.8 X 30 =	534	Tons	2
Sed	(512) Pasture	.3 X30 =	9	Tons	9
Sed	(550) Uplands	4.8 X 30 =	144	Tons	5
Sed	(550) Uplands	22.4 X 30 =	672	Tons	8
Sed	(442) Sprinkler Irrig	.9 X 30 =	27	Tons	11,12,13,14
Sub Total =		46.2	1386		

Table 4-7. Total Load Reductions using UDAF contract # 05-1645 Funds (Fiscal Year 2004):

<u>303(d) Assessment</u>	<u>Pollutant</u>	<u>Annual Load Reduction</u>	<u>Life/Yrs</u>	<u>Total</u>
San Pitch River	N	71.6 Lbs/yr	30	10,392 Lbs
San Pitch River	P	27.6 Lbs/yr	30	4,569 Lbs
San Pitch River	BOD	143.6 Lbs/yr	30	29,754 Lbs
San Pitch River	Sediment	46.2 Tons/yr	30	3,078 Tons

Table 4-8. Grand Total Load Reductions to date (Both Grants):

<u>303(d) Assessment</u>	<u>Pollutant</u>	<u>Annual Load Reduction</u>	<u>Life/Yrs</u>	<u>Total</u>
San Pitch River	N	418.0 Lbs/yr	30	12,540 Lbs
San Pitch River	P	179.9 Lbs/yr	30	5,397Lbs
San Pitch River	BOD	1135.1 Lbs/yr	30	34,053 Lbs
San Pitch River	Sediment	148.8 Tons/yr	30	4,464Tons

4.1.2. FY 03 FY 04 Project Photos:

Ross Terry Stream Improvement

Before



After

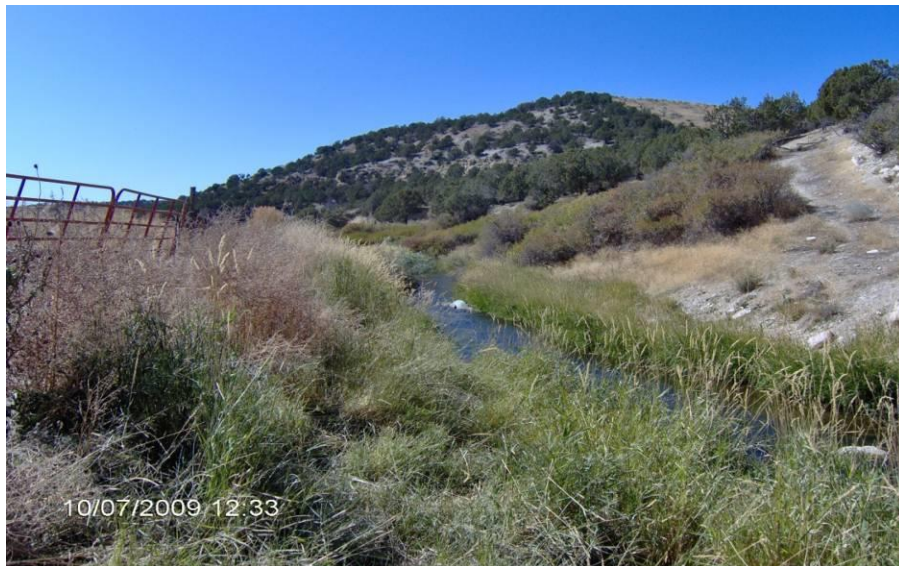


Scott Mower Stream Restoration Project

Before



After



Watershed Education Day 2009



4.2. FY05 Implementation Results

The following sections summarize the results of project implementation for FY 2005 including project locations, description of implementation practices, and load reduction estimates.

4.2.1. Project Descriptions

The projects that were implemented in FY 2005 are listed in Table 4-9 while Figure 4-2 displays their approximate locations. Fourteen projects were implemented during the grant year and projects included eight irrigation projects under PIP Goal #4, four streambank restoration projects under PIP Goal #2, and two pasture improvement projects under PIP Goal # 3. Table 4-10 lists the individual NRCS best management practices implemented for each project. Table 4-11 summarized the estimated load reductions achieved for each project.

Table 4-10 shows that 5,728 feet of streambank restoration, 57 acres of flood irrigation converted to center pivot irrigation, and 167 acres converted from flood irrigation converted to wheel line irrigation in FY 05. Additionally, 80 acres of pasture planting and grazing rotation were implemented. The remaining practices listed in Table 4-10 were implemented as part of the individual projects as determined by the conservation plan and schedule of operations.

Table 4-9 List of FY 05 Cooperators (Refer Cooperator Number to charts and Maps)

Cooperator	Project	Fiscal Year
15 - Graveyard Ditch Co.	Irrigation	04 & 05
16 - Gary Richards	Stream Restoration	05
17 - John Irons	Stream Restoration	05
18 - Ed Jessen	Stream Restoration	05
19 - Guy Farley	Stream Restoration	05
20 - Ray Christensen	Pasture Improvement	05
21 - Dee Jorgenson	Pasture Improvement	05
22 - Doug Taylor	Irrigation	05
23 - Shelby Taylor	Irrigation	05
24 - Quedell Jensen	Irrigation	05
25 - Seeley Family Trust	Irrigation	05
26 - Gayle Seeley	Irrigation	05
27 - Matt Briggs	Irrigation	05
28 - Lynn Hunter	Irrigation	05

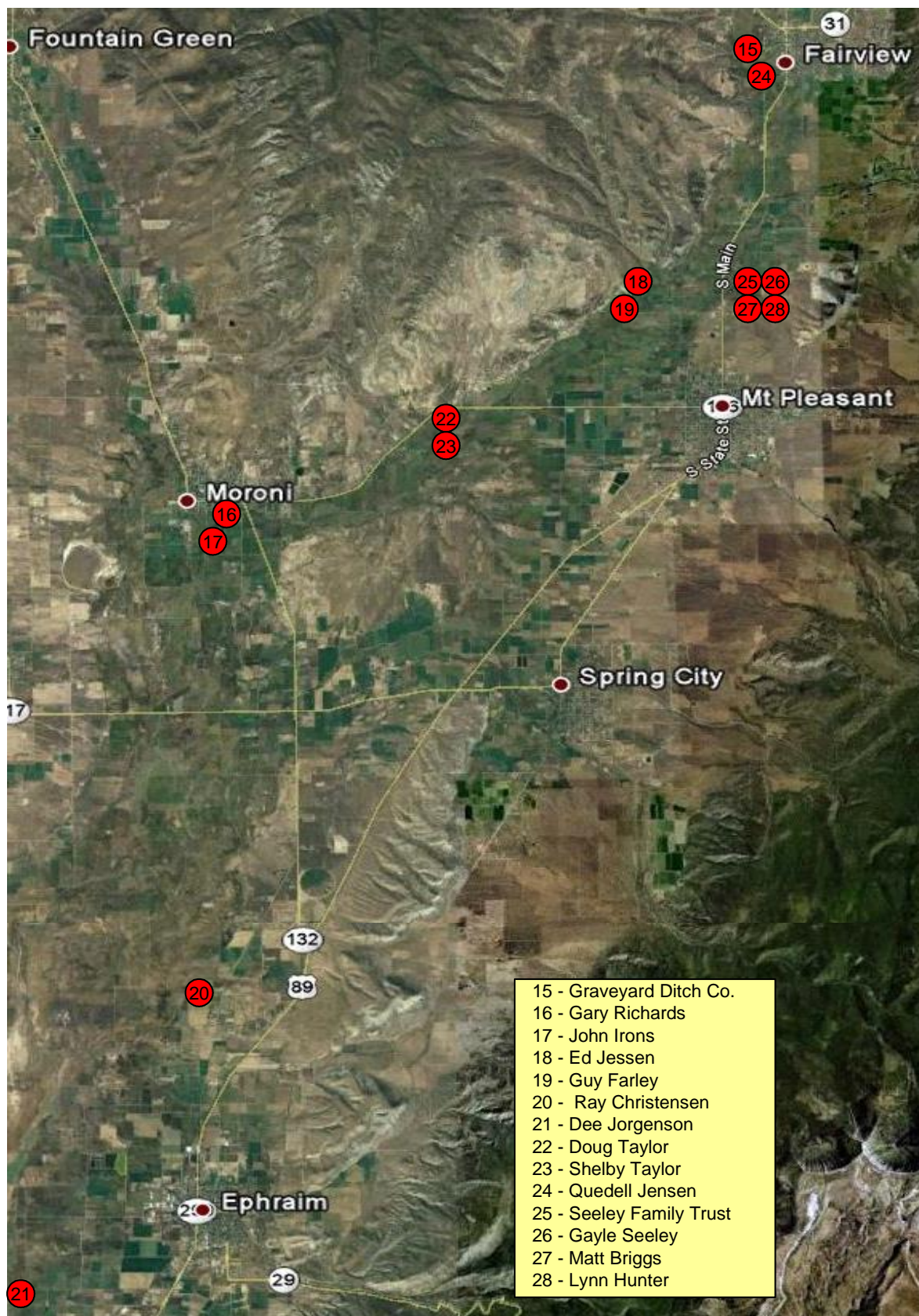


Figure 4-2. FY 05 Implementation Project Locations.

Table 4-10. Best Management Practices implemented using the NPS 319 FY05 funds contained in UDAF contract #06-1025:

Best Management Practice Used	Number Installed	Units	Cooperator(s)
580 - Stream bank Protection	5,728	Feet	16, 17, 18, 19
382 - Fence	8,865	Feet	16, 17, 18, 19, 21
578 - Stream Crossing	1	Each	16
430 - Irrigation pipeline	16,703	Feet	22,23,25,26,27,28,
587 - Structure for water control	2	Each	22, 23
516 - Stock water pipeline	6,092	Feet	1,3,5
533 - Pumping plant for water control	2	Each	22, 23
442 - Irrigation system (center pivot)	57	Acres	22, 23
442 - Irrigation system (wheel line)	167	Acres	25,26,27,28
512 - Pasture planting	80	Acres	21
550 - Range Planting	80	Acres	21
528 - Prescribed Grazing Management	80	Acres	21
552 - Irrigation Regulating Reservoir	1	Each	25,26,27,28
521 - Pond Clay Lining	1	Each	25,26,27,28

4.2.2. FY 2005 Project Budget

Table 4-11 shows the FY05 grant award budget and the actual amounts implemented. The total grant award was for \$225,000 with \$187,540.00, \$33, 540.00, and \$3,920.00 targeted for on the ground implementation, technical assistance, and I &E, respectively. Only \$2,711.46 of the proposed \$33,540.00 was utilized for technical assistance and the remaining balance was shifted to on the ground implementation activities. Similarly, on \$2,219.01 of \$3,920 proposed for I&E tasks was utilized and the remaining balance was applied to on the ground project implementation. Table 4-11 also shows the cooperator match for individual projects as well as the accrued match in each category. A forty percent match was maintained for all projects.

Table 4-11. FY2005 Project Budget.

