2005 Performance and Progress Report

State of Idaho
Nonpoint Source Management Program
January 1 through December 31, 2005

Idaho Department of Environmental Quality

Cover photo: **Sediment pond in the South Fork Cottonwood Creek Watershed.**

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February 2006

This photo and next: First graders from Moscow, Idaho public schools receive hands-on lessons about water quality protection in this stream bank protection project on Tammany Creek.
(Photo provided courtesy of Palouse-Clearwater Environmental Institute.)

Acknowledgments

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Lewis Soil Conservation District

Members of the various Basin Advisory Groups

Natural Resource Conservation Service

Northwest Natural Resource Group

Palouse-Clearwater Environmental Institute

Paradise Cove Homeowners Association

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Snake River Soil and Water Conservation District

Trout Unlimited

University of Idaho Extension Service

Valley Soil and Water Conservation District

Weiser River Soil Conservation District

Wood River Land Trust

Yellowstone Soil Conservation District

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Glossary

AFO	Animal Feeding Operation
BAG	Basin Advisory Group
BMP	Best Management Practice
CAFO	Confined Animal Feeding Operation
CWA	Clean Water Act
DEQ	Idaho Department of Environmental Quality
EC	Electrical Conductivity
EQIP	Environmental Quality Incentives Program
HUC	Hydrologic Unit Code
IASCD	Idaho Association of Soil Conservation Districts
ISWCD	Idaho Soil and Water Conservation District
RUSLE	Revised Universal Soil Loss Equation
SISL	Surface Irrigation Soil Loss
SRF	State Revolving Fund
STEPL	Spreadsheet Tool for Estimating Pollutant Loads
SWCD	Soil and Water Conservation District
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
WAG	Watershed Advisory Group
WFPS	Water Filled Pore Spaces
WQPA	Water Quality Program for Agriculture

Section 1. 2005 Performance and Progress Report

This section presents the State of Idaho's Nonpoint Source Management Program *Assessment Report of Program and Project Management* for the period January 1 through December 31, 2005. The Idaho Department of Environmental Quality (DEQ) administers the program for the state.

Introduction

The *Clean Water Act* (CWA), section 319(h) requires EPA to make an annual determination of satisfactory progress in meeting the milestones of each states' nonpoint source management plan. A part of this determination is based on an annual report, created by the state, that assesses the performance and progress made by the NPS Program toward meeting the goals of the CWA. The annual report assesses the program's progress toward meeting the goal of achieving, maintaining, and restoring clean water.

Overview of the Idaho Nonpoint Source Program

Congress established the national NPS Program in 1987, when it amended the *Clean Water Act* with section 319, *Nonpoint Source Management Programs*. States were given the federally-funded mandate to address NPS water pollution by 1) conducting statewide assessments of their waters, 2) developing NPS management programs to address identified impaired or threatened waters, and 3) implementing EPA-approved, federally-funded NPS management programs to clean up and prevent NPS pollution.

In accordance with the congressional mandate, DEQ places strong emphasis on assuring that section 319 funds are directed to on-the-ground projects that prevent, reduce, or eliminate NPS pollution in Idaho's surface water and groundwater. In Idaho, NPS funding has resulted in over 147 subgrant agreements for on-ground projects since 1998; while a few of these projects are aimed at statewide pollution reduction *education*, the great majority are designed to clean up and prevent NPS pollution, resulting in measurable pollution reduction.

Scope of the Idaho Nonpoint Source Program

Idaho currently oversees 51 active, on-going projects, each of which is described through formal *subgrant agreements* established between DEQ and a variety of project sponsors, including federal and state agencies, counties, municipalities, nonprofit organizations, and private individuals.

Assessing Program Performance

The Idaho NPS Program has adopted the goals and objectives of the 1999 *Idaho Nonpoint Source Management Plan* (1999 NPS Plan), which provide the structure for annual work plans to administer the program.

Watersheds Provide the Framework of the Program Methodology

The NPS Program, which is organized by watershed, operates as follows:

- Targeting water quality standards and following approved guidance, rules, and laws
- Formulating watershed plans through sound science, as provided through such mechanisms as total maximum daily loads (TMDLs), drinking water and source water protection plans, and ground water management plans

- Implementing TMDLs, drinking/source water protection plans, and ground water management plans
- Evaluating projects and approved watershed plans through project monitoring, watershed monitoring, and various forms of effectiveness monitoring

Program Emphasis and Focus

The great majority of DEQ projects focus on nonpoint source pollution associated with agriculture. DEQ identifies NPS water pollution as primarily occurring within six categories:

- Agriculture
- Mining
- Logging
- Urban storm water
- Transportation
- Groundwater

At EPA's request, for the past three years DEQ has stressed the need for measurable calculations of load reductions for sediment, phosphorous, and nitrogen. While most projects are focused at a particular site or stream segment, every opportunity is taken to ensure that site-specific projects are nested within the subwatershed and watershed scales of a given river basin. Therefore, the pollution load reduction from each project within a watershed can be combined to generate a cumulative load reduction over the entire basin.

Public Participation

Public participation is a major element of the NPS Program, achieved through interaction with public advisory groups as outlined in Idaho water quality statutes. Both Watershed Advisory Groups (WAGs) and Basin Advisory Groups (BAGs) are required to review, comment, recommend, and participate in the implementation of all projects.

In addition, coordination with local, state, and federal agencies, entities, and governments is critical to the success of all projects. The identification and support of designated management agencies is essential to ensure the closing of the feedback loop, project-by-project, at the habitat and watershed scales throughout each of the six river basins of the state.

Providing Technical Support to Projects

The Idaho NPS Program provides technical support to project sponsors and facilitates cooperative engagements with agency partners in implementing the nonpoint source and ecological restoration activities through such actions as the following:

- Leading by example at the state level and acting as the lead agency and program for facilitating and coordinating the implementation of the 1999 NPS Plan
- Coordinating consistent activities that benefit surface water and ground water as they relate to all six categories of NPS pollution
- Encouraging the enhancement of natural resource partnerships and interagency collaboration through educational opportunities and information or knowledge transfer

- Enhancing program implementation by way of revising agreements—such as memoranda of understanding (MOUs)—that support the 1999 NPS Plan
- Ensuring statewide consistency for base-level implementation activities related to TMDLs, drinking water, and ground water, including technical support, education, and information transfer
- Providing load reduction estimate calculations for sediment, phosphorus, and nitrogen through a variety of EPA approved models and methods.

Statewide Program and Project Administration

Statewide, the NPS program and the individual projects are coordinated through the following tasks, each of which can be measured in terms of "outputs."

Task 1: State office grant and project management

Output 1a. The Program administers approximately $15 million in multiple years of grant funding. Grants from 1997 and 1998 were closed out in 2004, and approximately $500,000 was carried over to the 2000 grant through work plan amendment. Grant funding from 1999 was extended until June 30, 2006 to cover some important projects that had experienced unavoidable delays. The Program was responsible for administering grants from 2000 through 2004. Seventeen new projects were implemented in the spring of 2005, totaling $2.4 million. The program intends to bring in approximately 23 additional projects for 2006.

Output 1b. The Program is currently administering 51 active projects through grants from 2000, 2001, 2002, 2003, 2004 and 2005. Project locations are displayed in Figure 1; a corresponding list of project names is presented by Table 1.

Output 1c. The Program coordinated the development and funding of nineteen (19) new projects with base and incremental funding in 2005. Encompassed within these new projects were fifteen (15) agricultural pollution reduction projects, two (2) lakeshore stabilization projects, one (1) municipal low impact development storm water treatment project, and one (1) logging road sediment reduction project. The Program redirected about $500,000 from closing three grants, 1997-1999, to new projects, not all of which have been contracted.

Output 1d. Thirty-two separate projects were closed-out in 2005 (see Table 11, page 61). Work products of interest for each of these closed projects, such as final reports, are available upon request. Between 13 and 15 additional projects are anticipated to wrap-up in 2006.

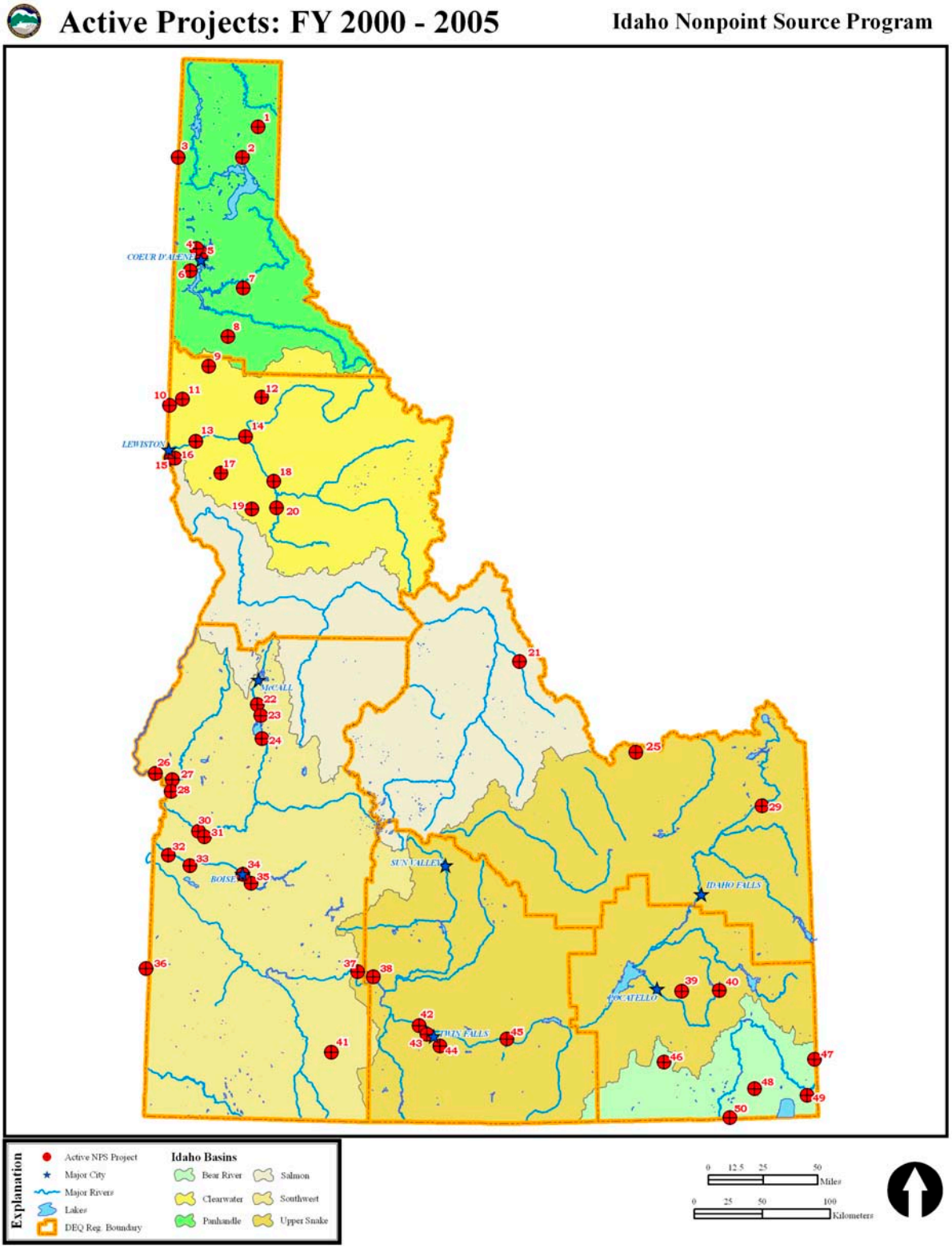

Figure 1. Active Nonpoint Source Program projects in Idaho.

Table 1. Active NPS projects.

No.	Subgrant	Project
1	S146	Twentymile Creek Habitat Restoration
2	S075	Pack River Watershed Sediment Reduction
3	S148	Bear Paw Sediment Yield Reduction Project
4	S147	Emerald Gardens
5	S081	Panhandle Health District Biorentention Basin
6	S091	Kid/Mica Creek
7	S149	Lower NF Clearwater Project 2
8	S095S	Santa Creek Streambank Protection & Stability, Phase 2
9	S105	Cow Creek Water Quality Improvement
10	S123	SF Palouse River Restoration
11	S143	Robinson Park, SF Restoration Project
12	S157	Partridge Creek Riparian Revegetation
13	S106	Potlatch Water Quality Improvement
14	S111	Lower N. Fork Clearwater TMDL, Phase 2
15	S072	Tammany Creek Watershed Imp.
16	S142	Tammany Creek BMP Demo Project
17	S069	N. Idaho AFO Project, Phase 2
18	S094S	Camas Prairie Groundwater Nitrate
19	S099S	S Fork of Cottonwood Creek TMDL Implementation, Phase 2
20	S144	Butcher/Three Mile Creek TMDL
21	S054	Lemhi Watershed TMDL Implementation
22	S077	Mud Creek BMP Implementation
23	S080	Gold Fork Watershed
24	S170	Cascade Reservoir Watershed Impl. Project, Phase 2
25	S051	Medicine Lodge Creek TMDL Implementation
26	S074	Weiser Water Quality Project
27	BRO	Scott Creek; Mann Creek BMPs for Groundwater
28	S145	Payette Clean Water Project, Middle Snake
29	S107	Ashton Groundwater Protection
30	S098S	Lower Payette River TMDL Implementation
31	S110	Gem County Storm Water Management Demonstration
32	S120	Jerrell Glenn Wetland Restoration
33	S130	Indian Creek LID Demonstration
34	S131	Downtown Boise Graywater Recycling Demonstration
35	S104	Boise River Side Channel Reconstruction
36	S141	Owyhee Restoration Incentive Project
37	S168	Y/Y9 Drain Elimination into Clover Creek
38	S129	Bliss Nitrate Priority Partnership
39	S023	Upper Rapid Creek Subwatershed Riparian
40	S008	Twentyfour-mile Creek TMDL implementation
41	S133	Clover Flats Riparian Restor. Project
42	S126	Jeff Woody Wetland
43	S139	O-Coulee Treatment Train
44	S127	Rock Creek Small Acreage Demonstration
45	S169	Restoration of Milner Lake Segment of Snake River
46	S150	Wrights Creek Stream Restoration Project
47	S108	Thomas Fork-Widmer Restoration
48	S171	Bear River AFO Demonstration Project
49	S151	Bear River Stream Bank Restoration
50	S018	Porter Riparian Restoration Cub River
51	S121	Idaho Home A Syst Program, Statewide

Task 2: Develop policies and guidance materials

Output 2a. DEQ co-sponsored a set of meetings with the Idaho Soil Conservation Commission (SCC) during the fall and winter of 2005.

The meetings, which were heavily attended by staff from DEQ, SCC, and the Natural Resources Conservation Service (NRCS), as well as other federal and state agencies, focused on section 319 projects, TMDL planning and implementation, and the section 319 grant pre-application and application process.

The meetings were held in Pocatello, Twin Falls, Boise, Lewiston, Idaho Falls, and Coeur d'Alene. Attendance ranged from 20 to over 35 participants. These meetings provided an excellent opportunity for pre-application packets to be reviewed with each of the six DEQ regions. Discussions were productive and assisted in furthering the prospect for applications to be submitted for the 2007 funding cycle. This process resulted in the creation of an interagency work group tasked with simplifying and streamlining the application and making it available on the Web. At this writing, the group has met and a first draft of the new application has been created. The goal of the workgroup is to finalize the new application and have it accessible via the Web in time for the 2008 application cycle.

Output 2b. The NPS Program revised, updated, and greatly expanded its Web presence on the DEQ home page. The Program Web site is fully functional and comprehensive and serves as an educational tool. The *Field Evaluation Annual Report – 2004*, added to the Web site in the spring of 2005, includes 177 pages of photographs and text describing the status of 24 projects that were field evaluated during 2004:

http://www.deq.idaho.gov/water/data_reports/surface_water/nps/reports.cfm#field

Output 2c. In September 2005, DEQ issued the request for pre-applications for FY2007 CWA, section 319 funding to over 350 individuals representing qualified agencies and groups. The deadline for submitting pre-applications was October 15, 2005.

DEQ received 35 pre-applications plus twelve other separate inquiries for informal review and comment. The dollar amount associated with the 35 pre-applications exceeded $5 million.

The pre-applications were reviewed and responded to within a sixty-day timeframe. DEQ State Office NPS Program staff met with regional DEQ staff, as well as staff from the Idaho Soil Conservation Commission, the Natural Resource Conservation Service, the Idaho Association of Soil Conservation Districts (IASCD), and many pre-applicants to discuss project concepts. The majority of comments and general discussion with agencies and pre-applicants was intended to improve the quality of formal applications.

Over 90% of the pre-applications were invited to submit a formal application, while the remaining 10% were either deferred to an alternative funding source or rejected due to lacking sufficient technical merit.

Formal funding application submittals were given a February 6, 2006 deadline. All applications for project funding will continue to be subject to a stringent regional review process to ensure that proposals meet federal and state guidelines, are consistent with the

1999 NPS Plan, and also meet statewide/regional needs for the restoration of beneficial uses. Like the previous grant cycle, an additional month has been made available to ensure that watershed and basin advisory groups have sufficient time to review and comment on all regional projects requesting funding.

Task 3: Revise existing NPS MOUs

Output 3a. A contract was let by DEQ in February 2005 to a local consulting firm for assistance in completing this task. Work products completed include compiling a list of participating agencies with respective contact information, interviewing and meeting with the involved agencies in June 2005, and summarizing all comments received in a July report to DEQ. Shortly after the report was prepared, two key DEQ personnel assigned to this effort either left the department or were reassigned. Further contractor work languished while awaiting guidance from the Program on how to proceed. Personnel are now in place at DEQ to continue this work as a priority for completion in 2006.

Task 4: Annual NPS Monitoring Workshop

Output 4a. Funding was made available to ensure continuance of the Idaho Nonpoint Source Water Quality Monitoring Results Workshop on an annual basis. The sixteenth workshop was held at Boise State University January 3-5, 2006[1].

Investigators made 34 oral presentations. Topics included the monitoring of bacteria, temperature and fine-grained sediment; endangered and invasive snails; physical and biological responses to stream restoration; total dissolved gas; project funding; ground water; and fish. Methods were presented for calculating temperature loads in TMDLs and estimating stream bank seepage. Ten posters were presented during the workshop, along with commercial displays.

A nonpoint source load reduction estimation session was conducted concurrent with the workshop. Twenty-seven people from federal, state, and county level governments, along with non-governmental organizations, attended. After an introduction of the section 319 programs and EPA database requirements, a presentation of direct volume calculations and Best Management Practice (BMP) effectiveness modeling, including the Spreadsheet Tool for Estimating Pollutant Loads (STEPL) and the Region 5 model, took place. The next presentation covered models, including the Revised Universal Soil Loss Equation (RUSLE) and the Surface Irrigation Soil Loss (SISL) equation and their applications to cropland. The final presentation discussed WinEPIC modeling results for a specific watershed and its load reduction calculations.

