Taking Plans to Action

State of Idaho Nonpoint Source Management Program

2001

Report to Congress

Idaho Department of Environmental Quality

Mission: To protect human health and preserve the quality of Idaho's air, land, and water for use and enjoyment today and in the future.

1410 North Hilton
Boise, ID 83706

Contents

Introduction

The State of Idaho has been operating under an *Enhanced Benefit Status* since June 2000. The 2001 annual report will mark the first full year of implementation tracking and reporting under the enhanced status. The **1999 Idaho Nonpoint Source Management Plan** represents multifaceted efforts made by the state to address and enhance water quality. The Plan incorporates many new processes and partnerships driven by water quality law, which were developed to:

- Enhance the targeting of §303(d) listed waters and Category I watersheds identified through the States' Unified Watershed Assessment;
- Improve and enhance partnerships among local, state, and federal agencies; and
- Increase coordination and integration of integrative funding opportunities among primary land management agency partners and cooperating ancillary agencies.

Idaho's upgraded nonpoint source management program provides new opportunities for collaboration and integration of agency roles and programs upon which the framework can be built for implementation of nonpoint source management activities. The collaborative framework in turn, is necessary to meet requirements in not only approved TMDLs, watershed management plans, and TMDL implementation plans, but also preventing impacts through multi-objective management approaches.

The planning process of the Clean Water Act has brought a higher level of awareness for agencies to work together and focus resources than in the past. The process has also greatly increased demand for information, education, and technical assistance to many groups and agencies. The Idaho Department of Environmental Quality continues to work toward engaging increasing numbers of state and federal entities to forge new and engage existing partnerships for implementation activities.

The three main projects highlighted in this report reflect the increased focus and integration of efforts by multiple entities:

- Paradise Creek Watershed Restoration Projects,
- Cascade Reservoir Watershed Implementation Projects, and
- Regional and Local Capacity Building for Drinking Water Protection.

Summaries of completed projects are also contained in this report to provide a cross-section of statewide activities representative of nonpoint source management sectors: agricultural, urban, transportation, silvicultural, mining, hydrologic-habitat modification, and ground water.

Paradise Creek Watershed Restoration Projects

Paradise Creek flows from Moscow Mountain in northern Idaho, though the city of Moscow, and into the South Fork of the Palouse River in Pullman, Washington. Impaired macroinvertebrate populations, significant decreases in biological integrity, and numerous recorded exceedances of water quality criteria have plagued Paradise Creek. Habitat destruction, excessive sediment and nutrients, high temperatures, altered flow, and high levels of pathogens and ammonia have caused these exceedances.

In 1997, a phased total maximum daily load (TMDL) was written for Paradise Creek. The TMDL set load capacities for sediment, total phosphorus, temperxature, pathogens, and ammonia. An implementation plan, written in 1999, outlines the activities and management practices needed to meet the load capacities set in the TMDL. While these activities and practices have been and are being implemented, it will take several years before many of them, such as planting native trees and shrubs, become fully effective; therefore, immediate quantitative results should not be expected.

The goals of the Paradise Creek Restoration Project are to:

- Reduce nonpoint and point source TMDL-listed pollutants in Paradise Creek
- Improve in-stream habitat and riparian vegetation
- Improve the water quality of the stream
- Increase the water resources ethic and stewardship within the community

While work continues on this project, these goals are beginning to be fulfilled.

- Nonpoint and point source TMDL-listed pollutants in Paradise Creek have been and will continue to be reduced with constructed wetlands, facility upgrades at the Moscow wastewater treatment plant, and newly-planted riparian vegetation. These improvements will reduce pollution by filtering runoff; increasing shade (which will reduce stream temperatures); decreasing erosion; and lowering nutrient, ammonia, and pathogen concentrations.
- Stream habitat and riparian vegetation are being improved by removing deleterious materials from the creek, planting and seeding riparian vegetation, re-meandering stream segments, and stabilizing and resloping stream banks.
- Water quality is being improved by decreasing pollutants such as temperature, nutrients, and sediment.
- The community's water resource ethic and stewardship are being increased through the use of local volunteers, particularly children, who learn about the importance of water resources as they work on Paradise Creek.

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Paradise Creek Restoration continued

Scope

The Paradise Creek Restoration Project is actually a combined series of many little projects along various stream segments and tributaries and in the Paradise Creek watershed. These projects include both urban and agriculture/forestry projects.