	Amounts	Match	Total
Grant Award	\$225,000.00	\$150,000.00	\$375,000.00
On-the-ground	\$187,540.00	\$125,026.67	\$312,566.67
Tech Assist.	\$33,540.00	\$22,360.00	\$55,900.00
I & E	\$3,920.00	\$2,613.33	\$6,533.33
On the Ground	\$220,069.53	\$146,713.03	\$366,782.56
Dee Jorgenson	\$2,897.10	\$1,931.40	\$4,828.50
Doug Taylor	\$28,107.37	\$18,738.25	\$46,845.62
Edward Jessen	\$4,943.24	\$3,295.49	\$8,238.73
Gary Richards	\$9,302.83	\$6,201.89	\$15,504.72
Gayle Seeley	\$31,702.18	\$21,134.79	\$52,836.97
Graveyard Ditch Co	\$3,724.91	\$2,483.27	\$6,208.18
Graveyard Irrigation	\$8,515.09	\$5,676.73	\$14,191.82
Lazy JW (John Irons)	\$4,979.47	\$3,319.65	\$8,299.12

Lynn Hunter	\$9,370.41	\$7,246.94	\$16,617.35
Matt Briggs	\$7,890.89	\$5,260.59	\$13,151.48
Ray B. Christensen	\$3,382.80	\$2,255.20	\$5,638.00
Seeley Family Trust	\$70,058.94	\$46,705.96	\$116,764.90
Seeley Irrigation Co	\$8,106.30	\$5,404.20	\$13,510.50
Shelby Taylor	\$27,088.00	\$17,058.67	\$44,146.67
Technical Assistance	\$2,711.46	\$1,807.64	\$4,519.10
Kerry VanDyke	\$2,711.46	\$1,807.64	\$4,519.10
I & E	\$2,219.01	\$1,479.34	\$3,698.35
6/4/2007	\$895.75	\$597.17	\$1,492.92
6/15/2009	\$662.29	\$441.53	\$1,103.82
6/2/2010	\$660.97	\$440.65	\$1,101.62
Total Spent	\$225,000.00	\$150,000.00	\$375,000.00

4.2.3. FY 2005 Load Reduction Estimates

Table 4-12 presents the estimated phosphorus, nitrogen, BOD, and sediment load reductions expected from each of the projects completed during FY 2005. These estimates were derived using the Spreadsheet Tool for Estimating Pollutant Loads (STEPL) developed by the EPA as a tool for 319 practitioners to estimate load reductions expected for implementation of a variety of BMPs. The table demonstrates that three streambank restoration projects resulted in approximately 497 lbs/year nitrogen, 102 lbs/yr phosphorus, and 102 tons/yr sediment. The two pasture projects completed resulted in 446 lbs/yr nitrogen, 126 lbs/yr phosphorus, and 93 lbs/yr sediment. Additionally, irrigation efficiency projects resulted in 755 lbs/yr, 120 lbs/yr, 1 ton/year of nitrogen, phosphorus, and sediment, respectively. Please note that the Ed Jessen and Guy Farley stream restoration projects are listed separately but are part of a single project; therefore, the load reduction estimates are listed only once and represent the total load reduction achieved by both cooperators.

Total load reductions achieved from BMP implementation during FY 2005 is estimated to be 1,699 lbs/yr nitrogen, 347 lbs/yr phosphorus, and 196 tons/yr sediment.

Table 4-12. FY 05 Load Reduction Estimates.

		Nitrogen				Phosphorus				BOD				Sediment			
		Pre-Implementation (lb/yr)	Load Reduction (lb/yr)	Post-Implementation (lb/yr)	% Reduction	Pre-Implementation (lb/yr)	Load Reduction (lb/yr)	Post-Implementation (lb/yr)	% Reduction	Pre-Implementation (lb/yr)	Load Reduction (lb/yr)	Post-Implementation (lb/yr)	% Reduction	Pre-Implementation (ton/yr)	Load Reduction (ton/yr)	Post-Implementation (ton/yr)	% Reduction
	Cooperator																
Streambank	15 - Graveyard Ditch Co.	***Summarized in FY 04***															
	16 - Gary Richards	128	94	34	73	25	21	4	85	355	84	271	24	27	25	3	91
	17 - John Irons	454	318	136	70	73	59	14	81	1,317	209	1,108	16	54	47	7	86
	18 - Ed Jessen	122	86	36	70	28	22	7	76	319	94	225	29	41	31	10	75
	19 - Guy Farley																
	Subtotal	704	497	206	214	126	102	24	242	1,991	387	1,604	69	122	102	20	252
Pasture	20 - Ray Christensen	847	328	519	0	256	109	147	0	1,978	542	1,436	0	194	85	109	0
	21 - Dee Jorgenson	473	118	355	25	68	17	51	25	1,406	53	1,353	4	33	8	25	25
	Subtotal	1,320	446	874	25	324	126	198	25	3,384	595	2,789	4	227	93	134	25
Irrigation	22 - Doug Taylor	446	188	258	42	73	30	44	40	938	395	543	42	4	0	4	0
	23 - Shelby Taylor	302	127	175	42	50	20	30	40	635	267	368	42	3	0	3	0
	24 - Quedell Jensen	44	36	8	1	9	6	3	1	91	75	17	1	3	1	3	0
	25 - Seeley Family Trust	1,071	249	822	23	173	39	133	23	2,253	525	1,728	23	5	0	5	0
	26 - Gayle Seeley	265	68	197	26	42	11	31	25	558	143	415	26	0	0	0	0
	27 - Matt Briggs	146	37	109	26	23	6	17	25	308	79	229	26	0	0	0	0
	28 - Lynn Hunter	206	50	156	24	33	8	25	24	434	106	328	24	1	0	1	0
	Subtotal	2,481	755	1,726	184	404	120	284	179	5,218	1,590	3,628	184	17	1	16	0
	Total	4,505	1,699	2,806	423	854	347	506	446	10,592	2,572	8,021	257	366	196	170	278

4.2.4. FY 05 Project Photos



4.3. FY 06 Implementation Results

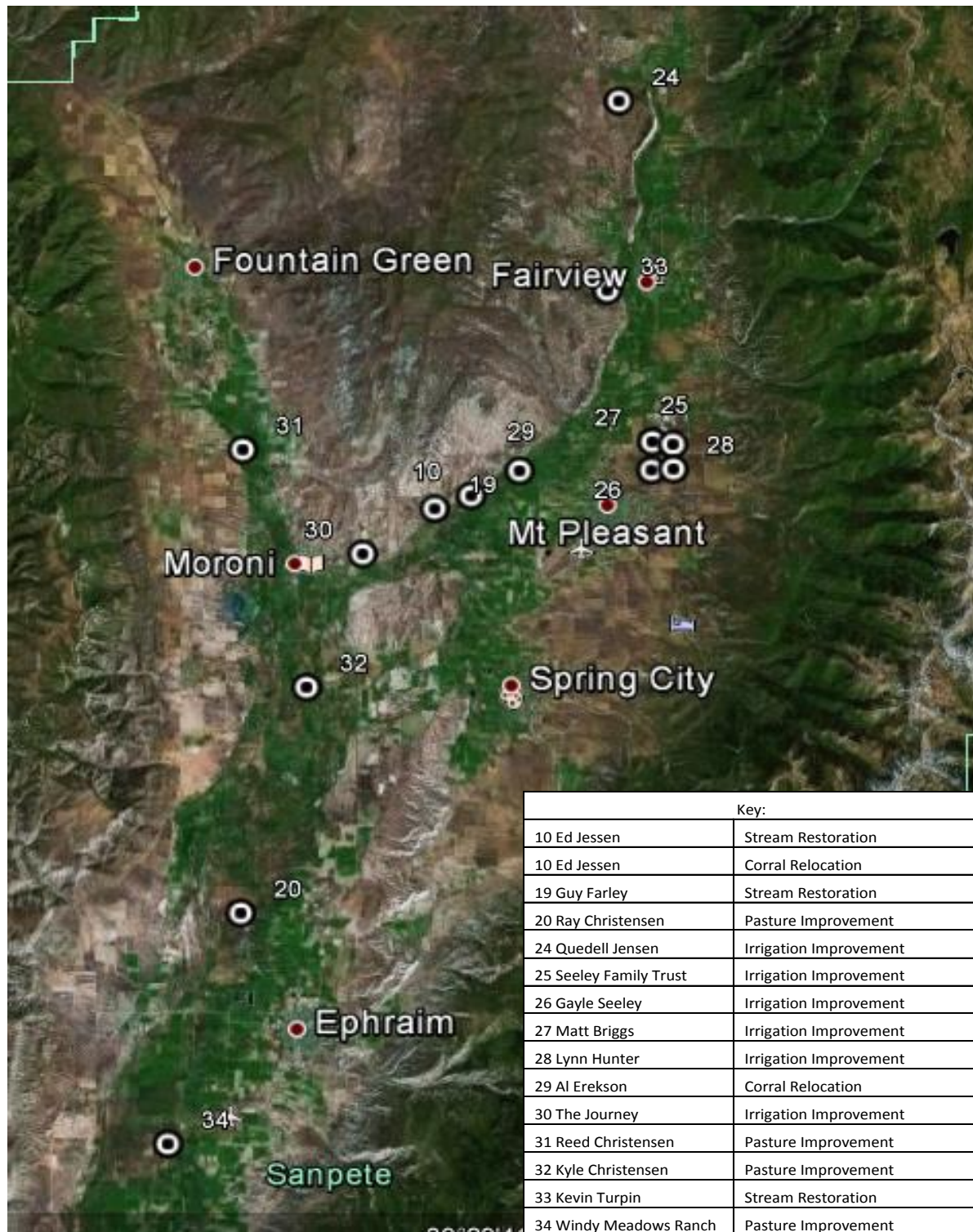


Figure 4-3. Map of FY-2006 Project Locations

Cooperators that have previous contracts or whose projects were funded out of more than one grant have the same number as in previous maps

Table 4-13. Best Management Practices implemented using the UDAF contract #07-1031 (FY-06) funds:

<u>Best Management Practice Used</u>	<u>Number Installed</u>	<u>Units</u>	<u>Cooperator(s)</u>
580 Stream bank Protection	6047	Feet	19, 10, 33
382 Fence	17081	Feet	29, 10, 19, 26, 31, 32, 20, 28, 34
430 Irrigation pipeline	17403	Feet	30, 26, 28, 27, 25
614 Watering Facility	5	Each	29, 10, 31, 34
587 Structure for water control	8	Each	30, 26, 28, 27, 25
516 Stock water pipeline	2804	Feet	30, 10, 31, 34
533 Pumping plant for water control	3	Each	29, 30
442 Irrigation system (wheel-line)	199	Acres	30, 26, 28, 27, 25
512 Pasture planting	221	Acres	30, 31, 32, 20
595 Pest Management	7	Acres	32
342 Seeding	20	Acres	19, 10, 33
561 Heavy Use Protection Area	1300	Feet ²	29, 10,
466 Land Smoothing	859	Yard ³	29, 10, 32
356 Dike (Burm)	50	Feet	10,
362 Diversion Ditch	15	Feet	10
315 Herbaceous Weed Control	40	Acres	32
552 Irrigation Regulating Reservoir	4	Each	26, 28, 27, 25
521 Pond Clay Lining	4	Each	26, 28, 27, 25
443 Surface Irrigation	27	Acres	24
464 Land Leveling	27	Acres	24