Conference sponsors included the Boise State University Biology Department, Idaho Department of Fish and Game, Idaho Department of Agriculture, Idaho Department of Lands, U.S. Agricultural Research Service, U.S. Bureau of Land Management, U.S. Environmental Protection Agency, U.S. Geological Survey, U.S. Forest Service, Idaho Power Company, EcoAnalysts, Inc., Electronic Data Solutions, CH2M Hill, Hach Environmental, and DEQ.

Attendees at the workshop totaled 182.

[1] Although this workshop was held in 2006, the preparatory work and most of the projects discussed took place in 2005.

Task 5: Facilitate discussion on TMDL implementation activities for urban watersheds; provide contractor to coordinate dialogue in the pacific northwest and sponsor statewide conference

Output 5a. DEQ determined that this task is not congruent with DEQ environmental priorities. Therefore, this task has been eliminated.

Task 6: On-ground review of existing nonpoint source projects

Output 6a. The Program evaluated over half of the on-going projects around the state. Twenty-six of 50 subgrant agreements, covering 24 projects, were evaluated in the field during 2005.

Task 7: Integration of NPS activities into the State Revolving Fund Program

Output 7a. No rules were developed. All NPS loans were closed out in early 2004. The NPS Program did support the State Revolving Fund (SRF) Loan Program by providing extensive information and references to support the NPS portion of the Needs Survey, which was due in early 2005; program staff evaluated two NPS projects for the SRF Priority List.

Task 8: Statewide technical support, education, and information transfer on TMDL implementation activities with an emphasis on urban watersheds.

Output 8a. DEQ continues to offer strong technical support to TMDL activities, including urban watersheds.

Task 9: Submit FY2004 Report to Congress to EPA.

Output 9a. This task was completed in early 2005; the report can be viewed at the following:

http://www.deq.idaho.gov/water/data_reports/surface_water/nps/reports.cfm#congress

Task 10: Coordinate, review, and distribute completed annual report for NPS Program.

Output 10a. This 2005 Performance and Progress Report is hereby submitted to the Region 10, NPS Program Coordinator.

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Section 2. 2005 Project Field Evaluation Season

This section summarizes the 2005 field evaluations. More detailed discussions for five highlighted projects can be found in Section 3 (page 15), and a listing of those projects closed out in 2005 can be found in Section 4 (page 61). Summaries for all project evaluations can be found in the appendix, starting on page 63.

Introduction

DEQ currently oversees 51 active projects in Idaho (Figure 1, page 4). Each project is assigned a unique tracking number once funding is awarded. To assure projects are completed in a timely manner and achieve their goal of cleaning up and preventing NPS water pollution, all projects are subject to field evaluations by DEQ. DEQ's goal is to annually field evaluate the progress of approximately half of all current projects. This evaluation rate ensures that, over a two-year period, all on-going projects receive a field evaluation.

Field Evaluation Process

During the summer and fall of 2005, DEQ staff evaluated field work at 24 project sites across Idaho (Figure 2). Eighteen of the 24 field projects (75 percent) focused on a variety of BMPs for water quality protection related to agriculture. The remaining projects were related to hydrologic habitat modification, transportation, mining, logging, and urban storm water runoff.

DEQ generated a standard form for staff to use for field evaluations. For all projects, the DEQ inspector visiting the site carefully reviewed the project's subgrant agreement prior to going to the field. The evaluator routinely contacted appropriate DEQ regional staff to make arrangements to accompany the project manager, DEQ state office, and any other stakeholders to the field. In all cases, the evaluation form was used as a guide to assure that all NPS requirements were being checked for and met in the field.

Results

Of the 24 projects evaluated, all appear to be fully meeting their work plan obligations by demonstrating substantial progress toward completion of their designated tasks to reduce, eliminate, or prevent NPS water pollution. Fieldwork on one sub-project within a very large overall project had not been completed to acceptable standards (see Figure 148, of Project S111 and S149 Lower North Fork Clearwater Phase I and Phase II, Page 102). However, this situation has since been corrected following our September 20, 2005 visit to the project site.

Table 2 lists all the NPS active projects (denoted as *Subgrants* in the table) that were field evaluated during the summer and fall of 2005. Estimated load reductions are cumulative for projects that began in or after 2002; load reduction estimates were not required for projects that began prior to 2002.

Figure 2. Locations of 24 nonpoint source projects evaluated during 2005.

Table 2. Active nonpoint source projects that were field evaluated during the summer/fall of 2005.

Subgrant Number[a]	Project Name	Cumulative Estimated Load Reduction through 2005[b]	Comments	DEQ Region
QC606	Boulder and Willow Creeks at Cascade Reservoir	N/A	This project covers numerous shoreline stabilization sub-projects along upper Cascade Reservoir. This project was implemented prior to load reduction estimation requirements.	Boise
DEQ-internal	Glory Hole at Stibnite	S = 365	This project involves the removal and/or stabilization of historic mine dumps and tailings at a portion of the Stibnite Mine.	Boise
DEQ - Internal	Meadow Creek at Stibnite	S = 420	This project involves the stabilization of a very large historic mine tailings facility and the segregation of mine waste from Meadow Creek. Meadow Creek is an important fish habitat and tributary to the East Fork of the South Fork of the Salmon River. This project is combined with the "Glory Hole" project in the "Outstanding Projects" section of the 2005 annual report.	Boise
S018	Cub River Project	N/A	This project involves stream bank stabilization along a section of the Cub River. This project was implemented prior to load reduction estimation requirements.	Pocatello
S051	Medicine Lodge Creek	S = 1,860	This project involves implementation of intense stream bank stabilization BMPs along five segments of Medicine Lodge Creek and its tributaries.	Idaho Falls
S054	Lemhi River Watershed	S = 467 P = 890 N = 4,817	This project involves Animal Feeding Operation (AFO) relocations and stream restoration along tributaries to the Lemhi River.	Idaho Falls
S055 #2	Hailey Big Wood River	S = 3,018	This project is an extension of the original subgrant. The work plan was amended (added to) to allow the remaining funds in S055 to be used to remove an historic bridge abutment that was about to collapse into the Big Wood River. This would have caused considerable sedimentation to an excellent salmonid spawning area.	Twin Falls
S070	Upper Thomas Fork – John Carricaburu	S = 82,824 P = 17, 460 N = 34, 066	This project is one of a series of similar stream bank stabilization efforts in which the Bear Lake Regional Commission has conducted intense, well-engineered, and implemented BMPs that have stabilized over one mile of Thomas Fork along a southeastern Idaho valley containing highly erosive soils.	Pocatello
S074	Weiser Water Quality Protection	N/A (Educational)	The primary focus of this project is to demonstrate to agricultural producers the protection of ground water from nitrates and to initiate watershed-wide BMP implementation, which will be carried out through the NRCS Environmental Quality Incentives Program (EQIP), Small Watershed Program, and the State Revolving Fund. A secondary benefit will be the protection of surface water from nutrients and sediment in addressing the two TMDLs being developed for the area.	Boise
S076 & S123	South Fork Palouse River Restoration, Phase I & II	S = 12,984 P = 19,721 N = 50,930	The Palouse-Clearwater Environmental Institute (PCEI) has restored approximately 1,000 linear feet of the South Fork of the Palouse River (SFPR) in Latah County, Idaho. This cooperative restoration project involved private landowners, local students, community organizations and volunteers, and multiple resource agencies. The primary goal was to improve the water quality of this highly degraded river. The project effectively reduced sediments, nutrients, and temperature and addressed flow and habitat alteration. This project will help ensure compliance with the recently finalized TMDL for the SFPR.	Lewiston
S094	Camas Prairie Ground Water Nitrogen & Surface Water Sedimentation Education	S = 60,300 Load reduction estimates for nitrogen are not available at this time.	This project is designed to educate farmers in nutrient management and low-till farming techniques. Farmers are learning about the economic and environmental value of decreased fertilizer applications and management of fertilizer applications. This course of action decreases nutrient loadings—specifically nitrate and ammonia—to fields according to soil testing and crop utilization of nutrients. Nutrient Management programs and split applications of fertilizers have been shown in the "Ground Water Quality Evaluation Craigmont, Idaho" report to reduce the amount of nutrients that are leached through the soil to groundwater sources. Sediment reduction estimates are based on low-till farming education and implementation.	Lewiston

Subgrant Number[a]	Project Name	Cumulative Estimated Load Reduction through 2005[b]	Comments	DEQ Region
S098S	Lower Payette River TMDL Implementation Project	S = 2,146 P = 3,476 N = 7,278	The project area covers that portion of Gem County that is located within the Gem Soil and Water Conservation District. This area includes the Lower Payette River and its tributaries that are located west of Black Canyon Reservoir to the Gem/Payette County Line. Land uses in this area are a mixture of agricultural irrigated cropland, irrigated pastureland riparian areas, native rangeland, urban areas and the City of Emmett. The main goal of the project is to reduce contributing nonpoint sources of pollutants of concern that are being added to the Lower Payette River. These pollutants are identified as bacteria (*E.coli*), phosphorous, sediment, and pesticides. This project will assist in meeting the Lower Payette TMDL Implementation Plan goals of decreasing the nonpoint sources of pollutants by 30%. This project will be separated into two phases.	Boise
S099S	Cottonwood Creek TMDL Implementation Phase II	S = 23,782 P = 2,000 N = 600	The purpose of this project is to use a watershed approach to implement agricultural BMPs to reduce non-point source loading of TMDL-listed pollutants to Cottonwood Creek and the South Fork of Clearwater River. Special emphasis is placed on Stockney Creek. Loading reductions will be focused on sediment and associated nutrients and pathogens. Agricultural lands comprise approximately 91,788 acres (74%) of the Cottonwood Creek watershed. Agricultural activities in the watershed contribute approximately 85% of the sediment load to Cottonwood Creek. Agricultural lands in Stockney Creek cover 17,26I acres (86%) of the watershed.	Lewiston
S104	Boise River Side Channel Project	N/A	This project, located at Harris Ranch in east Boise, is intended to improve water quality in the Boise River. The Boise River is a §303(d) water quality limited segment affected by nonpoint source activities, which have affected flow alteration, sedimentation, temperature, and dissolved oxygen. The project deals with temperature reduction by reestablishing a functioning riparian corridor. It will also restore spawning and rearing habitat for salmonid fishes with construction of a one mile long side channel adjacent to the Boise River. The project will provide fish passage from the Boise River to an area known as Barber Pool. This project is restoring connectivity between Barber Pool and the Boise River, which have been disconnected for nearly a century.	Boise
S105	Cow Creek Water Quality Improvement	S = 10,000 P = 3,950 N = 1,270	Cow Creek is on the State of Idaho's 303(d) list of impaired water bodies. The listed water quality parameters of concern include habitat alteration, nutrients, and temperature. Cow Creek is listed from the headwaters to the Washington State line. BMPs being implemented include continuous direct seeding, erosion and sediment control structures, riparian restoration and reforestation. In addition to BMP implementation, the project is augmented by a watershed-scale monitoring program initiated by DEQ in 2002. Public outreach to landowners and local growers will be undertaken to enhance the transferability of these BMPs to other landowners and growers in the area and throughout the region.	Lewiston
S106	Potlatch Water Quality Improvement	S = 12,800 P = 4,000 N = 1,300	Potlatch River and select tributaries are on the State of Idaho's 1998 303(d) list of impaired water bodies. The listed water quality parameters of concern include temperature, channel stability, sediment, bacteria, flow alteration, habitat alteration, and nutrients. The Potlatch River TMDL was recently completed. BMPs include continuous direct seeding and erosion and sediment control structures. In addition to BMP implementation, the project will continue with the watershed-scale monitoring program initiated by DEQ in 2002. Public outreach to landowners and local growers will be undertaken to enhance the transferability of these BMPs to other landowners and growers in the area and throughout the region.	Lewiston
S107	Ashton Ground Water Protection Project	N = 114,441	This project deals with ground water protection education and application of associated BMPs in numerous areas around and near the city of Ashton.	Idaho Falls
S108	Thomas Fork – Widmer	S = 40.8 P = 646 N = 1,122	This project is one of a series of projects developed and implemented by the Bear Lake Regional Commission (BLRC). Similar to previous BLRC projects along Thomas Fork, this project is effectively reducing the amount of total suspended solids (TSS) and nutrients entering the Thomas Fork River, the Bear River, and Bear Lake. This project will result in numerous improvements. Other benefits include reduced temperature of the water via shading and overall improvements to aquatic habitat conditions	Pocatello

Subgrant Number[a]	Project Name	Cumulative Estimated Load Reduction through 2005[b]	Comments	DEQ Region
S111 and S149	Lower North Fork Clearwater Phase I and Phase II	Phase I S = 553.4 Phase II S = TBA	Phase II is a seamless continuation of work completed under Phase I. Therefore, this evaluation covers work conducted under both subgrant agreements. This project is quite large. The Clearwater River watershed is approximately the size of the State of Rhode Island.	Lewiston
S119	Weiser Flat/Hog Creek Wetlands Project	S = 15,374 N = 20,500	The Hog Creek watershed is approximately 16,000 acres and includes about 16 percent of the total watershed of Hydrologic Unit Code (HUC) #17050201. This project will capture sediment and nutrients from Hog Creek prior to deposition to the Snake River. In addition to the normal intermittent flow of Hog Creek, the northernmost branch of the Galloway Canal dumps excess irrigation water and return flows from irrigation into Hog Creek, just upstream of the newly constructed wetland area. Sediment levels are high, although generally not exceeding the target level of 50 mg/L.	Boise
S125	East Perrine Coulee Wetland	S = 6,150 P = 23,652	In this project, the Snake River Soil and Water Conservation District (SWCD), along with the Twin Falls Canal Company, used section 319 funding to help purchase a conservation easement from a private land owner to construct a large sediment pond and wetland area. SWCD purchased the property and the Twin Falls Canal Company constructed the facility. The property, to be held in a perpetual trust, is located upstream from the City of Twin Falls. The sediment pond and wetland are resulting in a significant reduction in sediment and, therefore, have a significant impact on water quality through the City of Twin Falls and, subsequently, to the Mid-Snake River. The City of Twin Falls may participate in the maintenance of the facility.	Twin Falls
S127	Rock Creek Small Acreage Demonstration	N/A (Educational)	The Rock Creek drainage in Twin Falls County has many small acreage properties that may be raising a limited number of livestock. These sites are sometimes constructed in environmentally sensitive areas near the canyon rim of Rock Creek or adjacent to wetland areas. The Rock Creek drainage lies in the number two-rated Twin Falls nitrate priority area and within the drinking water source water delineation for the City of Twin Falls. Rock Creek is a 303 (d) listed stream for nutrient and sediment and is identified in the Mid Snake Resource Plan. This project is education, so load reduction estimates are not calculated at this time.	Twin Falls
S132	Barber Park Green Roof Demonstration	N/A (Educational)	The objective of this project is to approach nonpoint source pollution "upstream" at the source, taking a highly cost effective approach, considered a "site level solution." The project proposes to design and construct a "living roof' for a single office/commercial building with a roof area of about 5,800 square feet The living roof will be integrated into the building, either through initial design as new development or through retrofit of a redeveloped site. The living roof project offers a demonstration of high performance building technology for preventing nonpoint source pollution through design integration. A living roof is a best management practice, ideal for a park setting with a serious educational program in place.	Boise
S143	South Fork Palouse River Upper Watershed- Robertson Park	S = 1,508 P = 2,040 N = 4,200	This project is at the site of a former constructed reservoir. Over the years, sediment built up behind the dam until the reservoir became dysfunctional. Some years ago, the dam was breached, and the creek began down-cutting through the reservoir sediments. The area that used to be a reservoir was converted into a recreational park. However, erosion continued to result in many tons per year of sediment deposition to the South Fork of the Palouse River. This project will stabilize the affected stream banks while enhancing recreational value and preventing further erosion at Robertson Park.	Lewiston

a More than one subgrant agreement number for a project indicates that additional funding was later granted for additional tasks.

b S = sediment expressed in tons
P = phosphorus expressed in pounds
N = nitrogen expressed in pounds

c Total for both projects.

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Section 3. Outstanding Projects of 2005

Five projects in this year's annual progress report exemplify outstanding coordination, design, and implementation:

- Stibnite Mine restoration, which includes the Glory Hole and Meadow Creek Projects, 2003-2005
- South Fork Cottonwood Creek Watershed Enhancement Project – Phase I, 2001-2004
- Upper Thomas Fork Creek Stream Bank Stabilization Project, 2003-2005
- Kinsey Corral Relocation and Riparian Fencing Project, 2001-2005
- Perrine Coulee Irrigation Return Flow Settling Ponds and Wetlands Project, 2003-2005

Summaries for each of these outstanding projects are presented in the following.

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Stibnite Mine Restoration: Glory Hole and Meadow Creek Projects

The goals of this multi-pronged effort have been to eliminate nonpoint source production and delivery of sediment and metals from historic mine roads, abandoned mill tailings impoundments, and mine waste dumps for the Glory Hole and Meadow Creek projects. Located along the *East Fork of the South Fork of the Salmon River* watershed, in eastern Valley County, Idaho, the project lies in the heart of salmon country and is one of only four drainages in the Columbia Basin that supports populations of B-run wild, native steelhead (*Oncorhynchus mykiss*). Adfluvial Bull Trout (*Salvelinus confluentus*) and cutthroat trout (*Oncorhynchus clarki lewis*) also occupy these waters, completing a very complex salmonid community.

The watershed also has socio-economic significance, providing multiple beneficial uses for Idahoans and tribal rights, such as subsistence hunting and fishing and religious practices, for the Nez Perce and Shoshone-Bannock tribes. Land uses in the watershed include road construction, logging, mining, hunting and fishing. Approximately 100 miles of rural county roads, and millions of tons of heavy-metal-ladened mine and mill tailings in the watershed, have been exposed to wind and water erosion. Production and delivery of sediment and heavy metals caused degradation of water quality and fisheries habitat throughout the watershed.

Poor water quality, adverse modifications to aquatic habitat, and creation of barriers to natural fish passage have been the three biggest problems in the watershed.

Over $800,000 in section 319 Grants were awarded to DEQ to implement the Meadow Creek Restoration and Glory Hole Projects; over $300,000 in state general funds and $125,000 of volunteer, in-kind labor contributions have supplemented the section 319 funds.