Urban Restoration Projects

1991-1998

- Adopt-a-Stream trash removal weekends have occurred annually since 1991. Between 1991 and 1996 alone, 23 tons of trash were removed from the creek.
- "Dump No Waste! Drains To Stream!" was stenciled near 1,200 storm drains in Moscow.
- A Point Source Pollution Impacts report was written for the city of Moscow.
- Carol Ryrie Brink Nature Park was created along a 1,200-foot section of re-meandered stream channel that had been surrounded by a wheat field. The floodplain and stream banks were restored, native plants were planted, and three, 175-foot revetments were built to stabilize the stream bank.
- Wastewater treatment wetlands were developed to provide tertiary treatment to wastewater treatment plant effluent and other polluted nonpoint source runoff that drains directly into Paradise Creek.
- A section of Paradise Creek owned by the University of Idaho was restored, the creek bed was re-meandered, the banks were stabilized, and a low-flow channel and floodplain were constructed. Pocket wetlands also were created to treat storm water runoff from a large parking lot. Hydraulic modeling shows that the constructed two-stage flood channel will cause a drop in the localized 100-year flood elevation of up to 1.5 feet.

1999-2001

- Four backyard restoration projects on private properties alleviated severe, vertical stream bank erosion and undercutting.
- A channelized segment of Paradise Creek surrounded by farmland was restored to become an ecologically viable stream reach that supports aquatic life and provides riparian habitat for wildlife. The stream channel was re-meandered, a 150 wide buffer strip was planted, and two wetlands were established
- Approximately 2,000 feet of stream bank paralleling the Chipman Trail (a railway turned walking path that connects Moscow and Pullman) was restored. Over 2,000 native trees and shrubs were planted along the stream bank and in a 40-foot wide buffer strip along the bank. These will shade the stream and moderate stream temperatures, as well as filter runoff, provide wildlife habitat, and retain floodwaters.
- Eleven hundred trees and shrubs were planted along Paradise Creek where it flows through Mountain View Park. Because of the manicured park setting, there had been a lack of native vegetation along the bank. The trees and shrubs will shade the creek and help cool water temperatures.
- A 150-foot section of a stream bank in Berman Creekside Park was stabilized and revegetated, which has reduced the amount of sediment entering the stream and provided habitat for fish and wildlife.
- A wetland was created in the low-lying area of the backyard of private property that frequently flooded during heavy storms and high flows. The wetland filters nutrients and sediment from nearby farm fields and from adjacent livestock areas. The

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Paradise Creek Restoration continued

wetland area was planted with woody and wetland vegetation; the banks were seeded with native grasses. Additional plants will be planted in 2002.

- A sediment catchment system was created to trap sediment-filled water in a tributary to Paradise Creek characterized by high levels of sediment, erosion, and high stream temperatures due to a lack of woody vegetation and steep banks caused by dredging. The sediment from this tributary perennially adds to the sediment load in Paradise Creek. The catchment banks were resloped to a gradual slope and seeded with a riparian grass mixture. Native woody vegetation will be planted in 2002.
- A 1,020-foot section of a segment of Paradise Creek was stabilized and revegetated to provide habitat for fish and wildlife, shade to reduce stream temperatures, and a vegetative buffer from agriculture runoff; and to reduce the amounts of sediment entering the stream. The stream banks were resloped to more gradual slopes, which have reduced erosion and reconnected the stream to its floodplain. The resloped banks were seeded with a riparian grass mixture and native woody vegetation was planted.
- A stream bank with water flow barriers such as concrete walls, chunks of concrete dumped in the creek, and a steep gravel embankment was cleaned up, resloped, and stabilized. A two-tier floodplain was built, and the entire area was seeded with native riparian grass and planted with red osier dogwood.
- A stream segment that flows though a city park, under a street, then behind several homes had been impacted by yearly dredging, a lack of woody vegetation, and eroding stream banks. The segment was reconfigured from a straight, ditch-like creek to a low-flow channel with a terraced floodplain and was planted with woody shrubs and trees. This should decrease water temperatures and has decreased the local 10-year flood elevation by a maximum of 0.2 feet and the 100-year flood elevation by 0.1 feet upstream of the project.
- The City of Moscow has invested 12 million dollars to date to meet the in-stream requirement of the TMDL. This investment may reach 15 million depending on future demands. Facility upgrades at the wastewater treatment plant have been on-line since January 2002 and have demonstrated a marked improvement in the quality of the effluent discharge into Paradise Creek.

Agriculture and Forestry Restoration Projects

- Beginning in 2000, direct seeding has been used on approximately 1,370 acres within the Paradise Creek watershed. This practice, where farmers leave the residue from the previous year's harvest and plant over that residue, helps prevent erosion from the steep Palouse hills.
- A 13-acre filter strip was planted to grass and 18 erosion control structures were installed in 2001 by one landowner. Filter strips have been shown to be effective in reducing suspended sediments from overland flows.