Table 4-14. Pollutant Load Reductions by practice using the NPS 319 FY 06 Funds contained in UDAF Contract 07-1031:

<u>Pollutant</u>	<u>BMP</u>	<u>Annual X BMP life (yrs) =</u>	<u>Total Reduction</u>	<u>Unit</u>	<u>Cooperator(s)</u>
N	(580) Stream Rest.	619.8 X 30 =	18594	Lbs	19, 10, 33, 34
N	(512) Pasture	599.9 X 30 =	17997	Lbs	30, 31, 20
N	(442) Sprinkler Irrig.	404.9 X 30 =	12147	Lbs	25, 27, 26, 28, 24
Sub Total =		1624.6	48738		
P	(580) Stream Rest.	219.5 X 30 =	6585	Lbs	19, 10, 33, 34
P	(512) Pasture	190.1 X 30 =	5703	Lbs	30, 31, 20
P	(442) Sprinkler Irrig.	63.9 X 30 =	1917	Lbs	25, 27, 26, 28, 24
Sub Total =		473.5	14205		
BOD	(580) Stream Rest.	952.4 X 30 =	28572	Lbs	19, 10, 33
BOD	(512) Pasture	924.9 X 30 =	27747	Lbs	30, 31, 20
BOD	(442) Sprinkler Irrig.	852.2 X 30 =	25566	Lbs	25, 27, 26, 28, 24
Sub Total =		2729.5	81885		
Sed	(580) Stream Rest.	252.8 X 30 =	7584	Tons	19, 10, 33
Sed	(512) Pasture	144.5 X 30 =	4335	Tons	30, 31, 20
Sub Total =		397.3	11919		

Table 4-15. Total Load Reductions using UDAF contract # 05-1645 Funds (Fiscal Year 2004):

<u>303(d) Assessment</u>	<u>Pollutant</u>	<u>Annual Load Reduction</u>	<u>Life/Yrs</u>	<u>Total</u>
San Pitch River	N	1624.6 Lbs/yr	30	48,738 Lbs
San Pitch River	P	473.5 Lbs/yr	30	14,205 Lbs
San Pitch River	BOD	2729.5 Lbs/yr	30	81,885 Lbs
San Pitch River	Sediment	397.3 Tons/yr	30	11,919 Tons

4.4. FY 07 Implementation Results

The following sections summarize implementation results for FY 2007 including project descriptions, load reduction estimates, and budget.

Al Erikson River Photos



Before



After



Before



After/During



Before



During

4.4.1. FY 07 Project Descriptions

FY 07 8-1217 319 Projects

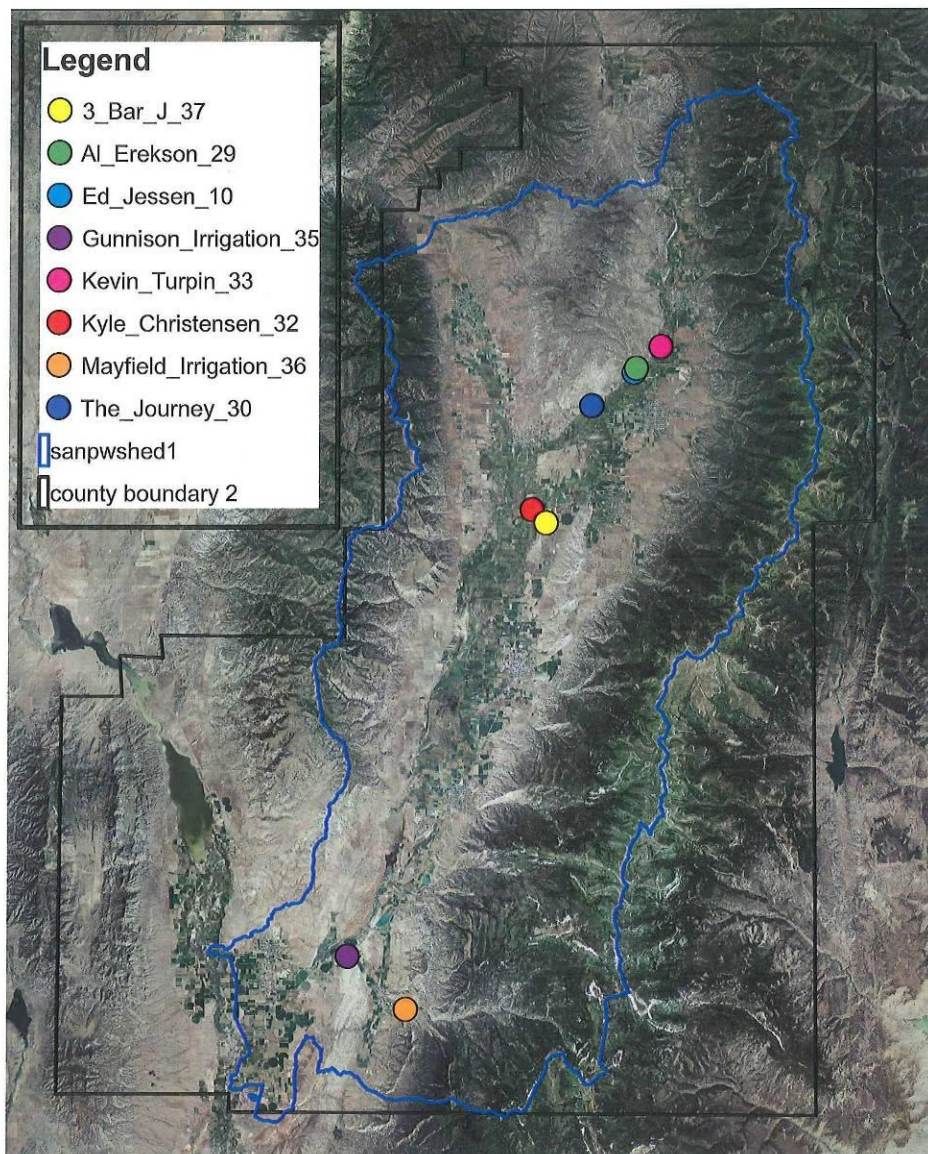


Figure 4-4. FY 2007 Project Locations.

**Table 4-16. Best Management Practices implemented using the
UDAF contract #08-1217 (FY-07) funds:**

<u>Best Management Practice Used</u>	<u>Number Installed</u>	<u>Units</u>	<u>Cooperator(s)</u>
580 Stream bank Protection	6400	Feet	29, 10, 33
382 Fence	8060	Feet	29, 10, 32,
430 Irrigation pipeline	60	Feet	37
614 Watering Facility	3	Each	29,
587 Structure for water control	3	Each	30, 35, 36
516 Stock water pipeline	1800	Feet	29
533 Pumping plant for water control	2	Each	30
442 Irrigation system	160	Acres	30, 37
512 Pasture planting	47	Acres	30, 32
595 Pest Management	7	Acres	32
342 Seeding	5	Acres	33
315 Herbaceous Weed Control	40	Acres	32
350 Sediment Basin	4	Each	35,36

4.4.2. FY 07 Load Reduction Estimates

Table 4-17 presents the estimated phosphorus, nitrogen, BOD, and sediment load reductions expected from each of the projects completed during FY 2007. These estimates were derived using the Spreadsheet Tool for Estimating Pollutant Loads (STEPL) developed by the EPA as a tool for 319 practitioners to estimate load reductions expected for implementation of a variety of BMPs. The table demonstrates that three streambank restoration projects resulted in approximately 7835 lbs. /year nitrogen, 1950 lbs. /year phosphorus, and 268 tons/yr. sediment. The two pasture projects completed resulted in 36 lbs. /year nitrogen, 39 lbs. /year phosphorus, and 60 lbs. /year sediment. Additionally, irrigation efficiency projects resulted in 1698 lbs. /year 235 lbs. /year

Total load reductions achieved from BMP implementation during FY 2005 is estimated to be 9570 lbs. /year nitrogen, 2224 lbs. /year phosphorus, and 328 tons/yr. sediment

Table 4-17. Pollutant Load Reductions by practice using the NPS 319 FY 07 Funds contained in UDAF Contract 08-1217:

<u>Pollutant</u>	<u>BMP</u>	<u>Annual X BMP life (yrs) =</u>	<u>Total Reduction</u>	<u>Unit</u>	<u>Cooperator(s)</u>
N	(580) Stream Rest.	7835.9 X 30	= 235077	Lbs	10, 29, 33
N	(512) Pasture	36.5 X 30	= 1095	Lbs	30, 32
N	(442) Sprinkler Irrig.	1698.4 X 30	= 50952	Lbs	30, 37
Sub Total =		9570.8		287124	
P	(580) Stream Rest.	1950.4 X 30	= 58512	Lbs	19, 10, 33, 34
P	(512) Pasture	39 X 30	= 1170	Lbs	30, 31, 20
P	(442) Sprinkler Irrig.	235 X 30	= 7050	Lbs	25, 27, 26, 28, 24
Sub Total =		2224.4	66732		
BOD	(580) Stream Rest.	1546.9 X 30	= 46407	Lbs	19, 10, 33
BOD	(512) Pasture	64.1 X 30	= 1923	Lbs	30, 31, 20
BOD	(442) Sprinkler Irrig.	3517.4 X 30	= 105522	Lbs	25, 27, 26, 28, 24
Sub Total =		5128.4	153852		
Sed	(580) Stream Rest.	268.8 X 30	= 8064	Tons	19, 10, 33
Sed	(512) Pasture	60 X 30	= 1800	Tons	30, 31, 20
Sub Total =		328.8	9864		

4.4.3. FY 2007 Project Budget

Table 4-14 shows the FY07 grant award budget and the actual amounts implemented. The total grant award was for \$153,000 with \$102,000, Cooperator Match. \$142,350.00 targeted for on the ground implementation, \$3,000.00 I & E, and \$7,650.00 for Tracking and Contract Administration. Table 4-14 also shows the cooperator match for individual projects as well as the accrued match in each category. A forty percent match was maintained for all projects.

Table 4-14. FY 2007 Project Budget.

08-1217	Date	Amounts	Match	Remaining in Fund
On-the-ground		\$142,350.00		\$0.00
I & E		\$3,000.00		\$2,684.80
Tracking & Contract Admin.		\$7,650.00	Contract	\$7,594.00
		\$153,000.00	\$102,000.00	\$255,000.00
The Journey	12/30/2011	\$1,370.23	\$913.49	
Gunnison Irrigation Co.	1/17/2012	\$38,114.00	\$25,409.33	
Mayfield Irrigation Co.	1/17/2012	\$26,486.00	\$17,657.33	
Kevin Turpin	5/7/2012	\$1,000.10	\$666.73	
Ed Jessen River	5/10/2012	\$6,068.74	\$4,045.83	
M. Kyle Christensen	6/20/2012	\$264.60	\$176.40	
3 Bar J Pivot	8/20/2012	\$10,443.53	\$6,962.35	
Kevin Turpin	8/20/2012	\$13,438.50	\$8,959.00	
Jones & DeMille (Al & Ed Project)	8/20/2012	\$9,000.00	\$6,000.00	
Affel Ereksen	8/20/2012	\$29,789.39	\$19,859.59	

Ed Jessen River	8/20/2012	\$6,374.91	\$4,249.94	
			\$0.00	
OTG		\$142,350.00	\$94,900.00	
Cox's BBQ LLC	2/9/2012	\$315.20	\$210.13	
Sanpete News Co.	2/9/2012	\$56.00	\$37.33	
SCD camera and trophy	3/21/2012	\$250.03	\$166.69	
Watershed Ed. Day	4/16/2012	\$653.04	\$435.36	
I Four Media	8/21/2012	\$1,725.73	\$1,150.49	
			\$0.00	
I & E		\$3,000.00	\$2,000.00	
Admin		\$3,825.00	\$2,550.00	
Admin		\$3,825.00	\$2,550.00	
			\$0.00	
			\$0.00	
			\$0.00	
			\$0.00	
Tracking & Contract Admin.		\$7,650.00	\$5,100.00	
Total spent		\$153,000.00	\$102,000.00	\$0.00
non-disbursed funds		\$0.00	\$0.00	Match required

4.5. FY 08 Implementation Results

The following sections summarize implementation results for FY 2008 including project descriptions, load reduction estimates, and budget.