Completed Tasks: Glory Hole

Tasks completed for the Glory Hole project include the following:

Bradley Waste Dump Removal

Overlooking the Glory Hole is the massive Northwest Bradley Waste Dump, site for disposal of what appeared to be mill tailings and laboratory wastes. Risk analysis indicated that metals concentrations at the surface posed a significant health risk to tourists and that leaching of these metals and those in the interior of the dump contributed to metals concentrations in the river.

DEQ, the USDA, and EPA collaboratively designed removal projects to encapsulate tailings over an area of significant recharge to the dumps, thereby eliminating both the exposure for visitors and reduce the

leaching of metals from the dump. A composite cap, consisting of Bentomat®,[2] top soil and vegetation should reduce these risks significantly.

Monday Camp Dump Access Road Closure

The only access to the Monday Camp was the cause of significant stream bank instability, responsible for production and delivery of in excess of five (5) tons of sediment per year (Figure 3).

Figure 3. Approximately 1.5 miles of access road to the Monday Camp Dump was redeveloped for access to the project. The historic roadway was marred by massive slope failures and deeply incised gullies on fill slopes. The road represented a major eroded surface and source for fine sediment delivery.

At the conclusion of the Monday Camp Dump stabilization task, the road was obliterated. Because riparian vegetation had established along the river, fill slopes were not pulled back and re-graded against the cut banks, but approximately two (2) acres of road surface were scalloped, using a track hoe, and then treated with fertilizer and reseeded. In areas where runoff waters eroded deep gullies, the watercourse was deeply ripped and armored with coarse durable rock. Finally, the entrance to the access road was filled with 36" (and larger) boulders to prevent ATVs from traveling on the reclaimed area.

Monday Camp Dump Stabilization

The East Fork of the South Fork of the Salmon River flowed alongside and undercut over 500 linear feet of the toe of the Monday Camp Dump (Figure 4), contributing approximately 500 tons of what was presumed to be heavy-metals-ladened sediment to the delta beneath the cascade. With no opportunities to relocate the channel, the solution was to *lay back* the entire dump (Figure 5), stabilizing it by soils building and revegetation.

Stream banks were initially excavated to expose materials for testing of hazardous materials and heavy metals and to create a working platform. A long reach track hoe was used to selectively pull back mine wastes and leave established riparian plants.

2 Bentomat is registered trademark of CETCO Lining Technologies.

Figure 4. The river cuts through toe of the Monday Camp dump.

Figure 5. Monday Camp Waste Dump during stabilization task. Note the track hoe near the center of the picture.

Fifty thousand (50,000) tons of mine waste was removed from the dump face and placed on another angle of repose dump face with approximately two acres of vegetated buffer area (Figure 6). The location and the underlying buffer zone ensure that fines eroded and transported down-gradient will be captured and attenuated. Once the mine waste had been removed, the dump was re-graded and scalloped using the track hoe.

Figure 6 Stabilized Monday Camp Dump.

Construction of Sediment Basins and Wetlands on Historic Mine Benches

The Glory Hole consists of numerous historic mining facilities and a public county road that traverses the site. The mine waste dumps, ore stockpiles, mine benches, and roadways were constructed and abandoned with very little regard to drainage and overall stability; modeling suggested that implementation of BMPs in and around the access roads would result in reductions of between one (1) and five (5) tons per year of sediment produced and transported due to mass wasting and erosion.

During DEQ's inventory for organic and top soil resources, three top soil borrow sites were identified that could be developed as sediment traps for post closure BMPs. In addition, DEQ observed that some of the mine's benches were effectively trapping sediment and evolving into ponds and functional wetlands.

After the top soil was removed from the borrow pits, DEQ had its contractor divert the drainage along the county road and the toe of the Northwest Bradley Waste Dump area into three borrow pits and a mine bench that were over-excavated to produce sediment basins. These basins were then roughed up, treated with top soil amendments, and planted with native seed mixtures (Figure 7).

Figure 7. Reclaimed sediment basin alongside of Glory Hole and the public access road was constructed from a top soil borrow source that was developed for the reclamation work in the Meadow Creek Valley.

Reclamation of Bradley Property Timber Project

Figure 8. Bradley Property Timber Project temporary stream crossing prior to reclamation work done under the Glory Hole CWA section 319 Project.

Figure 9. Obliterated Monday Camp Access Road after reclamation of the Monday Camp Dump.

Although a timber project was contracted by the Bradley Mining Company and regulated by the Idaho Department of Lands, the operator failed to fully reclaim the project area. Seizing an opportunity to acquire additional raw materials, DEQ and Thornton Construction salvaged slash and top soil, removed a poorly constructed stream crossing (Figure 8), and completed some of the timber company's reclamation work. When completed, DEQ reclaimed approximately 200' of timber roads and a one-acre area of disturbed lands that had been used to stockpile slash and logs.

Approximately 200 tons of large woody debris and 1,000 cubic yards of top soil were removed from the timber project area (Figure 9). The top soil had apparently been stockpiled during historic mining activities and was not discovered until Thornton construction began reclamation of the timber project. This large woody debris was stockpiled at the Meadow Creek Project site pending its use on constructing vegetated islands and general scatter.

DEQ seeded the reclaimed timber project with approximately 30 pounds of native seed mixes and then used a tri-phosphate chemical fertilizer to help pre-winter germination. Small slash and rocks were placed to impede recreational use and protect the reclaimed areas. It is hoped that this work will result in the elimination of at least one (1) to five (5) tons of fine sediment production and delivery from this area.

Completed Tasks: Meadow Creek

Tasks completed for Meadow Creek include the following.

Revegetation of Meadow Creek Stream Channel

Prior to DEQ's projects, which began in 2003, very little vegetation had begun to establish itself along the stream bank (Figure 10, left). In 2003, volunteers made up of Boy Scouts, high school students and teachers, DEQ and Fish and Game employees, and a local outfitter started planting willow cuttings, and one-year starts of riparian species. Volunteers also helped broadcast native seed mixtures along the channel.

Figure 10. (Left) Meadow Creek Stream prior to 2003 plantings. (Right) September 2005, after plantings.

Figure 11. (Left) Poorly implemented BMPs prior to this project resulted in continued piping of heavy-metals-ladened tailings. (Right) Top soil backfilling and revegetation stabilized the springs, reduced flows, and curtailed delivery of tailings.

Vegetated Islands Development

Initially, it was believed that DEQ's project would not generate enough top soil and amendments to cap the *spent ore disposal area* (SODA). Consequently, DEQ decided to try the longer-term solution of creating productive islands of vegetation from which seed and organic debris would be generated in sufficient quantities to slowly cover and re-colonize the SODA (Figure 12-Figure 14).

Figure 12. Islands were over-excavated one foot below the original surface and then backfilled with a mixture of spent ore, top soil, and compost to an average of one foot above the original surface.

Figure 13. The placement of the backfill mixture created an absorbent island of growing material that would capture and retain surface runoff from the interior of the SODA until the moisture could be evapotranspirated, significantly reducing surface runoff that had previously caused most of the erosion on the SODA benches.

Figure 14. One year after creating the first vegetated islands, lush grassy species and large woody debris hide and shade over 9,000 plantlings of wild roses and lodge pole pines.

In total, for the 2004 and 2005 construction seasons, nine (9) islands, each of which are approximately a quarter-acre in size, were constructed. After one year, the first vegetated islands produced lush vegetation and acted like sponges to hold soil moisture content above ten per cent until mid September.

Development of DEQ Tailings Repositories

During the identification of non-point sources of surface water pollutants, it became obvious that up to 1,000 cubic yards of historic tailings would have to be removed from the stream channel and other locations to stabilize the site. The tailings would also have to be placed in a repository for final disposal.

Because DEQ was planning to construct a lined area to produce compost, it was determined that the repository could be placed beneath, which would provide the base of a composite cap for the repository. In addition, if the facility were located properly, it would not be impacted by surface or groundwater.

Construction began with excavating spent ore from an area approximately 175 feet by 275 feet (Figure 15). The excavation provided for a 150-foot by 150-foot surface that had a 0.5 percent grade towards a 400,000 gallon settling basin. The pond was designed to contain 48 inches of precipitation that may occur in winter, to prevent runoff from the compost into the nearby Meadow Creek.

Figure 15. (Left) Excavated spent ore from storm water ponds and placed as berm. (Right) HDPE liner is placed on compacted tailings above repository.

Approximately 600 cubic yards of excavated spent ore was placed around the whole area as a retention berm. The interior of the composting area and retention pond was then backfilled with tailings to create a subliner approximately one (1) foot thick prior to placement of a 60-mil high-density polyethylene liner and geotextile.

Development of Wetland Communities and Spring Expressions

The SODA's topography is dominated by two benches that adjoin Meadow Creek. Similar to geologic contact zones, the zone between these benches is a conduit for near surface ground water flow. In several locations, the flow is expressed at the surface as springs, the most notable of which is a five (5) acre area (Figure 16). Until 2004, the areas around these springs were completely devoid of vegetation, and, were sources for the production and delivery of an estimated five (5) tons of metal-bearing fine sediment to Meadow Creek.

Figure 16. Springs are present at the base of the upper SODA bench (left), which became the site for a five acre wetland development to contain and abate fine sediment production and delivery to the adjoining Meadow Creek channel (right).

In 2004, DEQ and its contractor, Thornton Construction, begin to develop these springs into functional wetlands, which would capture storm water runoff and the fine sediment it transported rather than acting as a source. With substantial soil amendments, these areas are already functioning to capture and attenuate sediment from the SODA (Figure 17).

The development of the lower bench wetlands began in 2004, on five acres beneath the most unstable portion of the upper SODA bench. Initially, the access road, which is frequented by recreational traffic, was built up with crushed rock to maintain a firm road base and increase surface water retention time around the springs at the base of the upper SODA bench. Then, approximately 1,000 cubic yards of a mixture of top soil, wood chips, and compost were spread across the entire five-acre area.

Several different surface expressions of the springs were planted to contain stratified vegetative communities (Figure 18). Plantings provided for a slight overlap between each community. In the center of the wetlands, where there is a continuous presence of water, cattails and rushes were planted. From just inside the peripheral edges of the cattails and rushes, to the ephemeral edges of the spring, a mixture of alders, willows, dogwoods, wild roses, and quaking aspen were planted. Lastly, lodgepole pines were planted in uplands areas that tended to dry out before August of each year.

Approximately three (3) more acres on the SODA were determined to be suitable for wetland development (Figure 19).

Figure 17. One year after seeding, approximately fifty per cent of the upland and riparian plantings died from drought and browsing by deer and elk. However, lush grassy species development now hides and shades the remaining plantlings.

Figure 18. One year after planting, thick growths of grasses and forbs hide ten-inch willow, alder, and aspen starts.

Figure 19. Additional wetland sites were developed on slopes where other springs expressed themselves or where annual surface runoff could be retained by placing top soil in a way that created a dam and sediment basin. The dams were planted with upland species while the bottoms of the sediment basins were planted with wetland and riparian species.

In the center of what had been the mine operator's main haul road were springs that easily converted into a nice quarter-acre wetland. Thornton Construction constructed several stair stepped islands and catchment basins immediately above the haul road wetlands, and then cross-ripped the surrounding area. An armored drain was installed to transfer water during spring runoff from the BMPs into natural wetlands at the base of the SODA. Lastly, these BMPs were seeded with native grasses and forbs and planted with approximately 1,000 ten-inch riparian and upland starts.

DEQ estimates that these complimentary BMPs will prevent an annual production and delivery of between one and five tons of metals ladened fine sediment.

As the 2005 construction season ended, DEQ observed that storm water ran off the USDA's repository on the SODA through three distinct watercourses. To contain the fine sediment and curb erosion, Thorn Construction constructed three (3) 1/8 acre islands/sediment basins across the watercourses. These islands/sediment basins were excavated to approximately 18 inches below the original surface of the SODA, and the excavated waste was blended with top soils and compost to develop a high quality growth medium. The islands were then seeded with the native seed mix, scattered with large woody debris and boulders, treated with tri-phosphate chemical fertilizer, and planted with upland and wetland trees and shrubs. Hopefully, these island/sediment basins will develop into functional wetlands.

After observing the success of developing wetlands communities on the SODA, DEQ decided to make use of composite cap on DEQ's repository and the sediment basin at its lower end to develop one last wetland area (Figure 20). Although the two-acre wetland would provide great habitat on top of the SODA, the evapotranspiration that would occur in and around this wetland would eliminate approximately 1.5 acre-feet (500,000 gallons) of recharge through the mill waste to the springs adjoining Meadow Creek.

Figure 20. (Left) Surface runoff and mass wasting of upper SODA bench is one of the more significant sources for fine sediment production ad delivery. (Right) The storm water catchment pond at the composting facility was developed as a wetland to continue to restrict surface water runoff and utilize it to develop a vegetative cover on top of the SODA.

Re-contouring of SODA Bench

The slopes of the upper SODA bench prevented vegetation from becoming established and resulted in high velocities of surface water runoff in the spring—the primary cause of 5-10 tons of metals-laden sediment that was carried to Meadow Creek annually, depending on precipitation.

Development of five acres of wetlands on the lower SODA is anticipated to assimilate any fines being released from the upper bench, or the wetlands may have a limited life. However, the steepness of the slopes of the upper bench was obviously one of the limiting factors to retention of soil moisture and revegetation.

It was determined, therefore, that Thornton Construction should lay the slopes back and treat the slopes with approximately 1,800 pounds of compost per acre, constructing more than 250 micro islands, and planting 120 trees and shrubs in those micro islands (Figure 21). The total area treated in this fashion was approximately 2,000 feet long and 300 feet wide (15 acres).

Development of Armored Drains

DEQ designed and constructed armored drains on the SODA (Figure 22) to convey high flows during spring and storm runoff through a series of sediment basins and wetlands, eliminating annual delivery of approximately five (5) tons of metal-laden sediment from the top of the SODA into Meadow Creek. The drains also decrease the amount of water percolating into the SODA and the subsequent leaching of dissolved metals, and they conserve and direct fresh water into the constructed wetlands and vegetated islands.

Development of Vegetated Micro-Islands

Prior to reseeding the slopes of the upper SODA bench, Thornton Construction dotted the landscapes with micro-islands (Figure 23). Thornton excavated approximately three (3) cubic yards of spent ore and replaced it with topsoil and compost in each of the micro-islands. DEQ then seeded the entire slope and planted four to six ten-inch starts of ponderosa pine and wild roses in each. It is hoped that the lush vegetation that develops on each of these micro-islands will provide long-term seed sources for trees and shrubs and slowly expand outward across the slope.

Figure 21. D-8 Caterpillar with apron feed compost spreader applies approximately 0.25 inches (1,800 lbs/acre) of compost to the surface of the re-contoured upper SODA bench. Subsequently a D-3 Caterpillar dozer cross-ripped the bench parallel to the contours to impede overland flows.

Figure 22. Constructed armored drain connects wetlands constructed at the composting storm water pond to the wetlands constructed on the lower bench of the SODA

Final Closure of Composting Facilities

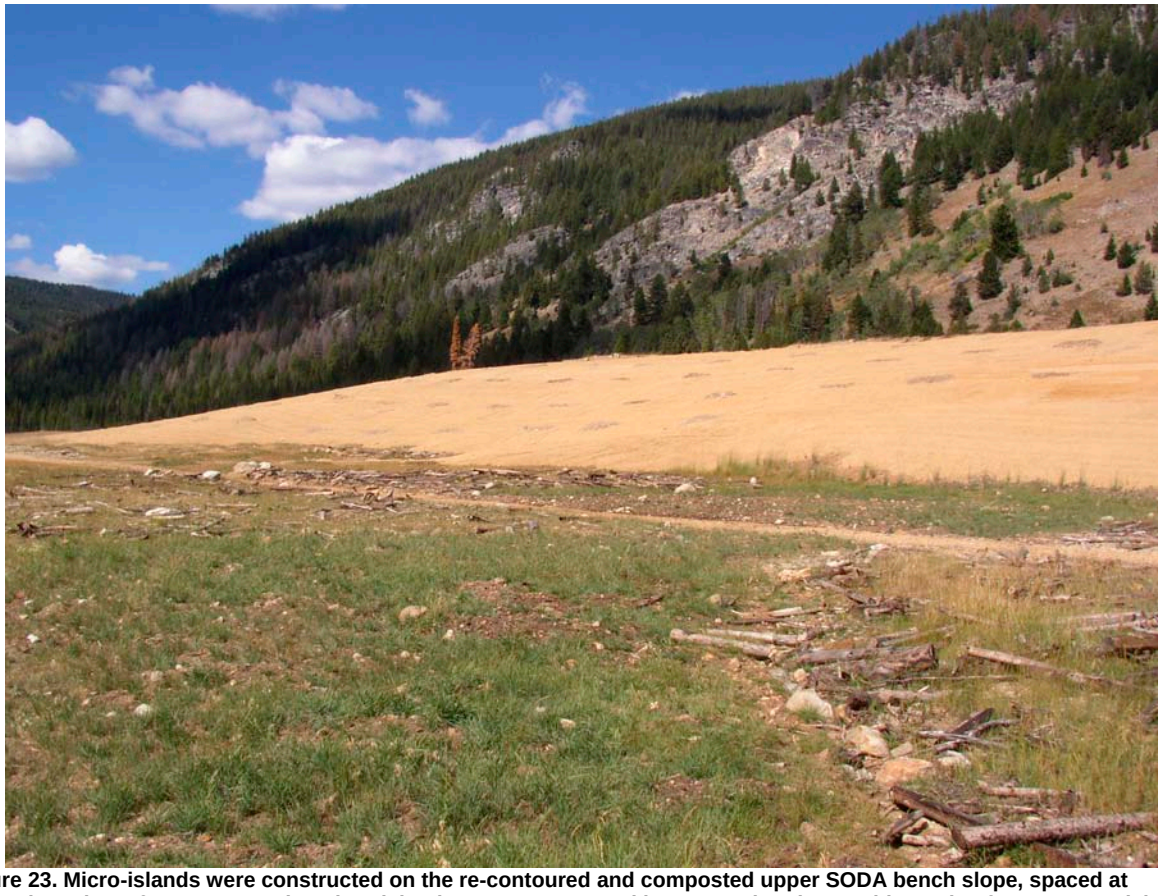

Figure 23. Micro-islands were constructed on the re-contoured and composted upper SODA bench slope, spaced at approximately 50-foot centers. The micro-islands were constructed by excavating three cubic yards of spent ore, mixing it with two cubic yards of top soil and compost, and then backfilling the excavation. The micro-islands were then seeded and planted with lodgepole pines and wild roses.

Final closure of the 1.5 acre composting facilities played on several design concepts. The composting facilities lay on top of a lined mill tailings repository, which would be left intact, but the repository needed substantial protection against either disturbance or natural erosion and exposure. The remedy was a functional composite cap of top soil, heavy boulders, large woody debris, micro-islands, a constructed wetland, and lush vegetation. The high density polyethylene liner would, in turn, hold winter precipitation near the surface, like a perched aquifer, such that soil moisture would remain high for a prolonged growing season.