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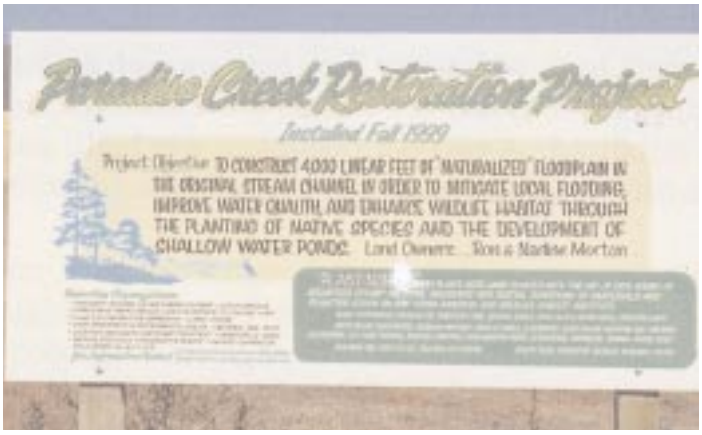
Paradise Creek Restoration continued

Analysis has shown that a 30-foot wide grass filter strip can trap from 70–98% of the sediment in water filtering through the strip.

- In an effort to control roadside erosion, the North Latah County Highway District reshaped and replanted native species along the banks of West Twin road.
- The Idaho Department of Lands and Bennett Lumber Company graded forest roads in the forested upper portion of the Paradise creek watershed in 2000 and rocked them in 2001 to reduce sedimentation. Grass seeding is scheduled for forest roads within the Paradise Creek watershed to reduce erosion of unprotected road banks.
- A demonstration site was built on private property to demonstrate the effectiveness of building ponds and adding riparian vegetation in improving water quality. The riparian vegetation has improved water quality in Paradise Creek by filtering sediments, nutrients, and organic matter from runoff before it reaches the creek.



Team Members

The Paradise Creek Watershed Advisory Group (WAG) has provided direction to the Idaho Department of Environmental Quality concerning the TMDL report and the best management practices needed to reach the TMDL's goals. The WAG was also the primary author of the Paradise Creek Implementation Plan, which outlines the steps to meet the TMDL goals. Paradise Creek WAG membership includes individuals representing major sectors of the local community.

The majority of the urban projects have been coordinated by the Palouse-Clearwater Environmental Institute. This organization has coordinated volunteers, including University of Idaho and Washington State University students, school children, homeowners, Girl Scouts, AmeriCorps* NCCC (National Civilian Community Corps), and citizens at large. The Latah County Soil and Water Conservation District has supervised the majority of the non-urban projects including coordinating with the agriculture and forestry communities. Many public agencies, private businesses, and individuals have contributed their time, expertise, and resources to these projects, including the North Latah County Highway District, Latah County Government, city of Moscow, Moscow School District, Bon Terra, TerraGraphics, Natural Resources Conservation Service, Idaho Soil Conservation Commission, Farm Service Agency, Bennett Lumber Company, University of Idaho's Idaho Water Resources Research Institute, University of Idaho's Forest Nursery, Idaho Department of Water Resources, Lewiston Regional Office of the Idaho Department of Environmental Quality, Idaho Department of Lands, U.S. Environmental Protection Agency, National Tree Trust, U.S. Department of Agriculture Plant Materials Center, the community at large, and the citizens of Idaho.

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Paradise Creek Restoration continued

Key Successes

While it is too early in the project to see quantitative changes in stream chemistry, temperature, or sediment load, many portions of the project have been successfully completed. Along many segments of Paradise Creek, natural riparian vegetation and wetlands have been reestablished, stream banks have been stabilized, and meanders and floodplains have been reconstructed. These actions are helping to recreate the natural state of Paradise Creek and will help to reach TMDL goals by reducing water temperature and sediment load, filtering pollutants from runoff before they reach the creek, restoring wildlife habitat, and decreasing flood elevations. In addition, modeling shows localized flood elevations will drop 0.2 feet (10 year flood elevation) in a city park, 0.1 feet (100 year flood elevation) upstream of that park, and 1.5 feet (100 year flood elevation) on University of Idaho property.

Some specific accomplishments include:

- 13,680 feet of stream bank restored
- Over 34,807 trees and shrubs planted along stream banks
- Thousands of acres seeded with native grasses
- 1,370 acres of agricultural crops direct seeded
- Moscow wastewater treatment plant upgraded to improve effluent discharge

Ground Water Sector—Case Study Project QC-600

Ground Water Quality Investigation and Wellhead Protection Study, City of Ashton, Idaho

Context

The City of Ashton is located in southeast Idaho in the southern portion of Fremont County. In 1998, Ashton was one of five communities to receive technical assistance from the Idaho Department of Environmental Quality and financial assistance from a U.S. Environmental Protection Agency §319 grant to investigate possible causes and solutions for elevated nitrate in the ground water resource of the Ashton area.