Kory Turpin River Project



Before

After



After



After



After



After



Kevin Turpin Project with 2 years growth



Al Erektion River with more growth
Compare with FY 07 pictures



Al Erektion Irrigation

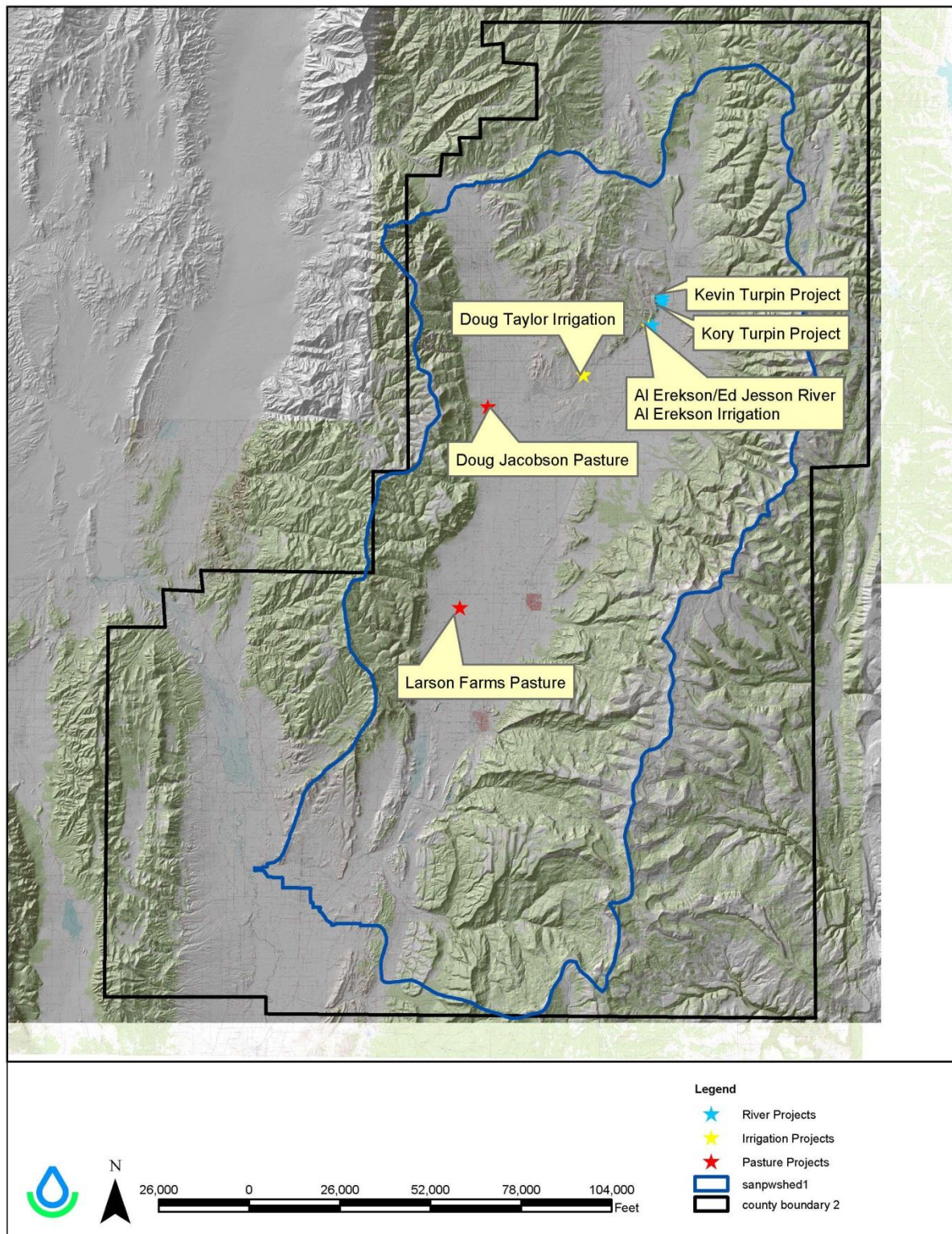
Doug Taylor Irrigation



Doug Jacobson Pasture Project
(The field with the grass sticking through the snow by the brush)

Mike Larson Pasture Project

4.5.1. FY 08 Project Descriptions



**Table 4-16. Best Management Practices implemented using the
UDAF contract #09-1060 (FY-08) funds:**

	<u>Best Management Practice Used</u>	<u>Number Installed</u>	<u>Units</u>	<u>Cooperator(s)</u>
Turpin (Al Erikson/Ed Jesson Project Counted on FY 07 Report)	580 Stream bank Protection	2,000	Feet	Kory Turpin, Kevin
	382 Fence	4,891	Feet	Larson Farms, Kory
Turpin	430 Irrigation pipeline	2,150	Feet	Al Erikson
	587 Structure for water control	3	Each	Larson Farms, Al
Erikson	516 Stock water pipeline	2600	Feet	Larson Farms
	442 Irrigation system	40	Acres	Al Erikson, Doug
Taylor	512 Pasture planting	190	Acres	Larson Farms, Doug
Jacobson				

4.5.1. FY 08 Load Reduction Estimates

Table 4-17 and 4-18 present the estimated phosphorus, nitrogen, BOD, and sediment load reductions expected from each of the projects completed during FY 2008. These estimates were derived using the Spreadsheet Tool for Estimating Pollutant Loads (STEPL) developed by the EPA as a tool for 319 practitioners to estimate load reductions expected for implementation of a variety of BMPs.

Total load reductions achieved from BMP implementation during FY 2008 is estimated to be 1509 lbs. /year nitrogen, 355 lbs. /year phosphorus, and 265 tons/yr. sediment

**Table 4-17. Pollutant Load Reductions by practice using the NPS 319 FY 08 Funds
contained in UDAF Contract 09-1060:**

<u>Pollutant</u>	<u>BMP</u>	<u>Annual X BMP life (yrs.) =</u>	<u>Total Reduction</u>	<u>Unit</u>
N	(580) Stream Restoration	276 X 30 =	8,280	Lbs.
N	(442) Sprinkler Irrigation	864 X 30 =	25,920	Lbs.
N	(512) Pasture planting and fence	369 X 30 =	11,070	Lbs.
Sub Total =		1509	45,270	Lbs.
P	(580) Stream Restoration	106 X 30 =	3180	Lbs.
P	(442) Sprinkler Irrigation	129 X 30 =	3,870	Lbs.
P	(512) Pasture planting and fence	120 X 30 =	3600	Lbs.
Sub Total =		355	10,650	Lbs.
BOD	(580) Stream Restoration	552 X 30 =	16,560	Lbs.
BOD	(442) Sprinkler Irrigation	594 X 30 =	17,820	Lbs.
BOD	(512) Pasture planting and fence	1,816 X 30 =	54,480	Lbs.
Sub Total =		2,963	88,890	Lbs.
Sediment	(580) Stream Restoration	172 X 30 =	5,160	Tons
Sediment	(512) Pasture planting and fence	93 X 30 =	2,790	Tons
Sub Total =		265	7950	Tons

Table 4-18. FY 2008 Load Reductions

Cooperator	Nitrogen				Phosphorus				BOD				Sediment			
	Pre-Implementation (lb/yr)	Load Reduction (lb/yr)	Post-Implementation (lb/yr)	% Reduction	Pre-Implementation (lb/yr)	Load Reduction (lb/yr)	Post-Implementation (lb/yr)	% Reduction	Pre-Implementation (lb/yr)	Load Reduction (lb/yr)	Post-Implementation (lb/yr)	% Reduction	Pre-Implementation (ton/yr)	Load Reduction (ton/yr)	Post-Implementation (ton/yr)	% Reduction
Kory Turpin	68.42	35.39	33.04	52%	20.47	13.62	6.843	67%	160.5	70.77	89.77	44%	27.1	22.12	4.983	82%
Kevin Turpin	182	88.5	93.5	49%	52.4	34.1	18.4	65%	435.1	177	258	41%	68.2	55.3	12.9	81%
Al Ereksen	212	117	95	55%	64	45	18.9	70%	495	234	261	47%	86.9	73	13.8	84%
Ed Jesson	68.4	35.4	33	52%	20.5	13.6	6.8	67%	160.5	70.8	89.8	44%	27.1	22.1	5	82%
Subtotal	530.8	276.3	254.5	52%	157.4	106.3	50.94	68%	1251	552.6	698.6	44%	209.3	172.5	36.68	82%
Doug Jacobson	76.2	19	57.1	25%	23.4	5.9	17.6	25%	176	28.6	147	16%	17.9	4.5	13.4	25%
Mike Larson	1043	349.9	692.7	34%	297.4	113.9	183.5	38%	2,505	565.7	1,939	23%	221	88.4	132.6	40%
Subtotal	1,119	369	750	33%	321	120	201	37%	2,681	594	2,086	22%	239	93	146	39%
Doug Taylor	429	161	268	37%	72	18	54	25%	814	336	478	41%	14	0	14	0%
Al Ereksen	2809	702.9	2106	25%	670.8	111	559.8	17%	4637	1480	3158	32%	49.93	0	49.93	0%
Subtotal	3,238	864	2,374	27%	743	129	613	17%	5,452	1,816	3,636	33%	64	0	64	0%
Total	4,888	1,509	3,379	31%	1,221	355	866	29%	9,384	2,963	6,421	32%	512	265	247	52%

4.5.2. FY 2008 Project Budget

Table 4-19 shows the FY08 grant award budget and the actual amounts implemented. The total grant award was for \$118,000 with \$78,667, Cooperator Match. \$109,600 targeted for on the ground implementation, \$2,500.00 I&E, and \$5,900.00 for Tracking and Contract Administration. Table 4-18 also shows the cooperator match for individual projects as well as the accrued match in each category. A forty percent match was maintained for all projects.