Summary

As a direct result of this project, the water quality trend will continue to improve and then stabilize at near pristine values. If the Nez Perce Tribe and USDA Forest Service are successful in obtaining grant monies to eliminate the last fish passage barrier in the Glory Hole, populations of both anadromous and resident fish species should rise sharply in the upper East Fork of the South Fork of the Salmon River and Meadow Creek. Within five to ten years after the project is completed, steelhead, Chinook, bull trout, and westslope cutthroat densities may be expected to reach 10.03/100m^2, 23.89/m^2, 8.00/ m^2, and 7.01/ m^2, equal to some of the population densities found in other tributaries to the below the mine.

South Fork Cottonwood Creek Watershed Enhancement Project – Phase I

Project Goal and Objectives

Goals and objectives for this project focused on the following:

- Cropland critical areas with excessive sheet and rill erosion as well as nutrient and pesticide losses that are impacting or have potential to impact water quality.
- Riparian critical acres with limited shade that produce higher water temperatures and areas with low stream bank stability.
- Animal Feeding Operation (AFO) critical acres that are impacting or have potential to impact water quality with bacteria or sediment during critical runoff periods.
- Road critical areas with excessive borrow ditch erosion and roads where tillage practices extend into the road right-of-way.

Critical area size

There are approximately 9,418 critical acres in the South Fork of Cottonwood watershed.

Treatment objectives

The objective of the South Fork Cottonwood TMDL Watershed Plan – Phase 1 is to recognize the resource concerns within the watershed and restore these resources to the point where the beneficial uses are supported and meet the state standards. With this in mind, the South Fork of Cottonwood Watershed Enhancement Project, in conjunction with the state NPS Program, is implementing a comprehensive program of BMPs to reduce in-stream temperatures, pathogens and sediment entering into the stream system and minimize the effects of nutrient loading on an estimated 4,700 critical acres.

The implementation of the Cottonwood project is a phased approach, with initial projects targeting primarily the South Fork of Cottonwood. The South Fork of Cottonwood has a watershed area of 12,557 acres with about 22 operators. The entire Cottonwood watershed has 124,439 total acres. The objective is to reach 50% of the critical acres within the watershed, or 46,665 critical acres with the ongoing implementation projects.

Acres Treated

We have treated 5,000 acres in the Cottonwood watershed using section 319 and Water Quality Program for Agriculture (WQPA) funds (Table 3). The majority of these acres are in six-year contracts. Other funding sources have treated an additional 517 acres in the South Fork of Cottonwood and 4,880 acres within the entire Cottonwood watershed. The table shows the amount of each BMP installed and the number of acres it treated.

A map showing the locations treated can be found in Figure 25, page 37.

Funding Sources

Acres have been treated using a variety of funding sources, which are grouped into two general categories: section 319/WQPA and other sources. The section 319 and WQPA funds are being used together to extend subgrant agreement times and cost share amounts as needed. The Division II Animal Feeding Operation section 319 grant was used to fund a feeding operation within the Cottonwood watershed.

Estimated pollutant reductions

Estimated pollutant reductions include the following:

- *Sediment* - There has been an estimated decrease in rill and sheet erosion of 10 tons/acre/year due to the implementation of no-till or direct seed; resulting in an erosion decrease of 45,780 tons/year for the Cottonwood watershed (Table 3).
- Approximately 325 head of cattle have been removed from stream banks by installations of fence and water facilities. Vegetative re-growth in these areas can be viewed in the photo documentation section, starting on page 38.
- *Nutrients* - Reduction of sediment losses often results in a reduction of nutrient losses since many nutrients are transported with sediment particles to the water source. Nutrient Management systems use soil tests to identify current soil nutrient levels before fertilizer is applied, reducing excess fertilizer applications.

Table 3. Estimated pollutant reductions for South Fork Cottonwood Creek.

Reduction Estimates					
Practice	Estimated Sediment Reduction	# Implemented	Potential Sediment Load Reduction	Potential Nutrient Load Reduction	Potential Bacteria Load Reduction
Direct seed	10 tons/acre/year	4,578 acres	45,780 tons/year	~500 lbs P/year	none
Sediment Basins & Ponds	15 tons/basin/year	1 basins	15 tons/year	negligible	none
Filter Strips	50% of sediment (average of 15 tons/acre/year sediment.losses)	3 acres	23 tons/year	50% of nutrients will be filtered	50% of bacteria will be filtered
Fencing and offsite water developments	stabilized stream banks in 2 to 5 years	6,533 feet of fence, 5 water developments	~1 ton / year	~500 lbs P2O5 ~300 lbs N	99% of in-stream deposits in treated areas

- Sediment load reductions at the field level are estimated at 45,780 tons/year—25,637 tons/year at the stream level.
- There is an estimated 50% reduction in bacteria and nutrients to live water from filter strips.
- Fencing and offsite water developments work together to eliminate or largely reduce livestock access to live water, creating a 99% to 100% reduction of in-stream manure deposits and, hence, bacteria

Monitoring results or indications

DEQ – A BURP crew monitored during the summer of 2005; results are available through the Lewiston Regional Office.

Nez Perce tribe – Nez Perce Tribe monitoring results for 2005, as summarized by Ken Clark (IASCD), are as follows:

Cottonwood Creek (at Darryl Newman's Bridge -- Mouth)

- Bacteria do not appear to be a problem.
- Phosphorus levels exceeded Idaho criteria of 0.10 mg/L for all but two of the sampling events. Phosphorus levels appear to have an inverse relationship to discharge rates. This is counterintuitive and deserves further explanation; phosphorus binds to soil particles and is typically seen in greater quantities in surface waters when flows and erosivity is highest.
- Total nitrogen levels were said to have violated Idaho criteria during spring flows, but were within acceptable limits during the summer months.
- Total Kjeldahl Nitrogen (TKN) on Cottonwood Creek at Newman's appeared to be very high during the sampling period.

Cottonwood Creek (at Columbus Crossing – prairie/canyon interface)

- Nitrogen and ammonia levels were seen as violating state standards at this site.
- Total phosphorus levels were very high during the sampling period, and showed an inverse relationship to discharge rates. Further investigation should be done; perhaps a type of time-release fertilizer was being used.
- Bacteria were not a problem.
- True discharge rates may have been higher than actually reported for all sites, since negative values were used at different sites to calculate discharge. Since streams do not flow uphill, the negative numbers must be due to measurements taken in an eddy; those numbers should have been discarded.

Cottonwood Creek (at Butte Site -- Headwaters)

This site was only sampled twice; it was frozen one of those times. No violations were observed.

IASCD - The actual results can be found in the monitoring report entitled *Tributaries of Cottonwood Creek Monitoring Results 2002* on the ISDA Web site:

- The monitoring program for Cottonwood Creek Tributaries was successfully carried out as planned. Protocols were followed, QA/QC standards were met, and specific information per TMDL parameter for each sub-watershed was collected.
- Dissolved oxygen exceedances were only observed on streams that almost or did go dry in mid summer.
- Instantaneous water temperatures standards were met at all sites with only one exception: at Shebang Creek, which went completely dry.
- All sites exceeded the Salmonid spawning temperature standard during June and July. All of these streams had discharges of 1 cfs or less during this time. Significant correlations ($p<0.05$) between TSS and TP suggests that phosphorous released into the water column was mobilized by sediment disturbance.
- Observations and the data suggest that grazing is a contributor to sediment mobilization. The data suggest that grazing is the main contributor to sediment mobilization.

- Bacteria problems were greatest around May and June, and the data suggest that grazing is a contributor because cattle were observed in the streams during this time (conclusions from Myler, August 2002).

IASCD monitoring will be performed in the 2005, to monitor success in load reductions in Cottonwood creek and tributaries.

BMP Effectiveness Results

BMP effectiveness reviews –BMP effectiveness will generally be monitored by the IASCD monitoring plan. More specific reviews took place utilizing soil quality, RUSLE, spot checks, and photo plots.

Soil Quality - A total of 34 sites have been sampled within the boundaries of the Cottonwood Watershed on cropland that has been enrolled in the section 319/WQPA conservation programs. Figure 25 shows the location of the sites.

Several different tests were performed and a variety of data collected at each site. The results are shown in Table 4.

Table 4. Baseline soil quality data results for South Fork Cottonwood Creek.

	Minimum	Average	Maximum
Standardized respiration (lbs CO2-C/ac/day)	25	73	210
Infiltration rate (minutes/inch)	1.2	64	600
Surface bulk density (g/cm3)	0.6	0.9	1.2
Subsoil bulk density (g/cm3)	0.8	1.0	1.2
Water Filled Pore Space (WFPS) (%)	11	37	58
EC (dS/m)	0	0.4	0.9
PH	4.9	5.5	6.4
NO3-N (lbs NO3-N/ac)	4.4	22.2	215.8
Water stable aggregates (%)	1.8	37.3	71.7
Average soil slaking rating	1.1	2.4	4.5
Total earthworms (# /ft3)	0	1.5	8
Soil structure index	0	34	75
Organic matter (%)	3.4	5.3	8.0

A summary of the findings includes the following:

- The range in respiration data is highly variable, from medium to unusually high microbial activity, and the data represent this variability. To decrease the effects of field variability due to stage of growth and disturbance, samples in the future should be taken at similar crop stages or in the inter-row.
- Infiltration rates varied widely, from slow (300 to 1,000 min/in) to very rapid (less than 3 min/in) with the average being moderate (30 to 100 min/in). The data showed a trend of minimum-till fields having a slower infiltration rate than fields having four or more years of continuous no-till/direct seed.
- Bulk densities were lower than expected (less than 1.2 g/cm3). More quality control on the bulk density test procedure would potentially uncover any errors being made in sampling or handling of samples.
- Water Filled Pore Space (WFPS) data varied from too dry to optimum. About 30 percent of the samples taken had WFPS below 30 percent, therefore being too dry to standardize the microbial respiration for moisture. If there were an error in the bulk density values or water content values, this would affect the WFPS calculation and may change the values.
- Electrical conductivity (EC) is a measure of the salt content in the soil. All values within the Cottonwood watershed were non-saline, indicating no salt problems exist.
- The range in pH values was 4.9 to 6.4, indicating some acidic conditions. Nitrate availability is limited below a pH of 5.5, which directly affects crop growth. Historic pH ranges (1961 – 1976) for the soils

sampled were from 5.6 to 7.3 (USDA-SCS; 1982). These historic ranges could be contributed to parent material. Decreases in pH values since that time are likely to be caused by fertilization impacts on the cropland. An active nutrient management program has been implemented with the no-till/direct seed program and should minimize these effects in time.

- Nitrate levels at the time of sampling for this project ranged from low to very high. Levels of nitrates seemed to be a direct function of timing. For future samplings and data analysis the fertilizer dates need to be collected to better analyze the data.
- Aggregate stability ranged from highly unstable to stable (65 to 81 percent) for the soil types sampled. Organic matter contents and textures were constant for the sites sampled, so higher values were due to increased root growth and microbial glomalin. Fields that had been in pasture previously where root growth was abundant had the highest aggregate stability and minimum till fields had the lowest aggregate stability. This shows an improving trend as root growth and microbes increase within the soil.
- Soil slaking ratings varied from the unstable range to low stability and strength. For the soils sampled, the variability was in glomalin contents. The higher ratings were, in general, from fields that had been in no-till/direct seed systems for a longer period, indicating no-till/direct seed systems over time are effectively reducing sediment losses from fields.
- Earthworm counts ranged from 0 to 8 worms in a cubic foot. Sampling that is collected too early under cold conditions or too late under hot, dry conditions yielded no worms even in fields with high residue levels. Under optimum sampling conditions, total worms increased with increased residue or food sources, which were more prevalent in a no-till/direct seed system.
- Structure ratings varied from 0 to 75, with the higher rating in fields that had been in pasture prior to being direct seeded. In general, as time in a no-till/direct seed systems increased, the better the soil structure. The better the soil structure the better the infiltration rate, which in turn reduces soil runoff.
- The organic matter contents measured in this study averaged 5.3 percent. The highest organic matter contents were in the fields that had been in pasture before crop production with a direct seed system. In addition to high organic matter contents, fields that have been in a no-till/direct seed system have high levels of decomposing residues on the surface of the soil that hold moisture and reduce soil temperatures allowing better microbial activity and more decomposition of the residues.

In conclusion, this data is good baseline data, indicating a positive trend in soil quality with increased years of no-till/direct seeding. Further testing at the third year and sixth year into the contracts should substantiate this trend.

Administration

The district board set watershed priorities by determining which BMPs would make the most impact towards meeting water quality goals. Cost lists were developed through numerous meetings with the Idaho Soil and Water Conservation District (ISWCD) board, the Cottonwood Creek WAG and the Cottonwood Creek advisory committee. Modifications to the cost lists were submitted to the ISWCD board and approved by the ISWCD board at a regularly scheduled board meeting. NRCS and SCC personnel developed contracts and conservation plans with the District approving the contracts, plans and modifications. The Conservation district compiled payment applications and the ISWCD board approved payments as well as preparing financial records for annual audits.

Public Outreach

The conservation district has implemented an information and education program targeting potential project participants, landowners, and operators within the watershed and Idaho County:

- The first educational program netted twenty-five agreements for contracts.
- Watershed meetings, tours, and newsletters were used to highlight public awareness of BMPs and their effectiveness, the TMDL process and the progress of the implementation plan. Local media outlets were utilized to disseminate watershed activities and broader issues of water quality to the general public. A tour was held June 2002, and 50 people attended. The tour spotlighted the direct seeding and no-till practices being implemented within the Cottonwood watershed, with featured producers discussing their successes and challenges.
- In February 2003 and February 2004, the District gave an update on the project at the annual cereal growers meetings in Greencreek, Idaho. The District also had an informational booth promoting the Cottonwood TMDL Implementation at the Idaho County Fair (August 2001, 2002, 2003, 2004).
- Indirect public outreach was accomplished at the South Fork Clearwater (SFC) WAG meetings in 2003/2004. The SFC WAG was informed of the voluntary participation in the Cottonwood Creek TMDL Implementation.

Total Project Costs

Total project costs are shown in Table 5.

Table 5. Total project costs for South Fork Cottonwood Creek.

	WQPA ($)	319 ($)	Landowner ($)	Other ($)	Total ($)
BMP Cost-Share	105,351	235,705	294,019		635075
Administration	5,596	25,718			31,314
Outreach	606	5,759			6,365
Tech. Assistance				70,000	70,000
Monitoring				15,000	15,000
Other					
Subtotal	111,553	267,182	294,019	85,000	757,754

Project Conclusions and Recommendations

The project has been successful:

- We have educated many landowners, operators and public citizens about water quality issues
- We have had substantial volunteers for water quality projects with more envisioned in the future
- Planned BMPs are working toward the objectives for this project
- Thus far, we have reached 23% of our project critical acres with section 319 and WQPA projects and 34% with all projects for the South Fork of Cottonwood (23% of the total Cottonwood watershed critical acres objective).

Figure 24. July 9th, 2005, DEQ Field review of the Cottonwood section 319 – Implementation of BMPs. Left to right: Cliff Tacke, Cottonwood WAG Chairman; Ed Stuivenga, ISWCD Supervisor; Leon Slichter, ISWCD Supervisor; Jerry West, DEQ; Pete Lane, ISWCD Supervisor; Scott Wasem, ISWCD Supervisor; John Cardwell, DEQ.

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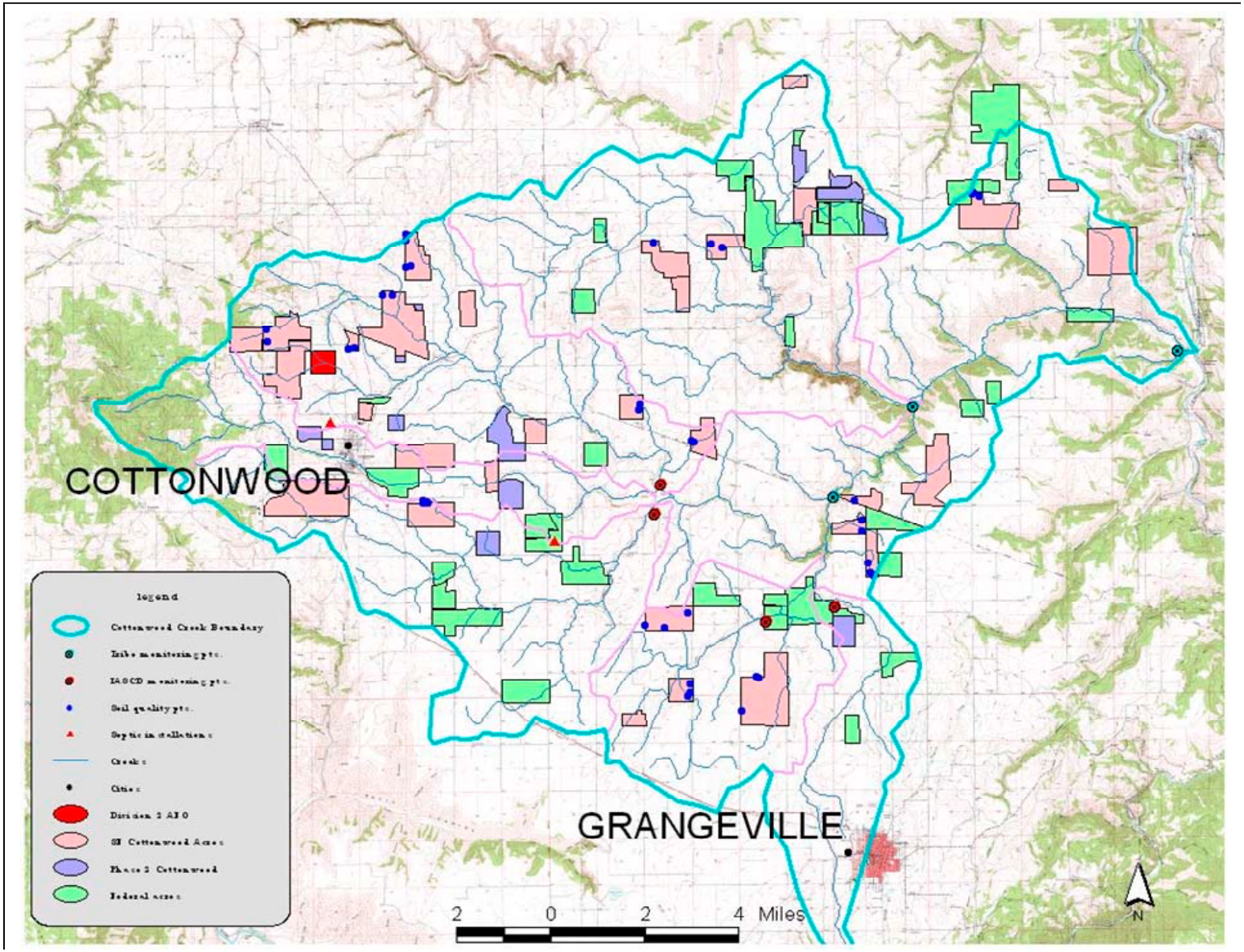

Figure 25. Cottonwood BMP Implementations (11/04).