Problems Identified

Nitrate-nitrogen (NO3-N) concentrations in ground water near Ashton have steadily increased since the 1960s. Twenty per cent of the wells sampled in 1998 have exceed the maximum contaminate level (MCL) of 10 milligrams per liter (mg/L) while eighty per cent have elevated levels greater than 5 mg/L. Additional sampling for nitrogen isotopes as well as chloride and sulfate concentrations have provided for the determination that the likely source of elevated NO3-N is the excess application of commercial fertilizer on agricultural lands.

Solutions Implemented

The local community, state and federal agencies as well as agricultural producers have initiated programs to install best management practices (BMPs). These programs include source water protection for public water supply wells and nutrient and irrigation water management plan. The program items include but are not limited to:

- Yellowstone Soil Conservation District (SCD) has been developing conservation plans with the local agricultural community to implement BMPs, which will help reduce the application rate of commercial fertilizer as well as modify the application methods.

  The Yellowstone SCD will be developing BMPs for irrigation water management which when used as designed will reduce the amount of water applied to agricultural land.

- The City of Ashton will be implementing BMPs for the operation of drinking water system source wells located within the city. The BMPs used will be decided upon by results of continued ground water sampling.

See the Report, "Ground Water Quality Investigation and Wellhead Protection Study, City of Ashton," Idaho for further information, available at the DEQ web site: state.id.us/deq/publist1.htm.

Cascade Reservior Watershed Implementation Projects

Located in central Idaho, about 75 miles north of Boise, Cascade Reservoir supplies agricultural irrigation water and is a popular recreational area. However, the lake has been plagued with excessive algae blooms, which cause poor fish habitat, poor water quality for swimming and boating, and impair agriculture water supplies. Excess nutrients, primarily phosphorus, are the cause of the algae blooms. Since 1995, efforts to reduce phosphorus loading to the reservoir have reduced total phosphorus introduced by over 11, 000 kilograms (kg) per year.

In 1995, a phased total maximum daily load (TMDL) process was begun for the Cascade Reservoir watershed to address water quality concerns related to the algae blooms. The Cascade Reservoir Phase II Watershed Management Plan outlined a need for a 37% watershed-wide reduction in total phosphorus to bring the reservoir into compliance with water quality standards. Seven percent of the reduction will come from point sources and 30% from nonpoint sources. The watershed management plan outlines how this will happen.

Scope

With local input, the Idaho Department of Environmental Quality (DEQ) wrote a TMDL implementation plan to outline the necessary steps to achieve the 37% decrease in total phosphorus. The plan was completed in June 2000.

Point Source Reductions

J-Ditch Project

The wastewater treatment plant from the city of McCall once discharged about 3,947 kg of phosphorus each year to the North Fork Payette River, which empties into Cascade Reservoir. The city of McCall worked with ranchers and farmers to eliminate this discharge. The project, named the J-Ditch after the irrigation canal it replaced, mixes treated effluent from the wastewater treatment plant with irrigation water and applies it to pasture and crop land during the summer irrigation season. During winter, when farmers are not irrigating, the treated effluent is collected in a lined storage pond and saved for the following summer.

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Cascade Reservior Watershed continued

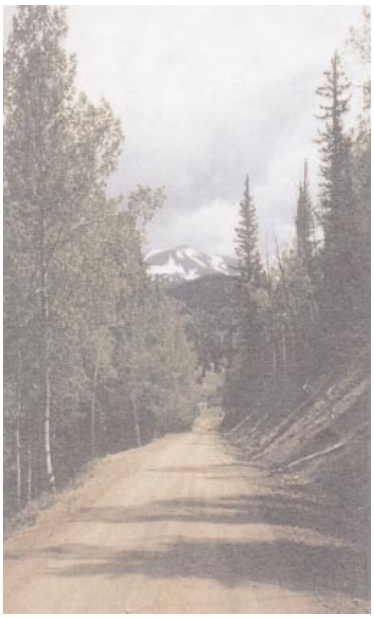
Fish Hatchery Improvements

An Idaho Department of Fish and Game fish hatchery is located along the banks of the North Fork Payette River and discharges its wastewater to the river. In 1994, Idaho Fish and Game changed food types and feeding practices, which reduced phosphorus loadings discharged to the river by 70%.

Nonpoint Source Reductions

Nonpoint sources of phosphorus to Cascade Reservoir are divided into three major categories based on land use: forestry, agriculture, and urban/suburban. Nonpoint sources are required to reduce their phosphorus loading by 30%.

Forestry



The major source of phosphorus from forestry practices is sediment runoff; and over 60% of this sediment comes from roads. Research shows hat graveling roads reduces sediment runoff by 92%. To date, 59 miles of high priority roads have been graveled and 7.7 miles of roads have had their drainage systems upgraded to reduce runoff. An effort is also underway to improve grazing practices on forest lands, install shoreline fences above the high water mark to keep cattle out of riparian areas, and provide vegetative buffers to erosion. In many areas, streambanks have been stabilized to further reduce erosion. Timber harvesting practices that result in reduced erosion and soil disturbance have also been implemented.