Table 4-19. FY 2008 Project Budget

09-1060	Date	Amounts	Match	Remaining in Fund
On-the-ground		\$109,600.00	\$78,667.00	\$0.00
Tracking		\$5,900.00		\$0.00
I & E		\$2,500.00		\$0.00
		\$118,000.00	\$78,666.67	\$196,666.67
Ed Jesson River	8/20/2012	\$17,842.99	\$11,895.33	
Ed Jesson River	10/15/2012	\$1,467.05	\$978.03	
Al Ereksion River	10/15/2012	\$6,910.72	\$4,607.15	
Ed Jesson River	11/19/2012	\$772.63	\$515.09	
Al Ereksion River	11/19/2012	\$5,729.81	\$3,819.87	
Doug Jacobson	12/17/2012	\$1,533.41	\$1,022.27	
Ed Jesson River	2/22/2013	\$258.00	\$172.00	
Al Ereksion River	2/22/2013	\$960.00	\$640.00	
Mike Larson	6/28/2013	\$662.93	\$441.95	
Doug Taylor irrigation	7/1/2013	\$5,192.00	\$3,461.33	
Kory Turpin River	8/20/2013	\$22,217.50	\$14,811.67	
AL Ereksion River	8/20/2013	\$547.31	\$364.87	
Kory Turpin River	9/17/2013	\$12,564.50	\$8,376.33	
Kevin Turpin Reap	9/30/2013	\$4,209.99	\$2,806.66	
Al Irrigation	9/24/2013	\$24,593.97	\$16,395.98	
Kory Turpin River	9/30/2013	\$2,718.00	\$1,812.00	
Al Ereksion River	9/24/2013	\$1,419.19	\$946.13	
OTG		\$109,600.00	\$73,066.67	
I-4 Media	8/22/2012	\$221.96	\$147.97	
Watershed Tour	11/19/2012	\$590.00	\$393.33	
Pesticide Class Snow College	2/23/2013	\$126.92	\$84.61	
Watershed Education Day	4/5/2013	\$365.08	\$243.39	
I-4 Media	9/27/2013	\$1,099.39	\$732.93	
Horseshoe Mt. Hardware	9/27/2013	\$96.65	\$64.43	
I & E		\$2,500.00	\$1,666.67	
			\$0.00	
UACD TA/Admin		\$5,900.00	\$3,933.33	
			\$0.00	
			\$0.00	
			\$0.00	
			\$0.00	
Technical Assistance/Admin		\$5,900.00	\$3,933.33	
Total spent		\$118,000.00	\$78,666.67	\$0.00
non-disbursed funds		\$0.00	\$0.00	Match required

5.0 MONITORING RESULTS

5.1. Water Chemistry

5.1.1. FY 03 and 04

Figure 5-1 displays the locations the implementation projects and the STORET monitoring locations on the San Pitch River used to monitor project effectiveness. The monitoring stations displayed are a combination of DWQ long-term ambient monitoring stations (4946750, 4946960, 4946650, 946450, 4946540, and 4946150) and DWQ Intensive basin stations (4946790, 946842, 4946840, 4946756, and 4946754). Total dissolved solids (TDS) is the parameter of concern in the Middle San Pitch River watershed and the following analysis will address TDS loading responses to nonpoint source BMP implementation and attainment of the TMDL endpoint. Although not listed as water quality impairment or documented as impairing a beneficial use, total phosphorus (TP) loading is considered to be a pollutant of concern in the watershed.

Table 5-1 and Table 5-2 summarize the TDS monitoring results for the main stem of the Middle and Upper San Pitch River. The implementation activities discussed in this document were completed between May 2003 and September 2009. Table 5-1 shows that the majority of TDS monitoring occurred before or during BMP implementation and no post implementation data has been collected. Table 5-2 confirms the agricultural beneficial use impairment by showing that the highest TDS concentrations occur in the middle segment of the San Pitch River with concentrations exceeding the 1,200 mg/L standard.

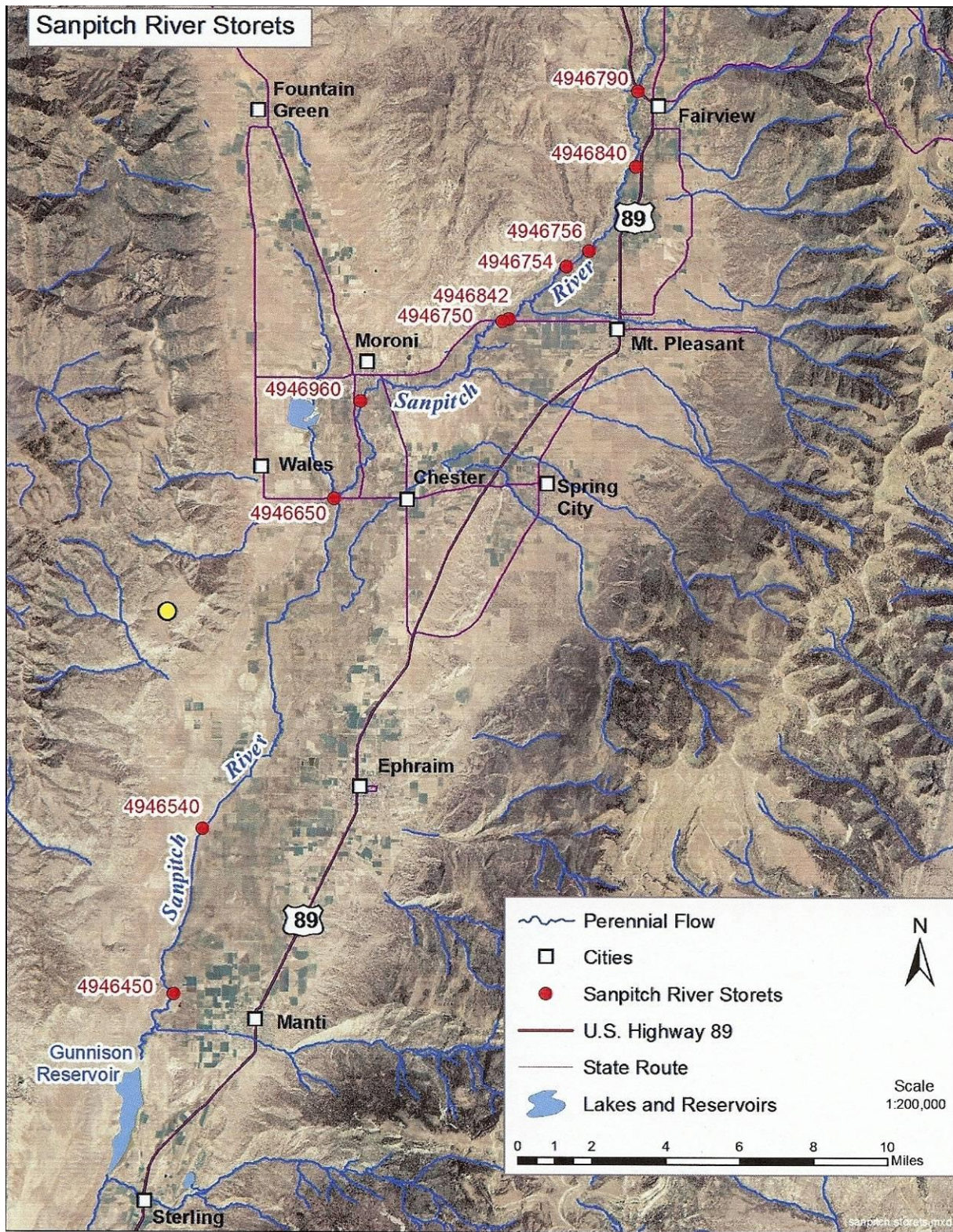


Figure 5-2. Location of the San Pitch Intensive and Long Term Monitoring Stations.

Table 5-1. Monitoring Frequency for the Upper and Middle San Pitch River.


	STORET	Location	Pre-Implementation	During Implementation	Post - Implementation
Up Stream 	Upper San Pitch River				
	4946790	San Pitch R. @ US 89 Xing N of Fairview	4/2/1996 to 6/19/2002 (n=28)	7/27/2006 to 6/27/2007 (n=11)	
	4946842	San Pitch R. ab Restoration Project West of Fairview		10/4/2005 to 10/4/2005 (n=1)	
	4946840	San Pitch R ab Fairview WWTP @ Restoration Project		11/13/2003 to 2/28/2008 (n=17)	
	4946756	San Pitch R BI Fairview WWTP			
	4946754	San Pitch R ab Cnfl/ Pleasant Ck At Farley Property		10/20/2008 to 10/20/2008 (n=1)	
	4946750	San Pitch R 2.5Mi W of Mt Pleasant At U116 Xing	1/9/1990 to 6/19/2002 (n=99)	9/2/2004 to 6/26/2007 (n=26)	
	Middle San Pitch River				
	4946960	San Pitch R ab Moroni WWTP	1/9/1990 to 6/19/2002 (n=46)		
	4946650	San Pitch R 1Mi W of Chester on U-117	4/2/1996 to 6/19/2002 (n=30)	7/27/2006 to 6/26/2007 (n=13)	
	4946540	San Pitch R NW of Manti	4/2/1996 to 4/11/2002 (n=18)	7/2/2003 to 6/26/2007 (n=27)	
Down Stream	4946450	San Pitch River W of Manti ab Gunnison Res At Cr Xing	6/12/1990 to 6/20/2002 (n=71)		
	4946150	San Pitch R 2Mi E of Gunnison At U137 Xing	1/9/1990 to 6/20/2002 (n=98)	7/27/2006 to 6/26/2007 (n=13)	

Table 5-2. TDS Monitoring Summary for the San Pitch River.

	STORET	Location	Start	End	Count	Min (mg/L)	Avg (mg/L)	Max (mg/L)
<div>Upstream</div> <div>↓</div> <div>Downstream</div>	Upper San Pitch River							
	4946790	San Pitch R. @ US 89 Xing N of Fairview	4/2/1996	6/26/2007	39	272	361	470
	4946842	San Pitch R. ab Restoration Project West of Fairview	10/4/2005	10/4/2005	1	434	434	434
	4946840	San Pitch R ab Fairview WWTP @ Restoration Project	11/13/2003	2/28/2008	17	300	375	428
	4946756	San Pitch R BI Fairview WWTP	ND	ND	0	ND	ND	ND
	4946754	San Pitch R ab Cnfl/ Pleasant Ck At Farley Property	10/20/2008	10/20/2008	1	414	414	414
	4946750	San Pitch R 2.5Mi W of Mt Pleasant At U116 Xing	1/9/1990	6/26/2007	125	272	455	1,040
	Middle San Pitch River							
	4946960	San Pitch R ab Moroni WWTP	1/9/1990	6/19/2002	46	306	520	1,160
	4946650	San Pitch R 1Mi W of Chester on U-117	4/2/1996	6/26/2007	43	312	602	910
	4946540	San Pitch R NW of Manti	4/2/1996	4/11/2002	18	468	1,002	3,774
	4946450	San Pitch River W of Manti ab Gunnison Res At Cr Xing	6/12/1990	6/26/2007	98	464	1,184	2,912
	4946150	San Pitch R 2Mi E of Gunnison At U137 Xing	1/9/1990	6/26/2007	111	496	1,805	3,228

Figure 5-2 demonstrates that TDS loading increases from upstream to downstream, which is likely the result of increased natural sources and agricultural irrigation return flow. Further analysis to determine TDS load reduction resulting from BMP implementation showed that there is significantly less TDS load (Anova with 95 percent confidence) during-implementation than for the pre-implementation time period (Figure 5-3). However, it is not certain that this load reduction is entirely due to project implementation that occurred during the period, other environmental and physical factors such as climate and stream flow, or any combination of factors. An analysis of stream flow showed that flow volume was significantly less for the same period as compared to the pre-implementation period (Anova = <0.05), which likely explains the decrease in load (Figure 4-4).