Implemented Best Management Practices

Figure 26. Direct Seed reduces runoff and sediment losses from fields due to the amount of residue left on the surface. In the Cottonwood area, there is approximately 10 tons/acre/year of sediment reductions due to direct seed and no-till systems.

Figure 27. Residue remaining in this minimum tillage field is significantly lower than residue rates in direct seed systems. The additional residue in direct seed systems slows runoff waters allowing infiltration into the soil and lowers sediment losses from the fields.

Figure 28. Sediment basins collect sediments and reduce the amount of sediment and nutrients entering streams and other water bodies. This sediment basin is seen completed in the fall (right) and full of water and sediments in the spring (left).

Figure 29. The runoff depicted is typical of summer fallow systems in the Cottonwood area before cooperators converted to direct seed systems. In areas where landowners are not converting to direct seed, some landowners are installing sediment basins to collect sediments.

Figure 30. Filter strips, serve to reduce sediment, bacteria, and nutrients entering water bodies. This is accomplished by slowing water velocity, allowing contaminates to settle out of run-off waters.

Figure 31. Fencing (left) reduces impacts to stream banks, and direct access to live water allowing streams to recover and pollutant loads to be reduced. The green re-growth along the creek in this photo is one season of re-growth.

Figure 32. Culvert crossings provide livestock access to additional pasture areas with minimal impacts to stream banks and creek waters.

Figure 33. Sediment Basin two years after installation. Fifteen tons of sediment has been removed each year from this basin.

Figure 34. Corral berms help to contain corral water and manure, allowing pollutants to settle and keeping them from entering the creek.

Upper Thomas Fork Creek Stream Bank Stabilization Projects

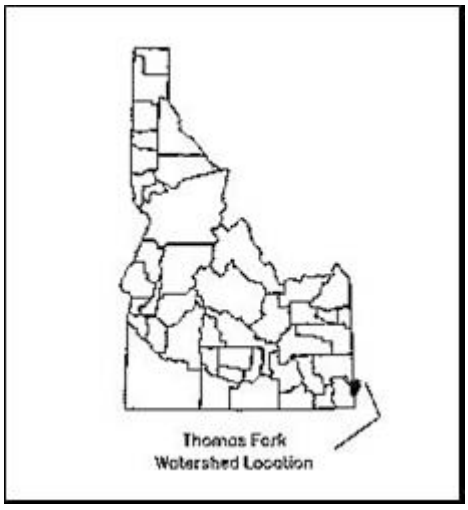

Figure 35 Location of Thomas Fork Creek.

Introduction

The Bear Lake Regional Commission (BLRC) initiated this project to address an identified sediment and dissolved nutrient loading problem in the Thomas Fork Creek. Specifically, a targeted reach of the Thomas Fork Creek in Bear Lake County, Idaho was selected for implementation of stream bank stabilization practices that were proven effective on prior projects on the Thomas Fork.

Project Goal and Objectives

The overall goal of the project was as follows:

"Improve the quality of water in the Thomas Fork Creek and stabilize the banks within the targeted reach, so the stream can sustain its beneficial uses as well as improve water quality conditions within the Bear River and Bear Lake."

The following objectives are specifically intended to meet the above goal:

Objective 1 Apply riparian and in-stream reclamation treatments along the Thomas Fork Creek for approximately 1,750-2,000 feet along degraded riparian zones.

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

Key Issues

To meet the above stated goal and objectives and to accommodate the needs of the landowner, this project addresses the following issues:

- Restricting livestock access to Thomas Fork Creek in this section with a fence and controlled water access.

- Commencing riparian restoration due to a lack of riparian vegetation resulting in unstable bank conditions. Unstable bank conditions ultimately increase the total suspended solids within this reach of Thomas Fork Creek.

Description

The bank conditions found were vertical banks 7 to 12 feet high. The permitting and implementation of the BMPs were under the direction of the BLRC with assistance from the landowner. Monitoring by Ecosystem Research Institute of Logan, Utah included water quality chemistry and surveys of stream cross-sections.

Accomplishments

Outputs from the project include:

- Installation of BMPs on approximately 2,400 feet of stream bank and erection of exclusionary fencing at strategic locations along the riparian area adjacent to pastureland.
- Monitoring using three methods
- Water chemistry at one site
- Photo monitoring at each of the treatment sites
- Stream cross-section surveys at four locations in the project area
- Information and education display at the Bear Lake County Fair, fall 2005, presenting information about the project
- Landowner maintenance agreement on completed project work

Background

The Thomas Fork Watershed (Figure 36) consists of 150,100 acres located in Bear Lake County, Idaho and Lincoln County, Wyoming. The elevation of the valley floor of the watershed is about 6,600 feet above sea level. Thomas Fork Creek is a tributary to the Bear River immediately upstream from the diversion of the Bear River into Bear Lake. Bear Lake has been designated by the State of Idaho as a Special Resource Water. Thomas Fork is listed as a 303(d) stream not supporting the beneficial uses of cold water biota, salmonid spawning and primary and secondary contact recreation.

Figure 36. Thomas Fork Watershed.

Thomas Fork Creek represents a valuable resource of concern. However, in addition to the values of the Thomas Fork, the eutrophication of Bear Lake and the degradation of the Bear River is due, in part, to excessive stream bank erosion from Thomas Fork.

Methods

This project employed BMPs used on prior treatment sites in the same general area. These BMPs have been in place for over seven years. During the grant application process, for this project, thirteen sections of stream bank were selected for the installation of BMPs.

Construction of BMPs on the thirteen sections were completed during 2003 and 2004. Five different types of BMP treatments were employed. They included stream bank shaping, bank barbs, rock rip-wrap, toe armoring, reseeding, willow plantings.

Description of Treatments

Bank shaping involves the use of heavy equipment to excavate excess soil from the stream bank and reduce the angle of repose. A trackhoe has proved to be superior to a backhoe based on reach and stability.

Toe armor consists of large rock placed at the toe of the slope to prevent constant wave action from removing soil on recently excavated slopes.

Rip-rap is applied using landowner equipment. Rock is placed from the toe of the slope to near the crest of the bank. Local geologic material is used as rip-rap to keep soil in place until vegetation can root. Geologic material is quarried from nearby a nearby site and is composed of dense, angular material.

Grass seed was used to keep soil in place and uptake nutrients. Each site is prepped using steel grate dragged along surface. Seed was spread by hand to prepped, treated sites and also to areas rip wrapped.

Seeds were covered to prevent predation by animals. The seed mix is composed of drought-tolerant native species to encourage natural function and consists of Sheep Fescue, Crested Wheatgrass and Stream bank Wheatgrass. This mix was selected based on site conditions and agronomist recommendation.

Stream barbs applied to this project were constructed of native geologic material mined from local quarries using NRCS design from previous project along the same stretch. Core material is 1'-3' in diameter while cover material is 2"-10" in diameter and highly angular. Each barb was anchored into the bank and extended into the flow along the streambed, at a 45° angle, and directed upstream.

Willow stock was produced on site from existing healthy communities and placed to maximize rooting. Cuttings were placed at .5' intervals along treated areas or other areas as needed. Each cutting was pressed into the soil near the waters edge to make use of the water table. Density of cuttings was increased at rock barb locations.

Monitoring

Monitoring of this project included photographs, stream transects, and water chemistry:

- Photo monitoring includes photos before, during and after construction, plus bi-annually after construction. Photo monitoring will continue for 2-3 years on semi-annual rotations to document the longer term success at this site.
- Cross-sections of the creek were surveyed to document channel movement and stability along a stretch of treated stream bank. Three transects were established along the stretch to be treated. One additional transect is installed below the treated areas as a control point. These transects were surveyed before and after BMP implementation to define the effects of BMPs on channel stability.
- Water chemistry samples are used to quantify the success of BMP implementation on water quality. Water quality parameters are sampled on a quarterly rotation and submitted to an EPA certified laboratory for analysis. Constituents sampled consist of: nitrate, nitrite, ammonia, orthophosphorus, total phosphorus, and total suspended solids. Grab samples were collected downstream from treated areas and transported to the lab for further analysis.

Maintenance agreement

An agreement for maintenance of the stream bank BMPs was signed by the landowner and is on file with the Bear Lake Regional Commission.

Involvement of the public and other agencies

In addition to the Bear Lake Regional Commission, several other public and private organizations were involved with this project at different levels.

The location of this project with respect to US Highway 89 required cooperation with the Idaho Department of Transportation. Sections 6 and 7 of this project are within close proximity of US Highway 89. The close proximity of the project to the highway right-of-way required excavation work to take place within the right of way. Agreements were made with the Idaho Department of Transportation to work in the right-of-way. The Idaho Department of Transportation also donated time and equipment to transport excavated material to upland sites.

Without implementing BMPs on sections 6 and 7, Thomas Fork would have shortly toppled an existing power line on this landowner's property. Prior to construction, a power pole owned by Utah Power and Light was within one foot of toppling into the Thomas Fork. Efforts were made to coordinate with PacifiCorp power utility for removal of the power pole with excavation work as part of bank shaping.

Other organizations not directly linked to this project were instrumental in the implementation of BMPs. Bear Lake Watch, an organization devoted to involvement in many aspects of Bear Lake and Trout Unlimited were both represented by volunteers aiding in implementing BMPs. Membership from both groups contributed to the success of this project by planting willows on different segments of the project.

A fair booth was erected during the annual Bear Lake County Fair. The booth detailed the work engaged by the regional commission along Thomas Fork for the past seven years.

Results

The results section includes a narrative of the condition of BMPs after implementation and the monitoring information. Each treated area is considered as a segment and a description of type and amount of BMP implemented at each treated area is reported. Monitoring results include: water chemistry samples, photo points and surveyed cross sections. Segment reaches have been plotted on an aerial photo of the area (Figure 37).

Overall, treated areas are responding well to applied BMPs. Several unique factors appear to have strongly influenced this project. Willows were planted during July along segment 7 with incredible success. Figure 38 illustrates the condition of the willows one month after planting. This is unusual because willows planted in July often show signs of stress not long after planting and soon perish. It could be asserted that this success is due in part to above average precipitation falling at this location. Afternoon rainfall followed by cooler temperatures appears to have provided needed moisture for growth. Based on comparative observations with other projects completed by the Bear Lake Regional Commission, the additional moisture during the summer appears to have greatly improved survival rates for the willows (at least temporarily) and grasses.

Financial resources to acquire exclusionary fencing and water gaps will also help to achieve the goals and objectives of this section 319 grant. Over 8,000 linear feet of fencing was purchased to prevent animals from grazing new riparian grasses. This fencing was to be installed by the landowner and labor costs applied as match to the project. Early snow and late rains have slowed this effort, but verbal commitment from the landowner provides assurance that the fencing will be completed in the near future. Presently, installation of exclusionary fencing is 80% complete.

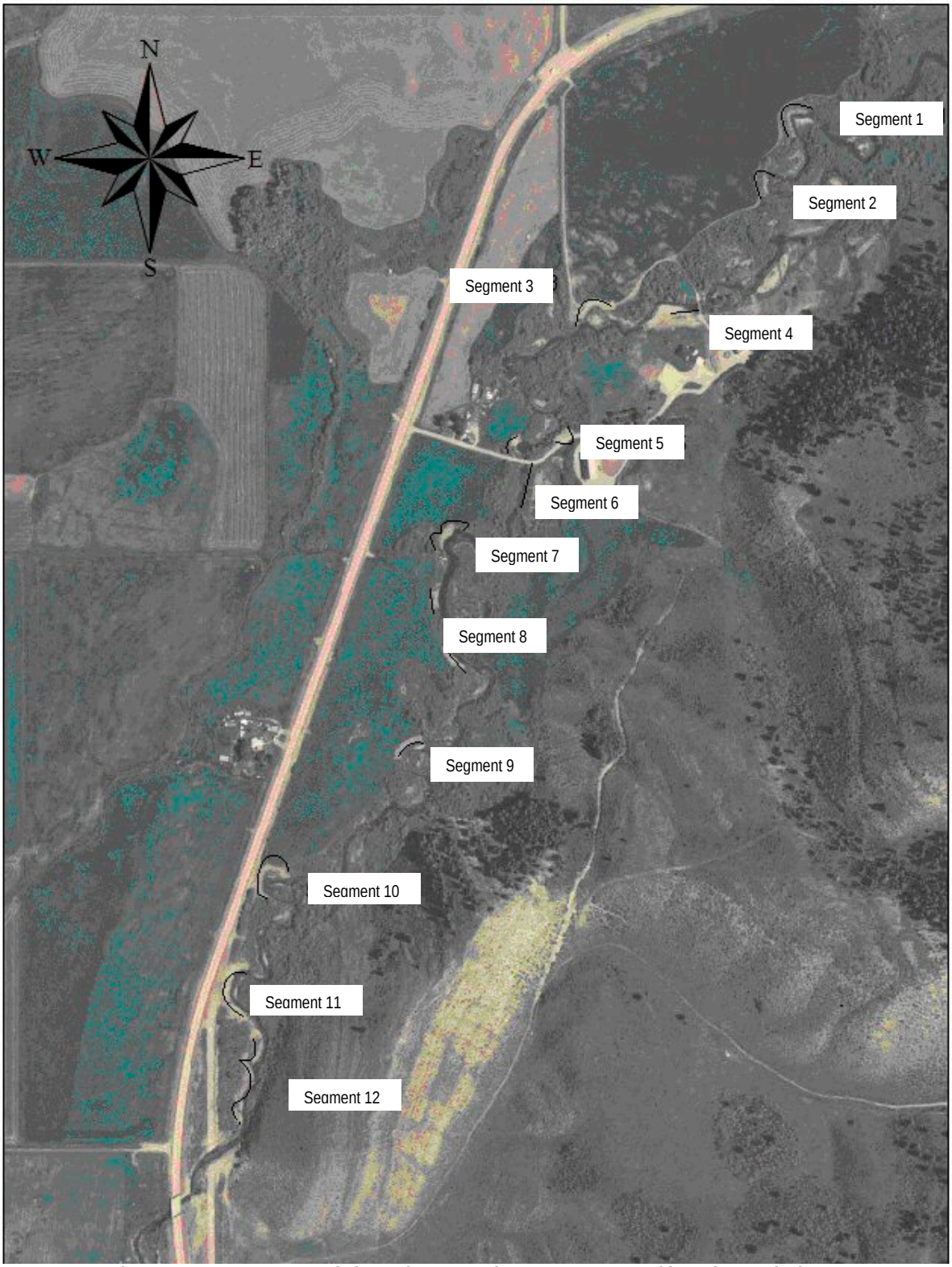

Figure 37. Segments treated along Thomas Fork on property owned by John Carricaburu.

Further description of each type of BMP implemented at each location and their condition one year after implementation is provided below.

Segment 1

Project construction was initiated and completed during the fall of 2004 on Segment 1. 160 linear feet of highly degraded stream bank were treated with rip-wrap, two bank barbs, toe armor, willow plantings, and reseeding techniques. Most of these treatments are in excellent condition. Willow cuttings that were planted during 2004 are virtually non-existent.

Segment 2

Construction was initiated and completed during the fall of 2003, along 100 linear feet of degraded riparian area. Treatments applied at this location include: rip-wrap, toe armor, three bank barbs, willow cuttings, reseeding, and sedge plugs. Most of the techniques implemented are in excellent condition. Willow plantings and sedge grass plugs are in poor condition or non-existent. Other improvements employed at this segment were the removal of existing (unapproved) stabilization practices. Three cars were removed from their placement along Thomas Fork Creek as erosion control many years ago. These treatments were removed from the stream and transported to a more appropriate location. Photos were taken before and after rehabilitation (Figure 38, Figure 39).

Segment 3

Once the primary channel for Thomas Fork Creek, this channel has now been largely abandoned except during high-flow events. However, during high flow events, unstable bank conditions contribute sediment and off site nutrients to the Thomas Fork. Implementation of BMPs was initiated and completed during Fall 2003. BMPs implemented along this 126 linear foot segment include: bank shaping, willow planting, and revegetation. All of the treatments are in excellent condition.

Segment 4

Season considerations of this 150 foot long segment encouraged the postponement of this segment until later. Start and finish at this location occurred during the spring of 2004. Treatments include toe armor, rip-wrap, willow plantings, grass reseeding, and two barbs. Most of the treatments applied at this location are in excellent condition. The barbs seem to have washed away and the willow growth at this location is poor.,

Figure 38. Segment 2 prior to treatment with BMPs.

Figure 39. Segment 2 after treatment with BMPs.

Segment 5

This segment considers two small, separate cut banks that are within close proximity but which will be distinguished as upper and lower. Combining the two under the same segment heading simplifies

describing them as they are within close proximity, yet difficult to separate on the map. The upper section is 35 linear feet and included the following treatments: bank shaping, toe armor, one bank barb, rip-wrap, willow plantings, bundles, and reseeding. Most of the treatments at this location are in excellent condition. Willow plantings and bundles appear to be non-existent except for pre-existing material.

Treatments applied along 65 linear feet at the lower site are similar to those at the upper site with the addition of removing previous attempts at protecting the stream bank. Approximately four hours were spent removing abandoned concrete slabs that had been placed at this location to prevent further erosion of cropland. These relics were removed to an upland location away from the stream.

Segment 6

125 linear feet along segment 6 was not considered as part of the original application to perform this work at this location. Between the time the application was submitted and approved, appreciable loss had taken place to warrant treatment. BMPs applied at this location include: bank shaping, and reseeding. Reseeding treatments appear to be successful.

Segment 7

Treatments applied along 100 linear feet at segment seven provided results contrary to convention. Treatments included bank shaping, willow planting, and reseeding. Willows were planted during July, which is contrary to popular convention; leading science suggests that willow regrowth is maximized when planted in early spring or late fall when plants are dormant. One month after planting, nearly 100% of those plantings were alive and healthy (Figure 40). Grass seed spread approximately the same time was also growing in abundance. One year later, nearly all of the willows are gone. Ninety-eight (98) percent of those still at the site have produced new growth and appear healthy. However, many of these same plants were either consumed or hauled away by beavers (Figure 41).