Agriculture

Agricultural implementation projects have been divided into three categories based on land types: Tier 1 lands (lands within 150 feet of a stream), Tier 2 lands (lowlands, mostly irrigated crops and pasture), and Tier 3 lands (uplands, mostly non-irrigated pasture). The top priority for the agricultural implementation plan is to treat 100% of the Tier 1 lands.

Tier 1 lands are being treated by fencing around streams and other sensitive areas to keep livestock out, stabilizing streambanks, watering animals away from streams, hardening stream crossings, and grazing animals on a rotating system. Tier 2 lands are being treated with many of these same prescriptions. In addition, many Tier 2 lands that were flood irrigated in the past will be sprinkler irrigated to reduce erosion; improved irrigation water management will be implemented on all irrigated land.

Urban/Suburban

Runoff from urban and suburban areas can greatly increase the phosphorus load in a water body. The implementation plan lists reductions in phosphorus from four major sources (roads, storm water, septic systems, and construction areas) as its priorities.

Road erosion is the primary source of sediment source in urban/suburban areas. Many roads in the Cascade Reservoir watershed are steeply sloped, some are improperly designed or inadequately maintained, and many include cuts and culverts in poor repair. Drainage and surface improvements to county roads completed to date are estimated to have reduced phosphorus loads by 200 kg per year.

Direct storm water treatment systems have been placed in the McCall storm water system, and similar treatments are being installed in the city of Donnelly. Wetlands to remove sediment-based and dissolved phosphorus from water have also been created in McCall, with more in the planning stages. Improvements in storm water drainage have been completed by the city of Donnelly. Combined, these measures should reduce phosphorus loads by about 600 kg per year.

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Cascade Reservior Watershed continued

Failing septic systems around Cascade Reservoir used to contribute about 2,205 kg per year of phosphorus to the reservoir. To combat this, a sewer district was formed to serve the northern portion of the reservoir and provides sewer service to approximately 650 residences. The sewer district connections are estimated to have reduced the total phosphorus loading to the reservoir by about 838 kg per year. A second sewer district has been formed for the southwest shore of the reservoir and is seeking funding.

Much of the construction near Cascade Reservoir occurs in close proximity to surface water or on steeply sloped, forested areas. Construction in these areas has the potential to increase sediment-based phosphorus loading to the reservoir. A handbook of approved construction management practices has been adopted by ordinance in the city of McCall and by resolution in Valley County.

Other

The U.S. Bureau of Reclamation has installed erosion control structures to control bank erosion along the shores of Cascade Reservoir. In addition, they have also created eight wetlands in the near shore area of the reservoir. These wetlands naturally treat dissolved phosphorus in the water. The Idaho Department of Parks and Recreation manages facilities along the shores of Cascade Reservoir. This agency has improved its roads to reduce the direct sediment transport to the reservoir and improved stormwater runoff treatment at some facilities.