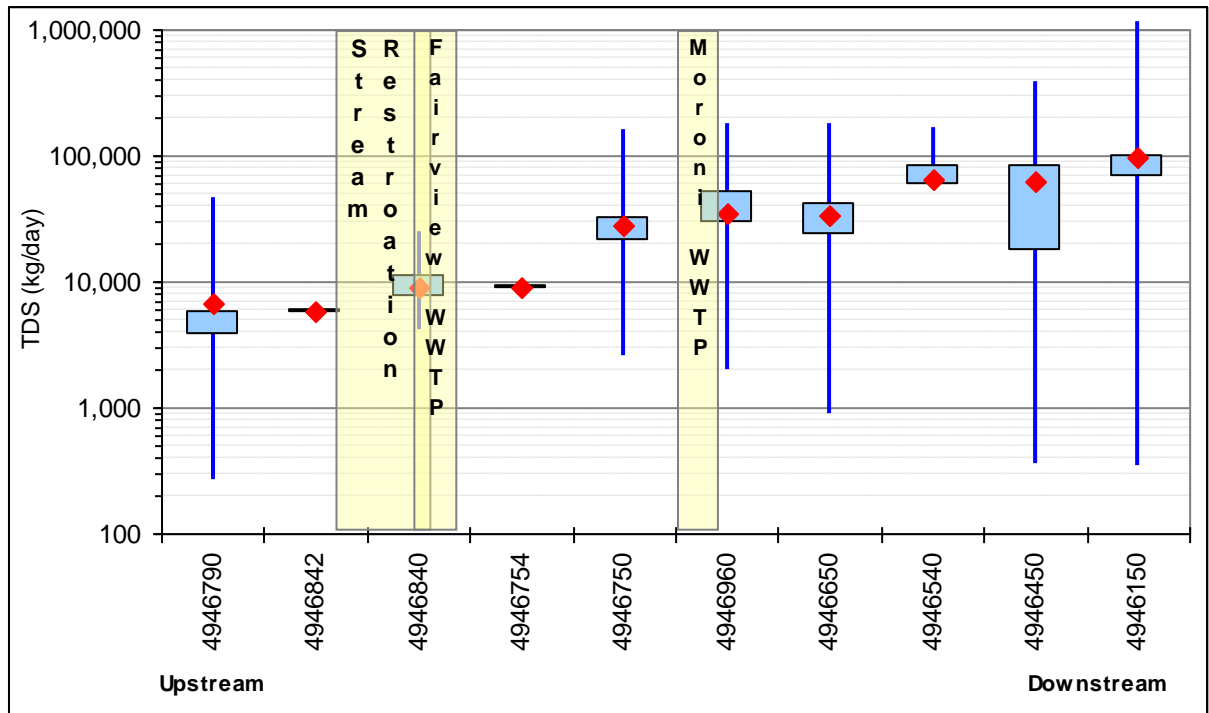


Figure 5-3. TDS Loading in the San Pitch River.

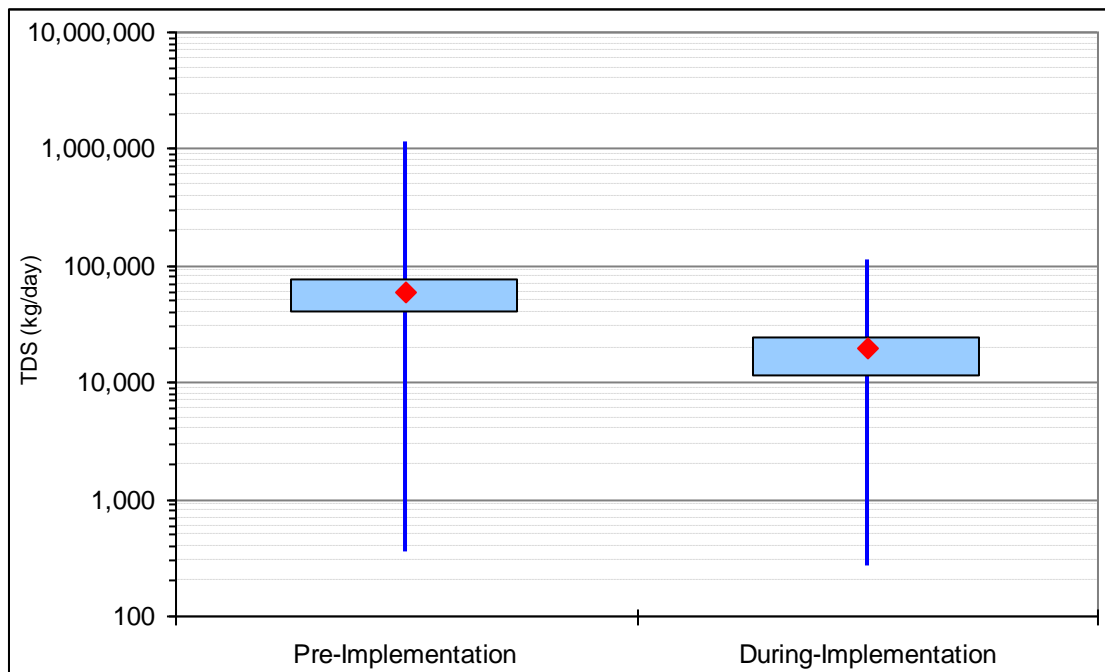


Figure 5-4. TDS Loading Summary Statistics for the Pre- and During-Implementation Period.

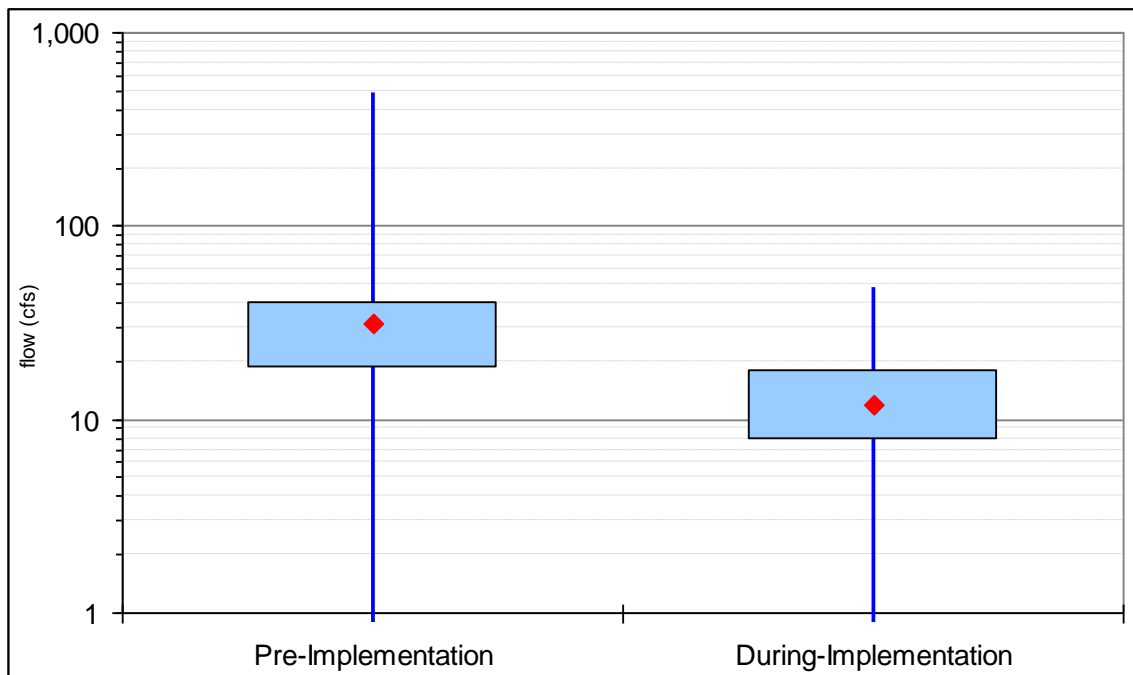


Figure 5-5. Flow Summary Statistics for the Pre- and During- Implementation Period.

Total phosphorus and TSS exhibit similar trends when compared to TDS (Figure 5-5 and Figure 5-6). TP and TSS loading increase in the downstream direction and are lower in the during-implementation period as compared to the pre-implementation period (Anova <0.05) (Figure 5-7 and Figure 5-8).

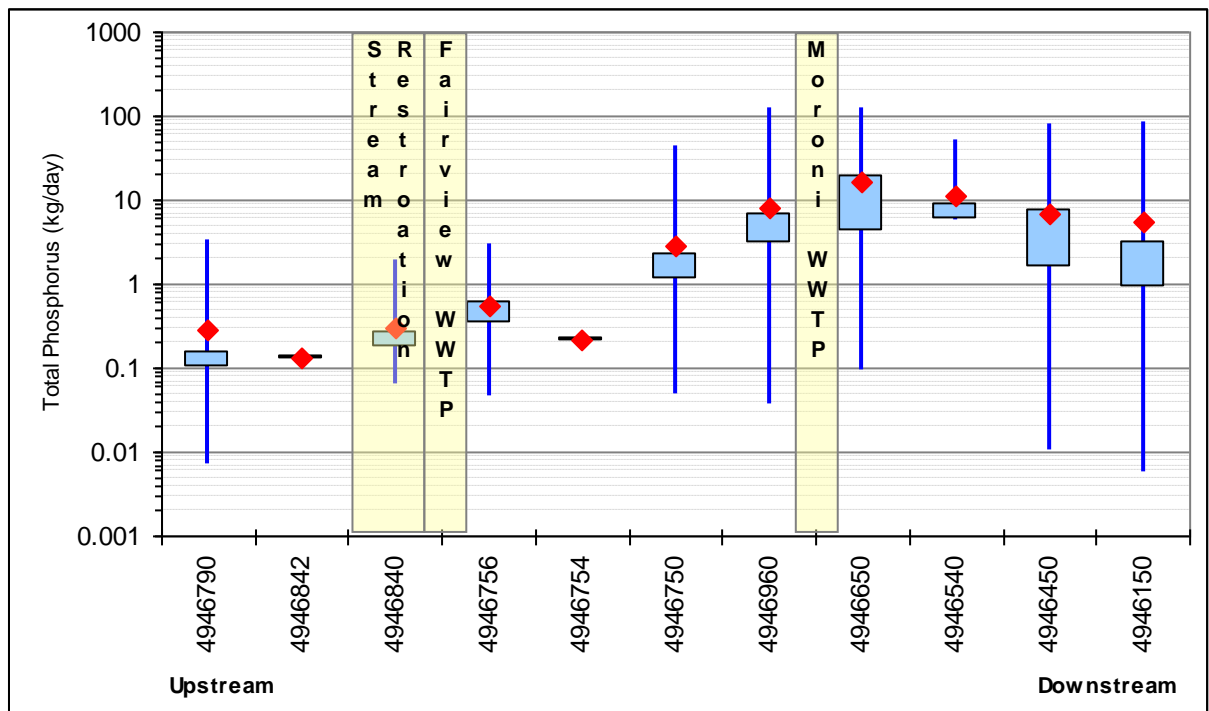


Figure 5-6. TP Loading in the San Pitch River.