Segment 8

Treatments applied at segment 8 are identical to those implemented at segment 7 because of similar conditions. Treatments along 250 linear feet include bank shaping, willow planting, and reseeding. Results are also similar to segment 7. Many of the willows have been removed but 90% of those still standing are alive and well. Grass seed is propagating rapidly and can be observed stabilizing existing conditions.

Figure 40. Success of willows planted in July (photo taken one month after planting).

Figure 41. Segment 7 willow plantings after one year.

Segment 9

Treatments applied along this segment include toe armor, rip-wrap, reseeding, willow planting. All treatments applied along this 173 foot segment are in excellent condition save the willows.

Segment 10

Treatments along 240 linear feet of unstable stream banks at this segment include bank shaping, toe armor, rip-wrap, willow planting, and reseeding. Similar to other segments, all treatments applied were in excellent condition. No willows were planted at this site due to miscommunication with volunteers and lessons learned from upstream segments.

Additional help was received from the Idaho Department of Transportation during bank shaping at this location. This segment was within close proximity to right of way owned by the highway that was being threatened by Thomas Fork. The Department of Transportation donated time and equipment necessary to haul away overburden created by bank shaping and safety personnel while working in the right of way. Over 21 dump truck loads of soil were removed from this site and transported to an upstream location by the Idaho Department of Transportation.

Segment 11

Treatments along this segment of highly eroded stream bank (Figure 42) include: bank shaping, rip-wrap, grass seed, and two bank barbs. These treatments were applied along 400 linear feet of stream bank to stabilize the channel meandering toward US highway 89. All of these treatments are in excellent condition (Figure 43). Willows were not planted at this location. Unsuccessful results at upstream locations were cause for not using this treatment at this location.

Idaho Department of Transportation was instrumental in assisting the Bear Lake Regional Commission during bank shaping at this location. Similar to Segment 10, this segment was close to the highway and required excavation activities to take place in the right of way. Idaho Department of Transportation donated time and equipment for the purpose of removing soil accumulated during bank shaping activities. Twenty-two dump-truck loads of soil were transported from this site to an upstream location courtesy of the Idaho Department of Transportation.

Figure 42. Segment 11 before treatment with BMPs.

Figure 43. One year after implementation of BMPs, Segment 11.

Not originally part of the proposal, this area showed evidence of unstable bank activity. Treatments applied at this location include: bank shaping and reseeding. Both treatments are in excellent condition and are aiding in reestablishing a healthy riparian zone.

Water Chemistry

One station on Thomas Fork Creek was sampled during 2004 and 2005 as part of the Thomas Fork Bank Stabilization Project. This location has been used as an upper sampling site for several years and was suitable as a sampling location for this project because of its location below the project area. Grab

samples were analyzed for nutrients (nitrate+nitrite, ammonia, total phosphorus and orthophosphorus) as well as total suspended solids. Increases observed in water chemistry could be attributed to stream flows greater than observed during the last five years. Nutrients and total suspended solids were analyzed at an EPA certified water laboratory.

An overall decrease in total inorganic nitrogen (TIN) load (expressed in lb/yr) in Thomas Fork Creek above upper Geneva Bridge has occurred since the completion of construction and bank stabilization projects within the Thomas Fork drainage. Nitrogen has been a target water quality parameter because of the dairy activities in the watershed and the high concentration of TIN observed in the Thomas Fork in the initial water quality investigations in the watershed.

Total suspended solid (TSS) was chosen as a monitoring parameter because of the direct correlation to unstable stream banks and the potential for future stabilization projects along Thomas Fork Creek. Reductions in concentration have occurred since 1999. It is not surprising that these concentrations would be decreasing given the number of linear feet of stream bank treated with BMPs along Thomas Fork.

To determine the magnitude of water quality improvements seen since the bank stabilization project began in 1997, nutrient loading at the Thomas Fork at Upper bridge (expressed in lb/day) for dissolved orthophosphorus, total phosphorus and total inorganic nitrogen (NH_3+NO_3+NO_2), and total suspended solids (expressed in tons/year) was compared over the period on projects implemented.

Nutrient loading for all four parameters decreased dramatically over the time period. All of the parameters display similar behavior following high flow events. 1998 and 2005 were the only high flow events over the last seven years.

Total phosphorus and orthophosphorus achieved similar reductions around 54%. Total phosphorus was reduced from 14,744 lbs/year to 8,135 lbs/year and orthophosphorus was reduced from 7,033 lbs/year to 3,050 lbs/year.

Total inorganic nitrogen loading was reduced by 73% from 30,707 lbs/year to 8,135 lbs/year. Reductions in total suspended solids were by the far the greatest with 93% from 21,465 tons/year to 1,417 tons/year.

Conclusions

Areas treated with BMPs along these segments appear to have accomplished their design by reducing sediment and nutrient inputs to Thomas Fork Creek. Overall, a majority of the areas treated within the scope of this project are functioning well.

Water chemistry sampling suggests that treatments applied have reduced the sediment and nutrients entering the Thomas Fork Creek. Cross-sectional surveys of Thomas Fork Creek indicate treatments have stabilized the stream bank without causing adverse channel migration downstream. Documentation through photo points and other locations along the project help support the results of the water chemistry monitoring and surveyed cross-sections.

Kinsey Corral Relocation and Riparian Fencing Project

McMullen Creek is listed on the State of Idaho's 1998 303(d) list of water quality impaired waters. The pollutants of concern are bacteria (*E. coli*), sediment, and phosphorous. The existing beneficial uses under the Upper Snake River TMDL for McMullen Creek are agricultural water supply, cold water aquatic life, secondary contact recreation and industrial water supply.

Funding Sources

Twin Falls Soil & Water Conservation District sought out funding to assist the Kinsey family in implementing best management practices on McMullen Creek. The District and the Kinsey family combined different sources of funding to get these BMPs on the ground. The funding sources include section 319 grant money, Soil Conservation Commission Water Quality grant money, a Soil Conservation Commission Water Quality loan to the Kinsey family, NRCS Environmental Quality Incentives Program (EQUIP) funding, and a great deal of matched labor by the Kinsey family.

Accomplishments

This project applied riparian BMPs to address water quality concerns relating to the Kinsey family animal feeding operation on McMullen Creek. The Kinseys wintered 500 head of cattle for approximately 180 days a year. The confined feeding operation was built over the top of and drained directly into McMullen Creek. These corrals were removed and new corrals were built approximately 1 mile south of McMullen Creek.

All runoff from the new corrals is contained in a waste storage pond designed to appropriately hold 180 days worth of waste storage runoff. All necessary berming has been constructed to eliminate any potential runoff from entering any waterways. Once the old corrals were removed, the site was completely cleaned up of all the old storage sheds and debris. This site has been seeded to pasture grass.

The entire project site on each side of McMullen Creek has been fenced off from cattle grazing. The fencing begins at the High Line Canal and continues along the Creek to the north end of the property. The fencing-off of McMullen Creek means total exclusion from all cattle grazing.

Three off-stream watering troughs will be installed in the spring of 2006. The riparian areas on McMullen Creek were so saturated this fall the trench could not be dug to install the pipe to feed the watering troughs.

The Natural Resource Conservation Service and the Twin Falls Soil & Water Conservation District will work closely with the Kinsey family to ensure that the off stream watering is completed in the spring of 2006. The new corrals included the placement of gravel, concrete, steel panels, and the installation of frost-free water troughs (including the electricity to operate them.

All work completed to date has been in accordance with the appropriate Idaho NRCS Standards and Specifications.

Water Quality Monitoring

Water quality monitoring was done before the implementation of this project, from 2001-2002,. and this past irrigation season (2005). Since all of the components of this project have not been completed, monitoring will continue through the fall of 2006.

Table 6 through Table 9 provide a summary of all collected data.

Table 6. Kinsey Corral 2005 TSS (mg/L) means and loads (lbs/day).

Site	Av. Q	Mean. TSS	TSS Load
	cfs	Tons/yr.	Tons/yr.
MC2	6.57	8.45	54.61
MC3	0.41	6.27	2.53

Table 7. Kinsey Corral 2001 TSS (mg/L) means and loads (lbs/day).

Site	Av. Q	Mean TSS	TSS Load
	Cfs	Tons/Yr.	Tons/yr.
MC2	3.04	5.80	93.8
MC3	0.41	0.47	1.05

TSS at MC2 decreased by 42% from 2001 to 2005.

TSS at MC3 increased by 141% from 2001 to 2005. However, MC3 loads are quite low; we feel that with the fencing off of McMullen Creek this fall will decrease this sediment load by an estimated 65%.

Table 8. Kinsey Corral *E. coli* Data, MC2.

MC2			
Site	Av. Q	Av. *E. coli*	*E. coli* Load
	cfs	cfu/100 mL	lbs/day
2005	6.57	78	12.52
2001	3.04	676	48.01

74% reduction in E. coli at MC2.

Table 9. Kinsey Corral *E. coli* Data, MC3.

MC3			
Site	Av. Q	Av. *E. coli*	*E. coli* Load
	cfs	mg/L	lbs/day
2005	0.41	38.3	0.38
2001	0.41	156.5	1.57

76% reduction in E. coli at MC3.

Figure 44. Corrals built directly on McMullen Creek before cleanup.

Figure 45. Kinsey Corral: old corral site after cleanup.

Figure 46. Kinsey Corral: riparian area after cleanup.

Figure 47. Kinsey Corral: new corrals rebuilt one mile away from McMullen Creek.

Figure 48. Kinsey Corral: another view of the new corrals.

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Perrine Coulee Irrigation Return Flow Settling Ponds and Wetlands Projects

The Main Perrine Coulee originates from diverted water from the Low Line Canal approximately 3.5 miles southeast of Kimberly. The Coulee system begins in the agricultural and grazing zone of the Rock Creek drainage and undulates through miles of agricultural and grazing lands, crossing the McMillan area prior to entering the City of Twin Falls.

The coulee runs through the College of Southern Idaho campus and enters a wetland area built just south of North College Street. Then it runs back into agricultural and grazing lands on the northwest side until it comes to the Snake River Canyon Rim where it forms the Perrine Coulee Falls, entering the Snake River canyon, where it splatters amongst lava rocks and runs through wetlands prior to discharging into the Snake River at the Centennial Falls Park.

Throughout the whole length of the Main Perrine Coulee, a myriad of groundwater seeps impact the stream feeding it with additional water. The Main Perrine Coulee watershed drains a total area of approximately 21,000 acres of gravity flow irrigated agricultural land.

Problem

The Perrine Coulee watershed has been delivering excess sediment, nutrients, and bacteria to the Middle Snake River and impairing the designated beneficial water uses. Designated beneficial uses for the Middle Snake River from Rock Creek to Shoshone Falls include cold water aquatic life, salmonid spawning, primary contact recreation, secondary contact recreation and agricultural water supply.

The *Upper Snake Rock Watershed Management Plan* has been written and approved by the Twin Falls Regional Office (TFRO) and has defined the Perrine Coulee as one of the coulees where reductions in TSS, TP, and *E. Coli* will have a significant impact on the Middle Snake River.

The Perrine Coulee project is located at 42°31.86 N., 114°24.83 W. The HUC is 17040212-013 or the Shoshone Falls watershed. In the *Upper Snake Rock Watershed Management Plan*, this HUC is known as the Perrine Coulee Complex.

Plan

To help achieve the reductions in pollutants, the Twin Falls Canal Company, along with the Snake River Soil & Water Conservation District and TFRO, looked at ways to decrease the pollutants of concern on the Main Perrine Coulee.

Even with the conversion from furrow irrigation to sprinkler irrigation, it has not been enough to reduce the amount of runoff leaving agricultural fields. The *Compendium of Best Management Practices for Controlling Polluted Runoff*, (Meitl, Maguire 2003) lists best management practices for controlling runoff, with sediment retention wetlands among the suggested BMPs. It was decided that this would be the most beneficial way to achieve water quality goals in the Main Perrine Coulee and, therefore, the Snake River.

Actions

There are now two sediment basin/wetland complexes on the Main Perrine Coulee, which were funded through the NPS Program. The grant was awarded and construction began in October of 2003. The Snake River Soil & Water Conservation District purchased the property on which the project was built and has signed a perpetual conservation easement.

The Perrine Coulee Wetland Project covers approximately 14 acres. Perrine Coulee water is diverted into two main ponds:

- The first pond acts as an initial sediment pond. The pond is narrow and long and will be easy for the Twin Falls Canal Company to clean the sediment out on a regular basis.
- This water then moves into a 72,000 cubic yard sediment basin/wetland. This large pond is approximately 10 feet deep on the north and south ends, with fingers that extend from the center to the east and west that are planted with bulrush. In the center, there is an island, which extends for approximately 40 feet. The island has been planted with willows. The project includes construction of berms, banks and check structures. There are also concrete inlet structures and inlet and outlet culverts. Rock rip-rap was placed on the banks in areas where there was evidence of wind erosion.

Willows have been planted along the outsides of some of the banks for erosion control also. The roads in the project area are built and have been graveled for easy access. Bulrush has been planted in the wetland portion of the pond.

In April of 2005, the Snake River Soil & Water Conservation District was awarded a second grant for treatment of the Main Perrine Coulee. . This wetland is located five miles below the Main Perrine Coulee Wetland. The Snake River Soil & Water Conservation District purchased the six-acre piece of property and signed a perpetual conservation easement.

Results

Water quality monitoring data collected during the irrigation season of 2005, shows that the Main Perrine Coulee Wetland (Figure 49) is successful in removing pollutants from surface water. Water samples were taken above and below the wetland. This reduction is expected to decrease even further with the construction of the new Lower Perrine Coulee Wetland.

Background data has been collected and water quality monitoring will continue on both of these projects to get better estimates of the pollutant reductions. The total reductions for the Main Perrine Coulee Wetland are shown in Table 10.

Table 10. Main Perrine water quality data.

	TSS	TP	E. coli	N (2005)
Site 1 (above pond)	28,359.2 lb/day	89.9 lb/day	1,011.8 cfu/day	11 April-Oct.
Site 2 (below pond)	15,713.0 lb/day	67.5 lb/day	345.8 cfu/day	8 May-Oct.
% Reduction	44.6	24.9	65.8	
Estimated Load Reduction with Lower Wetland	55.6%	25.3%	53.9%	

After the Perrine Coulee exits from the Lower Perrine Coulee Wetland, it enters the City of Twin Falls where it receives storm water and urban runoff. TFRO was able to obtain grant money and furthered the treatment on the Main Perrine Coulee with two additional projects. The College of Southern Idaho (CSI)

Wetland Improvement Project increased the size of an existing wetland located on the CSI campus. This wetland complex is now double the size it use to be and will be much more effective.

The second project is the Centennial Watershed Complex and Riparian Buffer Zone. There will be a wetland complex with a 2-acre riparian buffer zone. The project is located at Centennial Park, where the Main Perrine Coulee enters the Snake River.

Figure 49. Main Perrine Coulee Wetland (Wetland located in center of photo)

Figure 50.Construction of Main Perrine Coulee Wetland.

Figure 51. Main Perrine Coulee Wetland inlet diversion.

Figure 52. Main Perrine Coulee Wetland inlet settling pond.

Figure 53. Main Perrine Coulee Wetland first water turned in.

Figure 54. Main Perrine Coulee two months afterestablishment.

Figure 55. Main Perrine Coulee Wetland outlet structure.

Figure 56. Lower Perrine Coulee Wetland construction start up.

Figure 57. Lower Perrine Coulee Wetland construction.

Figure 58. Lower Perrine Coulee Wetland construction.

Figure 59. Lower Perrine Coulee Wetland Inlet from Coulee.

Figure 60. Lower Perrine Coulee Wetland Inlet Structure.

Figure 61. Lower Perrine Wetland Cell.

Figure 62. Wetland Cell with bulrush planting.

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Section 4. Summary of Projects Closed During 2005

Table 11 lists nonpoint source projects closed in 2005. Descriptions for those completed projects not contained in this report can be found in previous years' Field Evaluation Progress Reports, located at the following Web page:

http://www.deq.state.id.us/water/data_reports/surface_water/nps/reports.cfm

Table 11. Projects completed in fiscal year 2005.

Subgrant #	Project Name
S138	Lower Perrine Coulee Wetland Project
S125	East Perrine Coulee Wetland (previously Wilson Creek/Kueny)
S119	Weiser Flat/Hog Creek Artificial Wetland
S070	Upper Thomas Fork Stream
S071	Cumulative Watershed Effects Analysis
S076	S. Fork Palouse River Restoration
S093	Edson Fichter Nature Wetland
S094S	Camas Prairie Groundwater Nitrate
S097S	Urban Livestock BMPs
S100S	Tammany Creek Restoration Project
S055	Hailey Big Wood River Enhancement
S049	Auger Falls Nutrient Removal Pilot
S039	North Idaho AFO Implementation Project, Phase I
S014	Trestle Creek
QC060600	Boulder Willow Riparian
S015	Jim Ford Creek
S041	Kinsey Corral Relocation
INTERNAL	Meadow Creek Restoration Project
INTERNAL	Monarch Mill Site Tailings Removal
S122	Living Roofs Statewide Demonstration
S132	Barber Park Living Roof Demo Project
S072	Tammany Creek Watershed Implementation
S073	Blue Creek Bay Water Quality Improvement
S078	Lakeshore Dr Road Improvement Project
S079	Perrine Coulee Wetland Mgt Project
S032	Santa Creek TMDL Implementation Project
S025	Success Mill Site
INTERNAL	Glory Hole Fish Passage & Habitat Restoration
S017	Cottonwood Creek
S010	15 Mile Creek/One Plan
S128	Middle Fork Payette River Tailslope Restoration

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Appendix: 2005 Evaluation Reports

This section presents summary evaluation reports for 2005.

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Boulder and Willow Creeks at Cascade Reservoir

Subgrant agreement	QC606
Description and location	This project covers numerous shoreline stabilization sub-projects along upper Cascade Reservoir. 44.7010 X 116.0964, 17050123
Completion date	The original completion date was set at December 31, 2003. Two extensions have been granted due to delays caused by the Paradise Cove Homeowner's Association and weather restrictions. The new date of completion is December 31, 2005.
Features evaluated	Features visited include a hardened crossing, lake shoreline stabilization, and exclusionary fencing. We also visited the site of a horizontal irrigation well that extends under Willow Creek. The permeated well casing replaces a manufactured dike that the rancher would build each spring to divert irrigation water. This dike used to create large volumes of sediment that ultimately was deposited in Cascade Reservoir.
Project status	This project has been repeatedly delayed due to lack of consensus for a plan of action from the homeowners and the narrow window for work to occur due to the seasonal rising water level of the reservoir. With help from Soil Conservation Commission engineering staff, a plan to complete shoreline stabilization has been created. While the basic intent of the work plan has been maintained, there have been some changes of specific subprojects due to logistics and feasibilities. There is still some question as to the design and engineering of shoreline stabilizing BMPs that will be used to protect the "island area" at Paradise Cove. The Paradise Cove Homeowner's Association needs to find a practical way to use logs and other materials they obtained to meet their 40% match. Although some water quality protection has been achieved, this project has not been one of our more productive endeavors. There was not a very clear list of specific BMPs to be installed, and some of the participants were not very knowledgeable about erosion control BMPs or the intent of the section 319 program. To compound the problem, Valley Soil and Water conservation District staff have come and gone during the project's implementation. In the future, DEQ should be cautious about entering into agreements with neighborhood associations or similar groups, where motivations and goals may not be in line with the intent of the section 319 grant program. Update on 11/30/2005 at the time this evaluation is being included into the section 319 annual report: In early November Bill Lillibridge, (engineer with the Soil Conservation Commission) designed a floating log wave barrier that will be installed in Paradise Cove this winter while the water level on Cascade reservoir is low. The system will be floated and tested next spring (2006), once the water level rises. One final subgrant agreement time extension has been granted to allow for the installation and testing of this BMP.
TMDL	This project is part of the Cascade Reservoir's TMDL implementation plan.