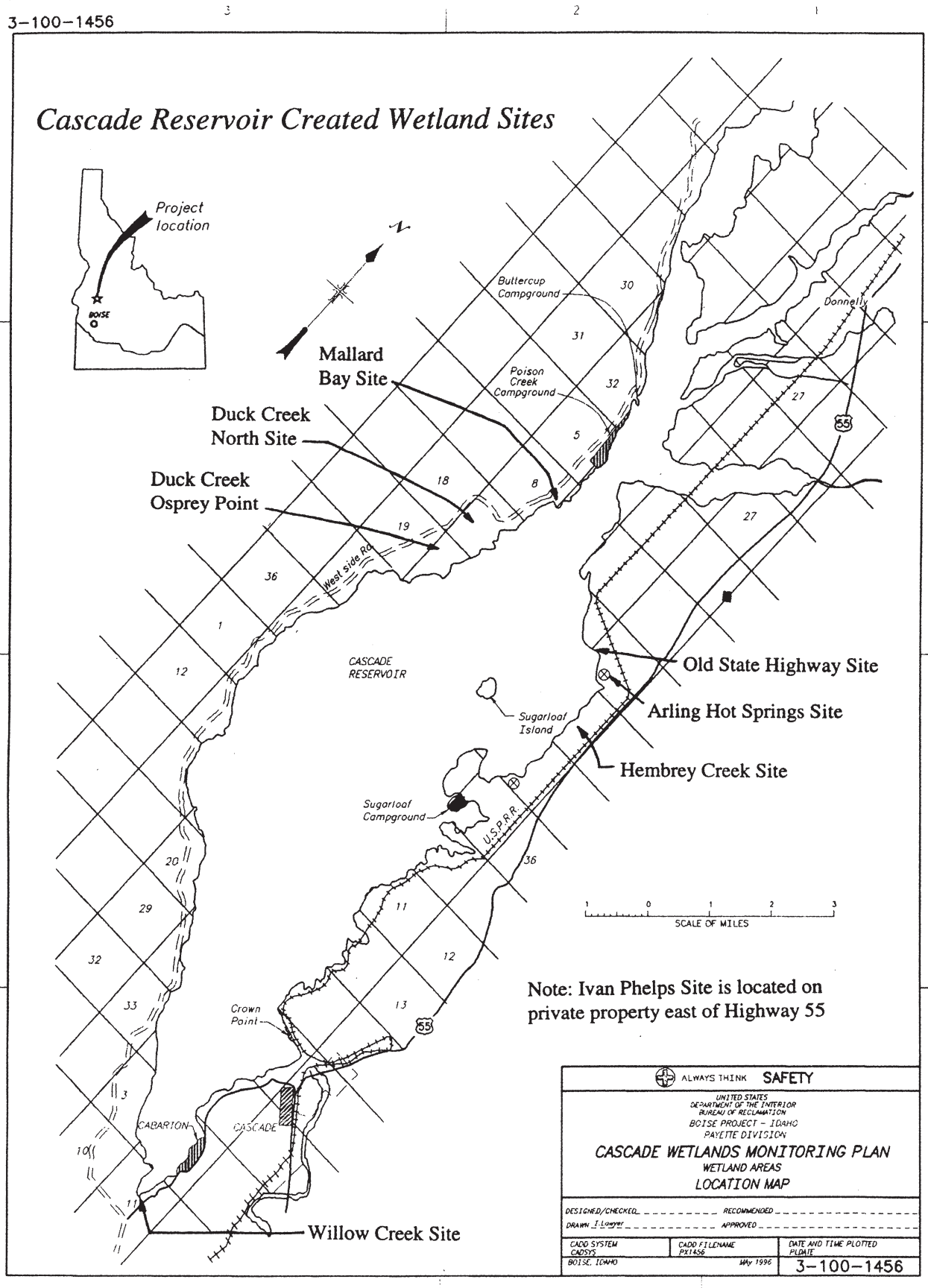
Team Members

The high level of success of this project is due to the strong commitment of all those involved. The Cascade Reservoir Coordinating Council (also called the Watershed Advisory Group, or WAG) provides direction to DEQ in developing and implementing the watershed management plan. Watershed Advisory Group membership includes individuals representing all major sectors of the local community. The WAG was instrumental in completing the Phase I and Phase II watershed management plans and was the driving force behind completion of the Implementation Plan for the Cascade Reservoir Phase II Watershed Management Plan.

The Cascade Reservoir Technical Advisory Committee (TAC) is an advisory group to the WAG and DEQ. Members of the TAC include scientific and engineering representatives from local, state, and federal agencies and industry. Members of the TAC helped write the TMDLs and wrote the nonpoint source implementation plans.

Key Successes

- The McCall water treatment plant no longer discharges to the North Fork Payette River.
- Improvements at the Idaho Department of Fish and Game fish hatchery led to a 70% reduction the in hatchery-related phosphorus load.
- Treating logging roads has reduced phosphorus by an estimated 1,500 kg per year.
- Stream bank conditions on grazed lands have dramatically improved.
- Improvements in grazing management have reduced phosphorus loads by an estimated 990 kg per year.
- Agricultural improvements have reduced total phosphorus by an estimated 800 kg per year.
- Approved construction management practices were adopted by Valley County and the city of McCall.
- Improved dissolved oxygen conditions in the reservoir were observed in 1999 and 2000.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Cascade Reservoir Created Wetland Sites
Project location
BOISE
Mallard Bay Site
Duck Creek North Site
Duck Creek Osprey Point
Buttercup Campground
Poison Creek Campground
Donnelly
West Side Rd
CASCADE RESERVOIR
Old State Highway Site
Arling Hot Springs Site
Hembrey Creek Site
Sugarloaf Island
Sugarloaf Campground
U.S.P.R.R.
Crown Point
CABARTON
CASCADE
Willow Creek Site
SCALE OF MILES
Note: Ivan Phelps Site is located on private property east of Highway 55
ALWAYS THINK SAFETY
UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION
BOISE PROJECT - IDAHO
PAYETTE DIVISION
CASCADE WETLANDS MONITORING PLAN
WETLAND AREAS
LOCATION MAP
DESIGNED/CHECKED
DRAWN J. Lowyer
RECOMMENDED
APPROVED
CADD SYSTEM CADSYS
CADD FILENAME PX1456
DATE AND TIME PLOTTED PLDATE
BOISE, IDAHO
May 1996
3-100-1456

Hydrologic-Habitat Modification Sector—Case Study Projects QC-278, QC-437 and QC-364

Implementation Actions in the Thomas Fork River Watershed, Bear County, Idaho

Collectively, these three reports cover field work initiated by the Bear Lake Regional Commission from 1995 through 2000. Each of the reports examines contaminant removal projects along the Thomas Fork River: a tributary to the Bear River, which drains into Bear Lake. Bear Lake has been geologically isolated for over 8,000 years and hosts five types of fish found nowhere else in the world.