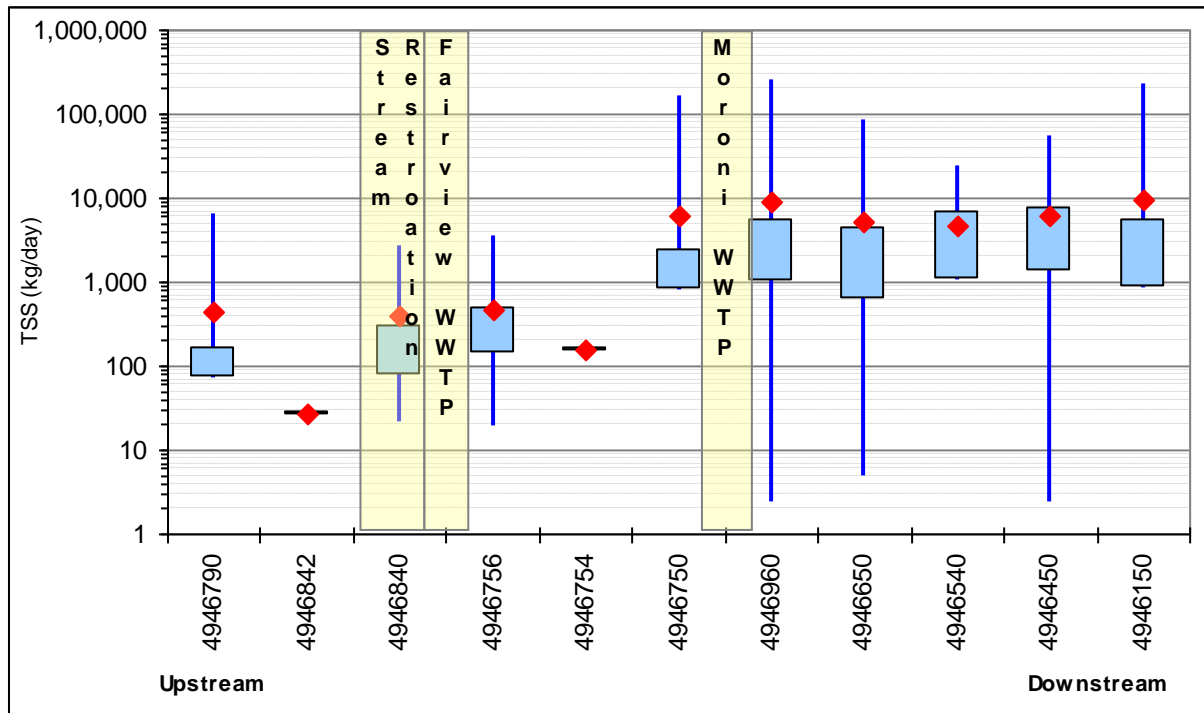


Figure 5-7. TSS Loading in the San Pitch River.

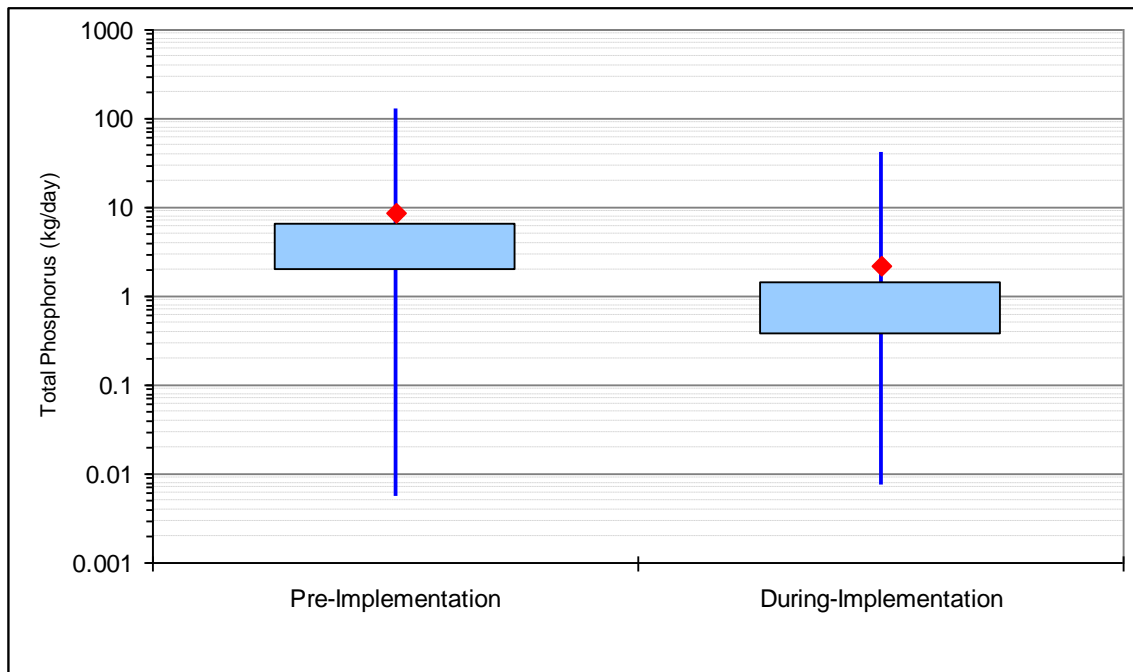


Figure 5-8. TP Loading Summary Statistics for the Pre- and During-Implementation Period.

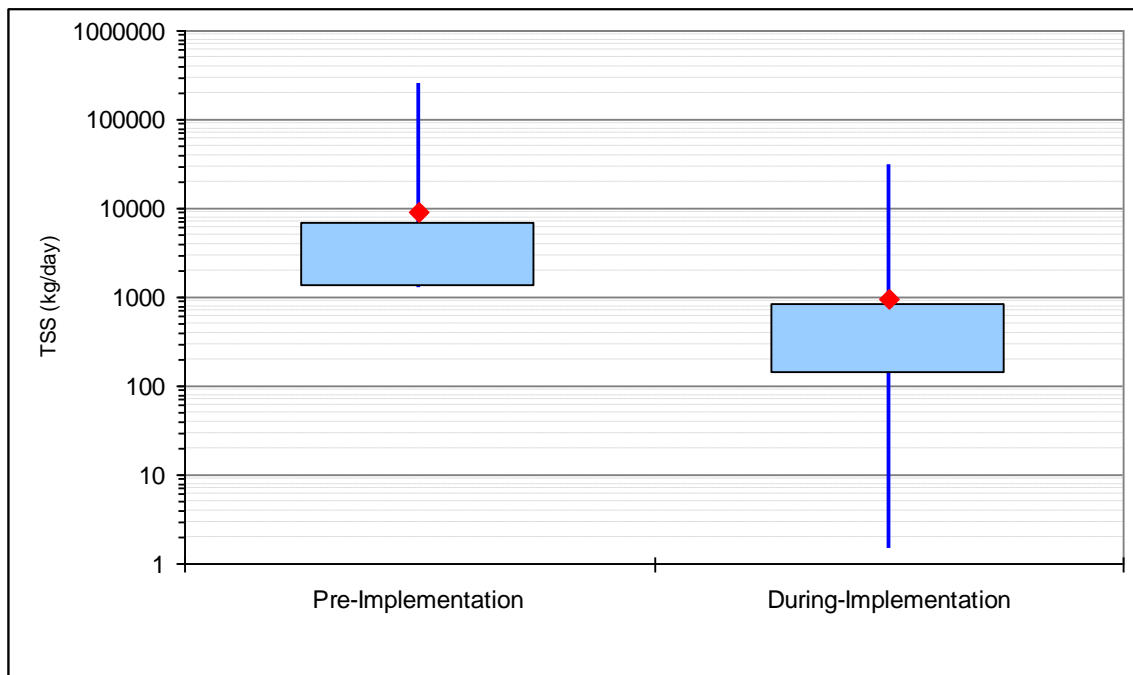


Figure 5-9. TSS Loading Summary Statistics for the Pre- and During-Implementation Period.

Even though load reductions for TDS, TSS, and TP are most likely due to decreased flow volumes for the during-implementation period, the decrease in concentration for these parameters may be due to implementation activities that occurred during that time. As described previously, many of BMP's implemented are watershed scale practices and insufficient data is available to determine their effectiveness. Continued water chemistry monitoring along with additional project-specific monitoring is needed to more accurately account for BMP load reductions. The San Pitch River intensive monitoring event is scheduled to begin in October 2013. This intensive effort will be designed to collect the needed information to demonstrate implementation effectiveness.

5.1.2. FY 05, FY 06, FY 07 and FY 08

The most current water chemistry data available to assess FY 05 implementation success is summarized in the previous section. No additional data has been collected since the analysis of the FY 04 water chemistry results. The next intensive monitoring effort the San Pitch River watershed is scheduled for 2014.

5.2. Biologic Monitoring Results

5.2.1. FY 04

The Utah Comprehensive Assessment of Stream Ecosystems (UCASE) involves sampling a variety of streams each fall and recording measurements of physical habitat, substrate, fish and macroinvertebrate communities, and other biological indicators. The

results from the UCASE program are being used by the DWQ for beneficial use assessment and to determine BMP effectiveness. One analysis of these results compare the stream macroinvertebrate populations expected in reference conditions with the populations observed in the sampling site. The ratio of observed to expected organisms can be used as an indicator of benthic community health. If only 60 percent of the expected population is observed ($O/E = 0.6$) at a particular site, the site is considered to be impaired and does not support the aquatic beneficial use. The results of the UCASE for the San Pitch River are presented in Table 5-3. The following bullets summarize the results:

- More taxa observed in upstream reach near restoration locations as opposed to lower reach sampling sites indicate biologic improvement due to restoration activities
- O/E scores exceeding the upper threshold (1.24, mean=1.03) indicate that enrichment is likely occurring in uppermost sites
- Consistent O/E scores indicate that population is stable
- Overall, O/E scores near restoration sites (upper reach) score “good” (mean=1.02) as opposed to the poorly scored sites in lower reach (mean=0.52) (pre-restoration condition)

Overall, the data suggest that stream restoration activities are helping to improve benthic invertebrate communities. However, it is recommended to continue biological monitoring at all established sites every few years to improve data quality and increase statistical strength of the data.

Table 5-3. UCASE Results for the Middle and Upper San Pitch.