Figure 63. Exclusionary fencing is one of the most effective ranch-related BMPs.

Figure 64. At Paradise Cove, well constructed retaining walls keep nutrient-rich sediment out of Cascade Reservoir. The State of Idaho owns and is responsible for a wide buffer strip around all of Cascade Reservoir.

Figure 65. This section of shoreline has not yet been protected and is subject to extensive erosion due to wave action during high water levels.

Figure 66. A good example of stabilized versus non-stabilized shoreline along Cascade Reservoir. Shoreline erosion is a major source of phosphorous and nitrogen in the reservoir.

Glory Hole at Stibnite

Subgrant agreement	DEQ internal
Description and location	This project involves the removal and/or stabilization of historic mine dumps and tailings at a portion of the Stibnite Mine. 44.8925 X 115.3344, HUC 17060208
Anticipated completion	December 31, 2005
Features evaluated	We viewed tailings removal and stream bank stabilization in an area near Stibnite known as the Glory Hole on the East Fork of the South Fork of the Salmon River.
Project status	The project is apparently going to be completed ahead of schedule. There were no deviations from the original plan.
TMDL	This project is part of the TMDL implementation plan for the East Fork of the South Fork of the Salmon River.

Figure 67. Approximately 50,000 tons of mine waste was removed from either side of the East Fork of the South Fork of the Salmon River in an area known as the Monday Camp. Most of the material removed was slowly being eroded into the river prior to removal. Mining in this area dates back to the 1930s.

Figure 68. One of the historic mine mill buildings that was preserved during reclamation.

Figure 69. Close-up view of the historic Monday Camp dump. Mining in this area dates back to the 1930s.

Figure 70. After the Monday Camp dump was stabilized, the access road to the site was obliterated.

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Meadow Creek at Stibnite

Subgrant agreement	DEQ internal
Description and location	This project involves the stabilization of a very large historic mine tailings facility and the segregation of mine waste from Meadow Creek. Meadow Creek is an important fish habitat and tributary to the East Fork of the South Fork of the Salmon River. 44.8925 X 115.3344, HUC 17060208
Anticipated completion	December 31, 2005
Features evaluated	We visited created wetlands, stream bank stabilization and sloping, vegetative plantings, drop structures and dam removal BMPs.
Project status	The project is apparently going to be completed ahead of schedule. The source of top soil had to be changed for the creation of wetlands and vegetative islands.
TMDL	This project is part of the TMDL implementation plan for the South Fork of the East Fork Salmon River.

Figure 71. A portion of a very large reclaimed mine tailings facility at Stibnite mine site known as the Bradley dump.

Figure 72. The same reclaimed mill tailings facility shown in Figure 71. Vegetation is coming in nicely amongst the woody material and rock debris that has been placed on the surface.

Figure 73. This portion of Meadow Creek had to be synthetically lined and channelized to minimize groundwater contamination emanating from the Bradley dump. The drop structure in the center of this photograph is one of several installed in Meadow Creek.

Figure 74. Artificial wetlands created near the top of the Bradley dump.

Figure 75. View from the top of the Bradley dump, showing the Meadow Creek channel.

Figures 76. Vegetation is coming in nicely along Meadow Creek. Much of the planting was conducted by Boy Scouts from the Boise area.

Cub River Project

Subgrant agreement	S018
Description and location	This project involves stream bank stabilization along a section of the Cub River.442.0280 X 111.8039, HUC 16010202
Anticipated completion	This project was due to be completed December 30, 2002, but has been extended until June 1, 2006.
Features evaluated	BMPs evaluated included rock barbs, drop structures, and woody (mainly willow) plantings.
Project status	Engineering designs and the farmer's inability to conduct matching labor caused this project to be delayed. The project is now on track to meet the extended deadline of June 1, 2006. There were no deviations from the original work plan.
TMDL	This project is part of the TMDL implementation plan for Cub River.

Figure 77. Vegetation in the background was planted in earlier years. The gravel in the foreground is part of a hardened crossing installed as part of this current project.

Figure 78. This recently installed drop structure is a good example of how work should be done. Note that the structure is 'V-ed' upstream and is anchored into the shoreline for maximum strength during high water.

Figure 79. Vegetation planted by volunteers is doing well after one growing season.

Figure 80. This rock barb is doing more harm than good because it is not anchored in the cut bank. It will likely will need to be re-built.

Figure 81. This vegetation was planted several years ago and is doing quite well.

Figure 82. This rock barb may hold during high water but will need to be re-checked after the next spring runoff.

Medicine Lodge Creek

Subgrant agreement	S051
Description and location	This project involves implementation of intense stream bank stabilization BMPs along five segments of Medicine Lodge Creek and its tributaries. 44.4402 N X 112.6105 W (upper end) 44.4366 N X 112.6158 W (lower end), HUC 17040215050100
Anticipated completion	This project should be completed by March 31, 2006.
Features evaluated	BMPs visited include stream bank stabilization including rock barbs, willow bundles, willow pole plantings, willow clumps, toe rock rip-rap, V-notch weirs, drop structures, grass and fencing. In total, there are about 100 stream segments over a 12 mile span of Medicine Lodge Creek and its tributaries.
Project status	This project is on schedule. There have been no deviations.
TMDL	This project is part of the TMDL for Medicine Lodge Creek.

Figure 83. After one year, willows and grassy vegetation are slowly being established.

Figure 84. Woody and grassy vegetation are regaining a foothold since cattle have been excluded and stream bank stabilization has been conducted.

Figure 85. This new hard crossing with a drop-down fence confines cattle to a narrow section of Medicine Lodge Creek while protecting the stream bank.

Figure 86. Vegetation is coming in nicely and the biodegradable silt fencing is breaking down.

Figure 87. In another year or so, this area will look completely natural with excellent vegetative overhang for shade.

Figure 88. Rip-rap is allowing vegetation to become established.

Lemhi River Watershed

Subgrant agreement	S054
Description and location	This project involves AFO relocations and stream restoration along tributaries to the Lemhi River. 45.0500 X 113.6810 (middle of general area), HUC 17060204000035
Anticipated completion	This project was originally scheduled to be completed by December 31, 2003 and has been given two extensions. The project manager is requesting another extension. DEQ indicated that an extension would require an email request to Todd Maguire. If given a third extension it would likely be the last possible extension.
Features evaluated	M. Maser only had time to take us to one project, known as the Mulkie Creek Corrals. Corrals have been build away from Mulkie Creek, but the rancher indicated that he wished to keep the old corrals that straddle Mulkie Creek. DEQ does not agree that the old corrals should be maintained, because they are directly in the creek.
Project status	The project has consistently been delayed and has been granted two time extensions. One last extension if granted, would likely be the last extension. Other than continued delays, there have been no deviations from the original plan.
TMDL	This project is part of the Lemhi River TMDL Implementation Plan.


Figure 89. Some of the better work completed on the Lemhi subgrant: two AFOs are segregated from surface water by containment berms that keep storm water out and keep livestock waste contained.


Figure 90. This livestock watering facility is located away from flowing surface water.

Figure 91. There are still problems associated with work conducted on this rancher's land. The photographs are of the old corral that is located on an intermittent flowing tributary to the Lemhi River. This facility should be obliderated to adequately protect surface water.

Hailey Big Wood River

Subgrant agreement	S055 #2 (An extension of the original subgrant agreement)
Description and location	The work plan was amended (added to) to allow the remaining funds in S055 to be used to remove an historic bridge abutment that was about to collapse into the Wood River. This would have caused considerable sedimentation to an excellent salmonid spawning area on the Big Wood River. 43.5154 X 114.3192, HUC 17040219
Anticipated completion	March 28, 2005
Features evaluated	We observed stream bank stabilization via removal of unstable bridge abutment, recontouring of a small section of the Big Wood River bank and vegetation planted by local volunteers
Project status	Due to excellent coordination by the project manager, this project was completed in about one week. All of the activity contained in this report reflects an amendment to the original work plan. Previous work that was included in the original work plan is described in the 'Hailey Big Wood River' project evaluation report and in the 'Outstanding Projects' sections of the 2004 annual report on the DEQ Web site.
TMDL	This is a portion of the TMDL implementation plan for the Big Wood River.

Figure 92. A decades-old abandoned bridge abutment formerly stood from the foreground of this photograph to a point near the existing bridge. The abutment and a large volume of sediment and debris were situated to the right, behind the old abutment.

Figure 93. Vegetation was planted by student volunteers from Hailey.

Figure 94. All of the vegetation is coming in nicely.

Upper Thomas Fork

Subgrant agreement	S070
Description and location	This project is one of a series of similar stream bank stabilization efforts during which the Bear Lake Regional Commission has conducted intense, well engineered and implemented BMPs that have stabilized over one mile of Thomas Fork along a southeastern Idaho valley containing highly erosive soils. 42.3965 X 111.0478, HUC 16010102
Anticipated completion	December 30, 2004
Features evaluated	This evaluation included rip-rap, woody plantings grass plantings, re-sloped stream banks, and rock barbs over a 2,500 foot span of river.
Project status	This project was completed on schedule. There have been no deviations from the original plan
TMDL	This project is part of a much larger watershed-wide project and collectively is the TMDL implementation plan.

Figure 95. For this subproject and the numerous other subprojects conducted by the Bear Lake Regional Commission along Thomas Fork, re-sloping and the installation of rip-rap creates the foundation for stream bank stabilization.

Figure 96. Vegetation quickly covers stream banks once initial stabilization has been completed.

Figure 97. In another year, the rip-rap in this photograph will likely be completely concealed by vegetation.

Figure 98. After one year, this section of reclaimed stream bank looks quite natural.

Figure 99. This section used to have a near-vertical bank slope but has been re-sloped and vegetated.

Figure 100. Where heavy livestock traffic is a threat, exclusionary fencing and watering gaps were created.

Weiser Water Quality Protection

Subgrant agreement	S074
Description and location	The primary focus of this project is to demonstrate to agricultural producers the protection of ground water from nitrates and to initiate watershed-wide BMP implementation, which will be carried out through the NRCS EQIP, Small Watershed Program, and the State Revolving Fund. A secondary benefit will be the protection surface water from nutrients and sediment in addressing the two TMDLs being developed or the area. 44.2675 X 117.0338, the stream reach code for Scott Creek is 17050201000198
Anticipated completion	December 30, 2004
Features evaluated	BMPs visited include drip irrigation and surge Irrigation with soil moisture sensors, ground water monitor wells, lysimeters, filter strips, and sediment basins.
Project status	Funding came late, therefore, work did not start until August rather than April, 2003. The project is now back on schedule.A wetland was part of the original plan but has since been determined to not be necessary. That money was reallocated to the other BMPs listed.
TMDL	This project is the main component of the Ground Water Management Plan for Weiser.

Figure 101. Filter system designed to keep solid debris from clogging the irrigation system.

Figure 102. This filter strip will remove most of the sediment before irrigation water is returned to the river.

Figure 103. One of fifteen monitor wells in the Weiser nitrogen non-attainment area.

Figure 104. The surge irrigation system in this field will automatically allow part of the field to be irrigated at a time, using water more efficiently and reducing water pollution.

Figure 105. This settling pond reduces sediment and allows irrigation water to be recirculated to the fields.

Figure 106. Surge system control valve.

Figure 107. Where space is a premium in prime cropland, settling ponds must be build to conform to existing fields and roads.

Figure 108. Through education, farmers are encouraged to maintain filter strips along fields. Filter strips capture sediment as irrigation and storm water leave freshly cultivated fields.

South Fork Palouse River Restoration, Phase I & II

Subgrant agreement	S 076 & S 123
Description and location	The Palouse-Clearwater Environmental Institute (PCEI) has restored approximately 1,000 linear feet of the South Fork of the Palouse River (SFPR) in Latah County, Idaho. This cooperative restoration project involved private landowners, local students, community organizations and volunteers, and multiple resource agencies. The primary goal was to improve the water quality of this highly degraded river. The project effectively reduced sediments, nutrients, and temperature and addressed flow and habitat alteration. Restoration techniques and Best Management Practices to be implemented are described below. This project will help ensure compliance with the recently finalized TMDL for the SFPR. 46.7056 X 117.0323, HUC 17060108
Anticipated completion	Phase II was completed on June 30, 2005.
Features evaluated	BMPs include 3000 feet of extensive stream restoration including three wetlands, re-sloping of banks and installation of woody and grass plantings.
Project status	This project was completed on June 30, 2005 on schedule. There have been no deviations from the original plan.
TMDL	This project is part of the South Fork Palouse TMDL implementation plan.

Figure 109. PCEI posts information for the public on all section 319 projects they manage.

Figure 110. Overview of part of the project area. The blue plastic sleeves shield new plantings from animal browsing.

Figure 111. One of three constructed wetlands that treat storm water and irrigation runoff.

Figure 112. Vegetation planted by student and Job Corp volunteers (above and below) appears to have a very high survival rate.

Figure 113. Volunteers planted thousands of trees and shrubs over a 3,000 foot span of this stream valley.

Figure 114. Storm water and irrigation runoff come from a golf course and other fields above this barn. This land is adjacent to and within the University of Idaho campus, Moscow Idaho.

Camas Prairie Ground Water Nitrogen & Surface Water Sedimentation Education

Subgrant agreement	S094
Description and location	This project is designed to educate farmers through a nutrient management program. Farmers are learning the economic and environmental value of decreased fertilizer applications and/or management of fertilizer applications. This course of action decreases nutrient loadings; specifically nitrate and ammonia; to fields according to soil testing and crop utilization of nutrients. Nutrient Management programs and split applications of fertilizers have been shown in the "Ground Water Quality Evaluation; Craigmont, Idaho" report to reduce the amount of nutrients that are leached through the soil to groundwater sources. 46.2255 X 116.0132, 17060306022, 23, 24, and 26
Anticipated completion	September 30, 2005 (Extension to be requested)
Features evaluated	Nutrient management, well testing, direct seeding techniques, and other educational techniques were observed and discussed during our site visit.
Project status	The project is proceeding on schedule but will need and extension for an additional year because contracts with farmers last three years. There have been no deviations from the original plan taken during project evaluation.
TMDL	This project is part of the mitigation for the Camas Prairie Nitrate Priority Area and part of the Lawyer Creek TMDL implementation plan.

Figure 115. Part of the educational aspect of this project involves monitoring domestic wells within the Camas Prairie Nitrate Priority Area.

Figure 116. Lance Holloway from the Idaho Department of Agriculture (above and below) is sampling for nitrate in one of numerous domestic wells for this project.

Figure 117. Eileen Rowen from the Soil Conservation Commission is conducting soil tests (above and below) to determine the amounts of nutrients and other elements in farm fields.

Lower Payette River TMDL Implementation Project

Subgrant agreement	S098S
Description and location	The project area covers that portion of Gem County that is located within the Gem Soil and Water Conservation District. This area includes the Lower Payette River and its tributaries that are located west of the Black Canyon Reservoir to the Gem/Payette County Line. The land uses located in this area is a mixture of agricultural irrigated cropland, irrigated pastureland riparian areas, native rangeland, urban areas, and the City of Emmett. The main goal of the project is to reduce contributing nonpoint sources of pollutants of concern that are being added to the Lower Payette River. These pollutants are identified as bacteria (*E.coli*), phosphorous, sediment, and pesticides. This project will assist in meeting the Lower Payette TMDL Implementation Plan goals of decreasing the nonpoint sources of pollutants by 30%. This project will be separated into two phases. 1) The project has contracted temporary technical support services to help complete conservation planning, design, and implementation. The technical support is being used to complete site-specific conservation planning in accordance to the Gem SWCD guidance, USDA-NRCS criteria as defined in the NRCS Technical Guides, and new technical information from other partners. 2) The project will provide financial assistance to private landowners for the implementation of BMPs for nonpoint sources of pollution as identified in the Lower Payette TMDL Implementation Plan. 43.8952 X 116.6218, HUC 17050122
Anticipated completion	September 30, 2005
Features evaluated	Sediment basins, fencing, pipeline, Confined Animal Feeding Operation (CAFO) modifications, storm water diversions, and stream bank stabilization were observed during the evaluation.
Project status	This project is on schedule. There have been no deviations from the original plan.
TMDL	This project is part of the Lower Payette River TMDL Implementation Plan.

Figure 118. This sediment basin was installed on a 21-acre field with a grain/alfalfa crop rotation. The basin was designed to trap 65% of the sediment load from the field. The sediment load reduction is an estimated 54 tons/year. The banks will be seeded with a low growing, drought tolerant grass, such as crested wheat grass. This will stabilize the banks as well as act as an additional filter.

Figure 119. Animal Feeding Operation located in the Bissel Creek area. The owner is going to install an Animal Waste Storage Facility for a feedlot with an approximate capacity of 970 head. The project will consist of two ponds; wastewater will be piped to a small drainage pond above the feedlot that currently drains about 48 acres of rangeland and drains through the feedlot. A pipeline will divert storm water from the upland area underneath the feedlot. A nutrient management plan is also being developed to address current soil conditions and crop uptake to assure that manure is not over applied.

Before

After

Figure 120. Bissel Creek drainage area. The owner is fencing off 30 head of beef cattle from a surface drainage field ditch. The project involves 1,080 feet of fencing on 32.3 acres. This project addresses both sediment and bacteria. Livestock are now prevented from accessing the drain ditch.

Before

After

Figure 121. This project involved the installation of piping and clean-out structures. The land owner piped 330 feet of existing drain ditch to greatly reduce hillside and field erosion. Three clean-out structures were installed to allow trapped sediment and debris from upstream cropland to be removed from the pipe as needed.