Nutrient Reduction and Containment Plan Final Report (QC278, Archive file 16 F 1403, box 2) address dissolved nutrient loading problems along a portion of the Thomas Fork River. The specific targeted site of nutrient discharge is a dairy operation involving 80 cows belonging to the Garth Boehme family. A waste containment and processing system was constructed within the NE quarter of Section 22, T12N; R46 in Bear Lake County, Idaho.

The report includes explanation of:

- A 30,000 cubic feet concrete manure bunker
- A 2,600 cubic feet liquid solid waste separator
- A 1.80 acre-foot constructed wetland to retain waste
- An operations and management plan to maintain structural controls
- Surface and ground water quality data on the Thomas Fork River and the project site

Two reports, both named "***Thomas Fork Watershed Stream Bank Restoration Project***," discuss efforts along two neighboring stretches of the Thomas Fork River that have been heavily impacted by cattle grazing. The two projects (QC437, Archive file 16 F 16 1403, box 2 and QC364, Archive file 16 F 1405, box 4) have similar goals and objectives.

The goal of both projects is to "Improve the quality of water of the Thomas Fork stream and stabilize the banks within the targeted reach, so that the stream can sustain its beneficial uses as well as improve water quality conditions within the Bear Lake River and Bear Lake."

Both projects have similar objectives:

- To apply riparian and in-stream restoration treat ments along the eroding banks of the targeted segment of the Thomas Fork Stream, and
- To develop and implement a project administration and evaluation program that determines the effectiveness of the project.

The completion of project QC437 (report published in March 2000) has resulted in:

- Bank stabilization measures being imple-mented on approximately 1,750 feet of stream bank within a stream segment having over 5,000 feet of steam bank
- A monitoring program that uses three methods: up- and down-stream water chemistry, photo monitoring, and stream cross sections at five locations
- An information and education exhibit about the project at the Bear County fair
- Information about this project displayed on the internet
- A landowner maintenance agreement on completed project work

The completion of project QC364 (report published in May 2000) has resulted in:

- Best management practices being implemented on approximately 1,525 feet of stream bank
- Strong interest in implementing among other land owners along the Thomas Fork

Hydrologic-Habitat Modification Sector—Case Study Projects QC-278, QC-437 and QC-364 continued

Implementation Actions in the Thomas Fork River Watershed, Bear County, Idaho

- A monitoring program that includes photos, water chemistry, sampling, and stream transects
- Information about this project posted on the internet
- A landowner maintenance agreement for completed project work

In addition both projects contain numerous photographs of riverbank stretches before and after restoration work was completed.

Silvicultural Sector—Case Study Project QC-363

Field Evaluation of Silvicultural Practices and Spatial Sampling Strategies Used to Protect Stream Water Quality in the Mica Creek Watershed

Context

The Mica Creek project area is located 7.5 miles northeast of Fernwood, Idaho. The project area covers 9.4 square miles and is divided into seven monitored watersheds. The purpose of this project is to develop cost effective watershed resource management guidelines related to erosion control for logging roads. Potlatch Corporation gathered erosion data over a period of nine years. A graduate thesis evaluates that data and makes specific conclusions about which BMPs are most effective in erosion control. BMPs evaluated included water diversion structures, sediment traps, slash windrows, and leaving a wide buffer zone between the road and the stream.

Conclusions

Results indicate that water quality can be preserved during construction of logging roads if prudent management practices are implemented. Key factors in protecting water quality include placing the road at a considerable distance from the stream (>150 feet) and proper emplacement of water diversion structures and sediment traps. However, unprotected fill slopes near drainages will cause increased sediment suspension in the stream within 0.5 mile of the sediment source. Also, BMPs must be maintained. Culverts that are allowed to plug up with sediment will eventually be undermined causing loss of the roadway and substantial additional sediment load and water quality degradation.