STORET	Location	Year	Observed/ Expected	Assessment
4946750	San Pitch R. 2.5Mi W of Mt Pleasant at U116 Xing	2002	0.62	FAIR
4946750	San Pitch R. 2.5Mi W of Mt Pleasant at U116 Xing	2003	0.42	POOR
4946750	San Pitch R. 2.5Mi W of Mt Pleasant at U116 Xing	2004	0.62	FAIR
4946750	San Pitch R. 2.5Mi W of Mt Pleasant at U116 Xing	2005	0.42	POOR
4946842	San Pitch R. Ab Restorat ion Project West of Fairview	2006	1.27	FAIR (enriched)
4946842	San Pitch R. Ab Restoration Project West of Fairview	2007	0.99	GOOD
4946840	San Pitch R. Ab Fairview WWTP @ Restoration Project	2006	0.90	GOOD
4946840	San Pitch R. Ab Fairview WWTP @ Restoration Project	2007	0.90	GOOD
4946754	San Pitch R. Ab Cnfl/ Pleasant Ck at Farley Property (Ds)	2008	0.92	GOOD

Utah Division of Wildlife Resources fish sampling data from 2003 to 2006 subsequent to the two stream projects produced the following results. Sampling was done by electro-shocking the following stream reaches using a Double Pass technique:

Scott Mower's Project

Response: (Please refer to the summary table Appendix II)

- The number of trout >6 inches increased up to 230% over pre construction levels.
- Cover (the places where fish live) increased 1,118% over pre construction levels.
- The amount of erosion decreased 92% from pre-construction levels, this translates into better water quality, better riparian vegetation, potentially cooler water and better fish recruitment and habitat.
- Increased angling opportunities on this stretch of the San Pitch River.
- Leatherside chubs regularly observed since construction.
- Great relationship with landowner and “ambassador” for stream restoration work.

Ross Terry's Project

Response: (Please refer to the summary table Appendix II.)

- The number of trout >6 inches increased up to 278% over pre construction levels.
- Cover (the places where fish live) increased 2,564% over pre construction levels
- The amount of erosion decreased 55% from pre-construction levels, this translates into better water quality, better riparian vegetation, potentially cooler water and better fish recruitment and habitat.
- Lateral migration of the river ceased therefore Mr. Terry was no longer losing farming ground due to severe erosion from the river.
- The cattle were excluded from the river corridor with the new fence (selling item for Mr. Terry to allow DWR restoration work to commence) and this allowed vegetation to reestablish and will hold the banks long term.
- Leatherside chubs have been observed since construction.
- Great relationship with landowner and another “ambassador” for stream restoration work.

5.2.2. FY 05, FY 06, FY 07, and FY 08

The results presented in the FY 03 and 04 sections above display the most recent water biologic monitoring results.

Using photo point monitoring as well as line transects we plan on monitoring the effectiveness of the projects we are also in the process of helping the Utah Water Watch establish a volunteer monitoring program within the watershed to help with water quality and project monitoring. The results presented in the FY 03 and 04 sections above display the most recent water biologic monitoring results.

The DWR has completed fish counts on the San Pitch River that include some of the reaches where stream restoration projects have taken place, the fish counts have shown dramatic increases in fish numbers and biomass of fish. A fish count also took place after

the Would Hollow fire ash flows, and the resulting fish kills. I have requested a copy of these studies/monitoring and will add them to the report when I have a copy.

With the Help of Snow College Natural Resources Program in the early spring we are planning on establishing several cross sections along the San Pitch River at many of the project locations especially in the upper end of the watershed where we have a higher project density. The cross sections will be re surveyed annually for the first few years then every five years.

6.0 PUBLIC INVOLVEMENT AND COORDINATION

6.1. FY 03 and 04

The Sanpete Conservation District has enlisted the help of the San Pitch Watershed Stewardship Group to work with landowners and give oversight to project planning and implementation. The Sanpete Conservation District holds monthly public meetings on the third Tuesday each month. The San Pitch Watershed Stewardship Group, a group of interested parties that wish to implement the San Pitch Watershed Water Quality Improvement Plan, holds regular bi-monthly public meetings to discuss critical watershed issues and projects. Both groups actively seek public input into the prioritization of natural resource problems and concerns. Volunteer help is provided during many phases of the projects; streambank cleanup, re-vegetation, tour planning and media promotions.

A Watershed Coordinator has been hired to address issues more actively through media outlets and one-on-one contacts. All project solicitations are published in the local newspapers and by radio.

The Watershed Coordinator, along with the help of Agency presenters conducts a Watershed Education Day for all of the fourth grade students in Sanpete County, each year which involves both the North and South Sanpete School Districts.

6.2. FY 05

In addition to the ongoing efforts and meetings complete in FY 03 and FY 04, the Watershed Stewardship Group hosted the annual 4th grade education day for all Sanpete County school districts.

6.3. FY 06, FY 07, and FY 08

During FY 06, FY 07, and FY 08 the San Pitch Watershed Steward ship Group and Sanpete Conservation District have continued with the efforts listed in section

6.1 and section 6.2 hosting Watershed Tours and Watershed 4th grade education days as well as guiding the water quality conservation efforts within the watershed.

7.0 ASPECTS OF THE PROJECT THAT DID NOT WORK WELL

During the course of project implementation, there was turnover in the Watershed Coordinator Position which is critical to keep projects moving. After hiring it takes a period of time to bring the Watershed Coordinator up to speed. Because of the interruptions in continuity, projects were stalled for a period of time creating a backlog of work.

In the beginning, most of the required engineering for 319 projects was being provided by the NRCS. Backlogs in engineering contributed to projects being stalled for a period of time. This was partially resolved due to the hiring of a UACD engineer in Price, Utah; however, contracting engineering creates an additional unanticipated cost.

8.0 FUTURE ACTIVITY RECOMMENDATIONS

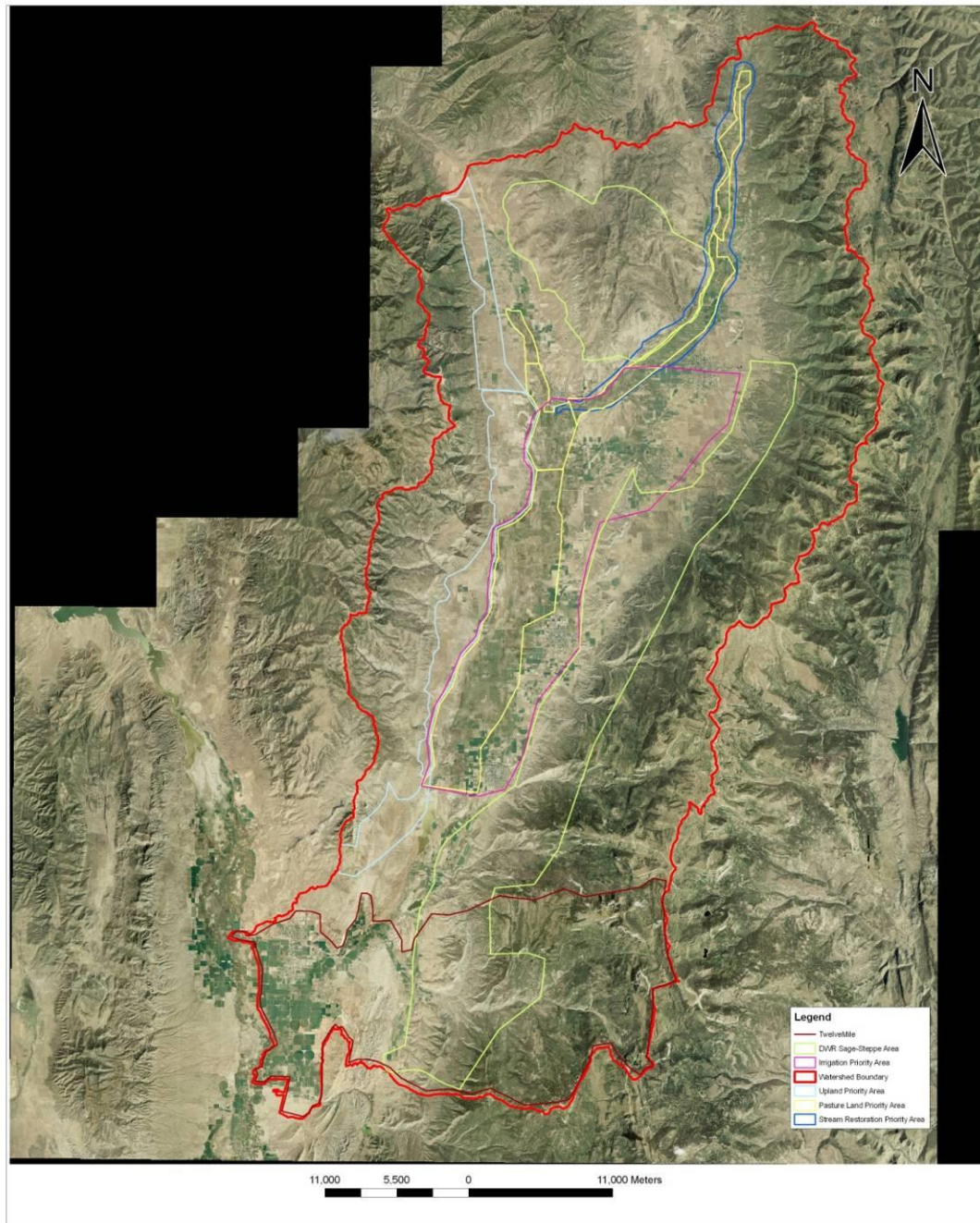
Whenever possible, we should coordinate projects with the NRCS, not only to take advantage of using EQIP and other funds to supplement 319 money, but to take advantage of the NRCS engineering that is provided.

The Sanpete Conservation District is actively trying to improve communications and cooperation with the Utah Division of Wildlife Resources for the completion of stream restoration projects and develop opportunities for funding.

APPENDIX A

<u>Item</u>	<u>Page</u>
County Map showing 319 Priority Areas.....	I.
Utah Division of Wildlife Resources Fish Sampling Data.....	II.

319 Priority Areas



Utah Division of Wildlife Resources

Sampling Data

Sampling was done with a backpack electro-shocker using a Double Pass technique.

Table 1. Change in numbers and biomass of trout and habitat parameters compared to conditions prior to habitat improvements (percent change in parentheses).

Location	Date	Change Compared to Pre Construction levels					
		# of fish/mile (>150mm)	lbs. of fish/acre (>150mm)	Cover (feet^2)	Erosion (feet)	Mean Depth (feet)	# of Macros (feet^2)
San Pitch (Mower's)	9/11/2003*	246	102	221	226	.94	117
	7/29/2004	467 (90%)	102 (0%)	866 (292%)	0 (-100%)	1.14 (21%)	195 (67%)
	7/18/2005	753 (206%)	171 (68%)	1,247 (464%)	16 (-93%)	1.55 (65%)	162 (38%)
	8/02/2006	812 (230%)	149 (46%)	2,691 (1,118%)	18 (-92%)	1.57 (67%)	357 (205%)
San Pitch (Terry's)	8/02/2004*	248	36	50	175	.82	108
	7/18/2005	753 (204%)	114 (217%)	861 (1,622%)	121 (-31%)	.78 (-5%)	139 (29%)
	8/02/2006	938 (278%)	164 (356%)	1,332 (2,564%)	79 (-55%)	.81 (-1%)	140 (30%)
Spanish Fork	8/21/2003*	57	4	121	101	.70	119
	8/18/2004	172 (202%)	21 (425%)	2,665 (2,102%)	15 (-85%)	1.13 (59%)	307 (158%)
	7/19/2005	319 (460%)	39 (900%)	2,186 (1,722%)	117 (17%)	1.56 (122%)	36 (-70%)
	8/04/2006	141 (147%)	36 (800%)	2,421 (1,901%)	85 (-16%)	1.28 (83%)	--

* Pre Construction levels (numbers)