Cottonwood Creek TMDL Implementation Phase II

Subgrant agreement	S099S
Description and location	This project is the second phase of the Cottonwood Creek TMDL Implementation Plan. The purpose of this project is to use a watershed approach to implement agricultural BMPs to reduce non-point source loading of TMDL-listed pollutants to Cottonwood Creek and the South Fork of Clearwater River. Special emphasis is placed on Stockney Creek. Loading reductions will be focused on sediment and associated nutrients and pathogens. Agricultural lands comprise approximately 91,788 acres (74%) of the Cottonwood Creek watershed. Agricultural activities in the watershed contribute approximately 85% of the sediment load to Cottonwood Creek. Agricultural lands in Stockney Creek cover 17,26I acres (86%) of the watershed. 46.039446 X 116.214743, 17060305
Anticipated completion	November 1, 2007; they have requested an extension until November 2007.
Features evaluated	Direct seeding, sediment basins, and animal feeding operations were observed during this evaluation.
Project status	There have been no deviations from the original plan. The project has proceeded on schedule but will require more time to finalize.
TMDL	Cottonwood Creek TMDL

Figure 122. Livestock have been fenced out of this section of creek and now come to this watering facility.

Figure 123. This settling pond was built to capture sediment and nutrients from hundreds of acres of highly erosive cropland in the watershed above.

Figure 124. The educational component of this project is very important. The settling pond combined with no-till farming techniques (above and below) result in the capture of tons of pollutants that normally would be discharged to Cottonwood Creek.

Figure 125. This relocated livestock feeding operation (above and below) keeps animals out of the creek.

Boise River Side Channel Project

Subgrant agreement	S104
Description and location	This project located at Harris Ranch in east Boise is intended to improve water quality in the Boise River. The Boise River is a §303(d) water quality limited segment affected by nonpoint source activities which have affected flow alteration, sedimentation, temperature, and dissolved oxygen. The Project aims to achieve water quality improvements by reestablishing a functioning riparian corridor. It will also restore spawning and rearing habitat for salmonid fishes with construction of a one mile long side channel adjacent to the Boise River. The project will provide fish passage from the Boise River to an area known as Barber Pool. This project is restoring connectivity between the Barber Pool and the Boise River, which have been disconnected for nearly a century. Thus this project is addressing one aspect of the §303 listing of the Lower Boise River caused by flow alternation or "hydrologic modification." 43.5622 X 116.1278, HUC 17050114
Anticipated completion	October 30, 2005
Features evaluated	2,400 feet of stream channel that has been excavated to date. At project completion there will be over 5,000 feet of channel.
Project status	A portion of the project has been delayed due to a delay in the abandonment of the Golden Dawn Estates Trailer Park sewer lagoon system. Mr. Brunell indicates that this portion of the project may not happen until 2007. There have been no deviations from the original plan.
TMDL	This project is part of the Lower Boise River TMDL implementation Plan.

Figure 126. Some of the volunteers for this project include kids from a nearby school. These students are learning about the need for shade to lower water temperature.

Figure 127. Volunteers are hand digging much of the side channel. They are making an effort to minimize destruction of existing vegetation that will add shade to water.

Figure 128. Disturbed marshy areas are being sloped and revegetated. These areas (above and below) will be quickly re-established.

Figure 129. Temporary BMPs are being installed to raise the water level for irrigation to allow vegetation to become established.

Figure 130. Fish friendly culverts are engineered for adequate flood water capacity.

Figure 131. This was the temporary end of the channel at the time of this evaluation. The 5,000 foot long channel project has since been tied back into the Boise River.

Cow creek Water Quality Improvement

Subgrant agreement	S105
Description and location	Cow Creek is on the State of Idaho's 303(d) list of impaired water bodies. The listed water quality parameters of concern include habitat alteration, nutrients and temperature. Cow Creek is listed from the headwaters to the Washington State line. BMPs being implemented include continuous direct seeding, erosion and sediment control structures, riparian restoration and reforestation. In addition to BMP implementation, the project augmented by a watershed-scale monitoring program initiated by DEQ in 2002. Public outreach to landowners and local growers will be undertaken to enhance the transferability of these BMPs to other landowners and growers in the area, and throughout the region. 46.9760 X 116.6679, 17060108
Anticipated completion	December 31, 2006
Features evaluated	This project is still in progress and consists of gully plugs, sediment basins, riparian plantings, reforestation, and direct seeding education and implementation with the farming community.
Project status	This project is on schedule to be completed within the contracted time. There have been no deviations from the original plan.
TMDL	This project is part of the TMDL implementation plan for Cow Creek.


Figure 132. The Cow Creek watershed (above and below) includes beautiful, rolling but highly erosive farmland.


Figure 133. Upon closer inspection, one can see (above and below) the high erosive nature of the wind driven, very fine grained sediment of the Palouse country.

Figure 134. A BMP, known locally as a "gully plug," consists of a sediment basin, stand pipe (above), and a conveyance pipe (below). Scores of gully plugs situated in small swales across cultivated Palouse country capture millions of gallons of storm water and associated pollutants. Relatively clean storm water is then conveyed to the foot of the hill via a pipeline, where it is ultimately discharged to streams.

Potlatch Water Quality Improvement

Subgrant agreement	S106
Description and location	Potlatch River and select tributaries are on the State of Idaho's 1998303(d) list of impaired water bodies. The listed water quality parameters of concern include temperature, channel stability, sediment, bacteria, flow alteration, habitat alteration and nutrients. The Potlatch River TMDL was recently completed. BMPs include continuous direct seeding and erosion and sediment control structures. In addition to BMP implementation, the project will continue with the watershed-scale monitoring program initiated by DEQ in 2002. Public outreach to landowners and local growers will be undertaken to enhance the transferability of these BMPs to other landowners and growers in the area, and throughout the region. 46.4752 X 116.7671, HUC 17060306
Anticipated completion	December 31, 2006
Features evaluated	This project consists of direct seeding education and installation of gully plugs.
Project status	This project is on schedule. There have been no deviations from the original work plan.
TMDL	The TMDL for this stream has not yet been completed. Upon TMDL completion, this project will be a major part of the plan.

Figure 135. The Potlatch River watershed extends to the mountains in the background of this photograph. All of this agricultural land is highly erosive.

Figure 136. With 2,500 acres proposed for BMP treatment within the Potlatch River watershed, approximately 5,000 tons/year of sediment could be eliminated. A one-ton reduction in sediment can reduce orthophosphate (H_2P0^4) loads by 14,000 mg and total nitrogen loads by 4,500 mg.

Figure 137. Pine Creek is a more heavily timbered tributary to the Potlatch River. In both areas BMPs including conservation tillage practices (i.e., residue management) is a key management practice to reduce erosion from fields and sedimentation of streams.

Figure 138. Pine Creek and its tributaries in the foreground drain to the Potlatch River in the background.

Ashton Ground Water Protection Project

Subgrant agreement	S107
Description and location	This project deals with ground water protection education and application of associated BMPs in numerous areas around and near the city of Ashton. 44.0176 x 111.4483, HUC 17040202
Anticipated completion	October 30, 2007 Originally, this project was to be completed in 2005. An extension has been requested because the educational process has become very successful and effective in the Ashton area.
Features evaluated	Nutrient management education for farmers in the Ashton area is resulting in far less application of nitrogen and phosphorous to fields. Application rates have been evaluated and adjusted as a result of studies conducted by the University of Idaho Department of Agriculture. After the first year, local farmers have reduced nitrogen application by 56,628 pounds per year and phosphorous application by 26,311 pounds per year.
Project status	This project is on schedule but has been extended due to the success of the program. The project has been more successful than was originally planned. Project participation has gone from one farmer to 15 farmers (4,800 acres) after 2 years and is now up to 29 farmers totaling 18,000 acres. Phase 2 of this project will no doubt result in more participation.
TMDL	This project does not deal with a TMDL. The City of Ashton is in a nitrate priority area and the goal of this project is to lower nutrient levels in ground water.

Figure 139. It is perhaps too early to tell conclusively, but there appears to be no reduction in crop yield by reducing the fertilizer application rate. This field received a reduced rate of application.

Figure 140. This field received the normal higher rate of fertilizer application.

Figure 141. However, a true test of the effectiveness of the reduced application rate will take more than one growing season. Further evaluations will monitor the crop production rate and the effect on nitrogen levels in ground water.

Thomas Fork – Widmer

Subgrant agreement	S108
Description and location	This project is one of a series of projects developed and implemented by the Bear Lake Regional Commission. Similar to previous BLRC projects along Thomas Fork this project is effectively reducing the amount of total suspended solids (TSS) and nutrients from entering the Thomas Fork River, the Bear River, and Bear Lake. This project will result in numerous improvements. Other benefits include reduce temperature of the water via shading, and overall improvements to aquatic habitat conditions. 42.3934 X 111.0520, HUC 16010102
Anticipated completion	October 30, 2005
Features evaluated	This evaluation included rip-rap, woody plantings grass plantings, sod mats, re-sloped stream banks and rock barbs over a 2,500 foot span of river.
Project status	This project was completed on schedule. There have been no deviations from the original plan.
TMDL	This project is part of a much larger watershed-wide project that is collectively the TMDL Implementation Plan for Thomas Fork.

Figure 142 (above and below). What used to be a near vertical unstable head cut has been sloped to a 3 or 4:1 angle and rip-rapped. It does not look very attractive now but will quickly be covered with natural and planted vegetation.

Figure 143. The photographs above and below depict grass mats that were purchased from a nearby nursery. The mats were rolled out similar to lawn sod and staked in place.

Figure 144. This newly formed bank looks pretty bad now but will soon look much better.

Figure 145. The work in the foreground was completed several years ago. The work in the distance was just completed. Note the rock barb near the middle of the photograph, which will deflect strong water currents away from the stream bank.

Lower North Fork Clearwater Phase I and Phase II

Subgrant agreement	S111, S149
Description and location	Phase II is a seamless continuation of work completed under Phase I. Therefore, this evaluation covers work conducted under both subgrant agreements. This project is quite large. The Clearwater River watershed is approximately the size of the State of Rhode Island. Dwarshak Dam - 46.5175 X 116.2911 Breakfast Creek – 46.56 X 115.69 Cranberry Creek – 46.61 X 116.14 Elk Creek – 46.68 X 116.22 Long Meadow – 46.69 X 116.23 HUC 17060308
Anticipated completion	The Phase I subgrant is expired and work has been completed. The current date of expiration for Phase II is November 1, 2005. The expiration date will be extended.
Features evaluated	BMPs observed include off site watering facilities, six miles of road abandonment, and ten miles of road graveling.
Project status	This project is proceeding at a reasonable pace but will require additional time due to the vast extent of the work. There have been no deviations from the original work plan.
TMDL	This project is the TMDL Implementation Plan for a portion of the Lower North Fork of the Clearwater River.

Figure 146. These photographs show a portion of the Clearwater River watershed, which is roughly the size of Rhode Island. The valley on the right is the Breakfast Creek arm of Dworshak reservoir.

Figure 147. This logging road will be temporarily closed to vehicular travel until timber in the area is ready for harvest in several decades. Culverts are being removed, and drainage will be rip-rapped to allow for high levels of storm water and spring runoff flows.

Figure 148. Things can go wrong on projects as large as this one. Here the subcontractor improperly cut the slopes at a 1:1 angle in highly erosive granitic soils and improperly installed the geofabric. The project manager will directly oversee the correction of this problem. The slopes will be recut to an approximate 4:1 slope and the fabric will be properly anchored. This is just one of the many sub-projects within this overall project area. And it was the only problem area we found during our two day long evaluation.

Weiser Flat/Hog Creek Wetlands Project Subgrant Agreement Number: Weiser Flat/Hog Creek Wetlands Project

Subgrant agreement	S119
Description and location	The Hog Creek watershed is approximately 16,000 acres and includes about 16 percent of the total watershed of HUC #17050201. This project will capture sediment and nutrients from Hog Creek prior to deposition to the Snake River. In addition to the normal intermittent flow of Hog Creek, the northernmost branch of the Galloway Canal dumps excess irrigation water and return flows from irrigation into Hog Creek, just upstream of the newly constructed wetland area. As a result, phosphorus loads, particularly, exceed both state standards and the TMDL target for Hog Creek by as much as 371% (an average of .26 mg/L of P2 in lower Hog Creek vs. a target load of 0.07 mg/L). Sediment levels are also high, although generally not exceeding the target level of 50 mg/L. 44.2896 X 117.0867
Anticipated completion	June 30, 2005
Features evaluated	Two wetland/settling ponds totaling 10 acres were visited during this evaluation.
Project status	The project was completed on schedule. There have been no deviations from the original work plan.
TMDL	This project is part of the Weiser River TMDL Implementation Plan.

Figure 149. This view of the new settling pond and wetland is looking downstream of Hog Creek towards the Weiser River.

Figure 150. The dam will need to be inspected frequently to assure that wave action does not jeprodize the integrity of the facility. This gate will allow the pond to be emptied for maintenance purposes.

Figure 151. Galloway Canal irrigation inflow gate.

Figure 152. This island will function as a nesting area for geese.

East Perrine Coulee Wetland

Subgrant agreement	S125
Description and location	In this project the Snake River Soil and Water Conservation District (SWCD), along with the Twin Falls Canal Company, used section 319 funding to help purchase a conservation easement from the a private land owner to construct a large sediment pond and wetland area. SWCD purchase the property and the Twin Falls Canal Company constructed the facility. The property will be held in a perpetual trust. The property is located upstream from the City of Twin Falls. The sediment pond and wetland are resulting in a significant reduction in sediment and therefore have a significant impact on water quality through the City of Twin Falls and subsequently to the Mid-Snake River. The City of Twin Falls may participate in the maintenance of the facility. 42.6084 X 114.8019, 17040212 Shoshone Falls Watershed
Anticipated completion	August 30, 2005
Features evaluated	This project consists of four settling ponds and one wetland all designed to treat irrigation return flow prior to reentry into the Snake River.
Project status	This project was completed on schedule. The original plan was to build one settling pond and wetland. Matching funds and efforts allowed four setting ponds and one wetland to be constructed.
TMDL	This project is part of the TMDL Implementation Plan for the Mid Snake River.

Figure 153. Main settling pond (above and below).

Figure 154. Control valves will assure flow levels in the ponds and wetlands.

Figure 155. The wetland component of this facility (above and below) will help take up nutrients from irrigation return flow.

Rock Creek Small Acreages Demonstration

Subgrant agreement	S127
Description and location	The Rock Creek drainage in Twin Falls County has many small acreage properties that may be raising a limited number of livestock. These sites are sometimes constructed in environmentally sensitive areas near the canyon rim of Rock Creek or adjacent to wetland areas. The Rock Creek drainage lies in the number two-rated Twin Falls Nitrate priority area and within the drinking water source water delineation for the City of Twin Falls. Rock Creek is a 303 (d) listed stream for nutrient and sediment and is identified in the Mid Snake Resource Plan. 42.5028 X 114.4028, 17040212 Lower Rock Creek
Anticipated completion	December 30, 2005
Features evaluated	Public education, irrigation management, buffer strips, fertilizer management, pasture management and well head protection are all aspects of this project.
Project status	This project is on schedule. There have been no deviations from the original plan.
TMDL	This is part of the Rock Creek TMDL Implementation Plan.

Figure 156. The plateau area around Rock Creek (shown above and below) is the site of rapid growth. Some small (five to ten acre) ranchettes are situated in sensitive areas where bacteria, nitrogen, phosphorous and other contaminants can easily be introduced to rapidly descending ground water and irrigation return flows. Pollutant bearing ground and surface water can then discharge to Rock Creek. Education of landowners is the key to success.

Figure 157. Irrigated pastures and croplands, as shown above and below, are sources for pollution.

Figure 158. Domestic septic systems are another source of pollution. Again, education is the key to success.

Barber Park Green Roof Demonstration

Subgrant agreement	S132
Description and location	The objective of this project is to approach nonpoint source pollution "upstream" at the source, taking a highly cost effective approach, considered a "site level solution." The project proposes to design and construct a "living roof" for a single office/commercial building with a roof area of about 5,800 square feet The living roof will be integrated into the building, either through initial design as new development or through retrofit of a redeveloped site. The living roof project offers a demonstration of high performance building technology for preventing nonpoint source pollution through design integration. A living roof is a best management practice ideal for a park setting with a serious educational program in place. 43.5648 X 116.1346, 17060108
Anticipated completion	December 30, 2006
Features evaluated	We visited Green Roof Construction at the Barber Park raft rental and staff building at Barber Park.
Project status	This project was completed ahead of schedule. There were no deviations from the original plan.
TMDL	This is not part of a TMDL plan. This is a low impact storm water BMP demonstration project.

Figure 159. Shown above is the access/observation stage located atop the Ada County Parks and Recreation building at Barber Park, Boise.

Figure 160. Living rooftops can be built in a variety of ways, but the simplest involves a relatively light system of drainage and filtering components with a thin layer of soil mix (2 to 4 inches), which is installed and planted with drought-tolerant herbaceous vegetation.

Figure 161. The green roof.

Figure 162. Proven hardy green roof plants are the alpine types and those that can retain a certain amount of moisture within their leaves or bulbs. Other plants known to flourish in areas of high heat, drought, wind, direct sun, and temperature extremes should be particularly adaptable to the sometimes-harsh environment. Preliminary testing indicated that the drought resistant Sedum family of plants would be a good candidate for this project.

South Fork Palouse River Upper Watershed-Robertson Park

Subgrant agreement	S143
Description and location	This project is at the site of a former constructed reservoir. Over the years, sediment built up behind the dam until the reservoir became dysfunctional. Some years ago, the dam was breached and the creek began down-cutting through the reservoir sediments. The area that used to be a reservoir was converted into a recreational park. However, erosion continued to result in many tons per year of sediment deposition to the South Fork of the Palouse River. This project will stabilize the affected stream banks while enhancing recreational value and prevent further erosion at Robertson Park. 46.75 X 116.91, 17060108
Anticipated completion	December 30, 2006
Features evaluated	Near vertical stream banks are being laid back and stabilized with geomatting and plantings. Wetlands and catchment basins are being constructed.
Project status	This project is on schedule. There have been no deviations from the original work plan.
TMDL	This project is part of the Upper South Fork of the Palouse River TMDL.

Figure 163. If left alone, the creek will continue to meander across the old reservoir floor until thousands of tons of sediment is re-deposited downstream in low energy areas along the South Fork of the Palouse River.

Figure 164. This stump is several feet below the current surface and represents the pre-reservoir land surface.

Figure 165. The only way to correct this problem is to bring in sound engineering and heavy equipment.

Figure 166. As shown above and below, the subcontractor is implementing carefully engineered plans.

Figure 167. Some of the excess sediment is being utilized to create elevated, stabilized campsites for the many campers who come here from the nearby City of Moscow.

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