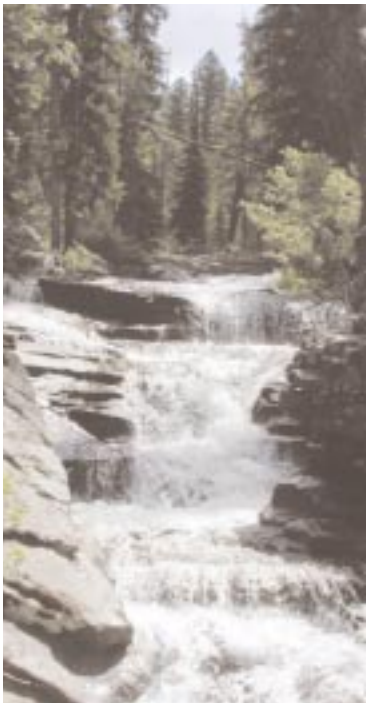
Recommendations

- Filter windrows should be placed along fill slopes of out-sloped forest roads to reduce soil loss.
- Erosion control blankets or mulch should be installed along fillslopes near stream crossings.
- Culverts and ditches should be cleaned out and maintained regularly.
- Stream water quality data should be collected and evaluated regularly to assure BMPs are functioning properly.

For further information the reader is referred to Archive file 16 F 1402, box 2.

Regional and Local Capacity Building for Drinking Water Protection

Association of Idaho Cities and Idaho Association of Counties



The Safe Drinking Water Act Amendments require the State to assess the source water from which Idaho's 2,900 public water systems draw to provide drinking water by May 2003. The source water assessments provide information on potential contaminant threats to these drinking water systems.

Ground water is the source of drinking water for an estimated 96% of Idaho's citizens. Idaho ranks among the top two states in the nation that depends on ground water for drinking water purposes. The rest of Idaho citizens that rely on public water systems (PWSs) to supply their drinking water needs are using surface water or a combination of ground and surface water.

Local communities, working in cooperation with state agencies, can use source water assessment information to create a broader source water protection program to address current problems and prevent future threats to the quality of their drinking water.

The Association of Idaho Cities and the Idaho Association of Counties hosted seven open house meetings throughout the state of Idaho to introduce local governments to drinking water protection. A series of displays and a manual were developed to help local decision makers and staff understand the key requirements and goals of source water protection; to learn how to build a plan within the community that will satisfy minimum requirements; to explore the types of activities and institutional framework that will work best for a community; or develop knowledge of other related regulatory programs and how to integrate them with planning efforts; and to understand regional cooperation and identifying ways to make cooperative efforts successful.

The target audience included city elected officials, county commissioners, planning and zoning directors, public works

Regional and Local Capacity Building continued

directors, and key community leaders. Representatives from state and federal agencies, universities and organizations such as the Idaho Rural Water Association, who are able to provide assistance in drinking water protection, also participated in these meetings as exhibitors.

The open house format provided a user-friendly format for disseminating information, encouraging a dialogue between participants and exhibitors and also resulted in better coordination between the state agencies and associations who participated as exhibitors. Several of the displays developed for the project capacity-building workshops are enclosed here as a reference. For more information, contact Ms. Debbie Bloom, Association of Idaho Cities, at (208) 344-8594.

Agricultural Sector—Case Study Project QC-435

Sediment and Total Phosphorus Export Coefficients for Grazing Related Activities in Southern Idaho

Problem Identified

As water resources have become increasingly scarce within the Upper Snake River Basin, the water quality of these resources has attracted additional attention. For over 30 years, reductions in point source pollution have been the focus of the resource agencies responsible for the protection of water quality. However, during the last decade, reduction of non-point source pollution has been the targeted goal. The fundamental mechanism for reducing these loads is through the quantitative process of establishing total maximum daily loads (TMDLs) for those parameters where a stream is not meeting its designated beneficial uses. Because of common climatic conditions (winter snow followed by spring runoff) and vegetation types (sparse rangeland and forest cover), large areas of the west are susceptible to erosion and therefore non-point source loadings. The Upper Snake River Basin is a good example of this problem. Associated with this erosion potential are land use activities, which accelerate the erosion process. The removal of vegetative cover from uplands and the reduction of riparian cover within bottomlands have resulted in significant sediment yields from denuded or modified watersheds.

Purpose

The purpose of the project was to develop quantitative sediment and phosphorous export coefficients for a variety of watersheds within southern Idaho, and to determine the mechanisms or watershed variables, which regulate the yield of these nutrients and sediments with the understanding that corrective actions can be implemented. Because land use activities, such as grazing have been implicated in the alteration of the structure and function of the riparian/valley bottom complexes as they relate to water quality, the effects of grazing were considered as a key attribute on this study.

Three major tasks were undertaken in order to quantify the export coefficients. They are:

1 Select watershed segments with similar climate, elevation and slopes and quantify watershed characteristics utilizing an established classification system.

2 Establish and implement a water quality monitoring network for determining phosphorous and suspended solids loading form watersheds noted in Task 1above.

3 Utilizing the watershed characteristics in Task 1 and water quality data in Task 2, determine the statistical relationships, which predict the export coefficients from watershed characteristics.

Results

Export coefficients developed for the 12 target watersheds in this project may be applied to other watersheds with similar geology, vegetation and hydrologic characteristics to accurately estimate phosphorous and sediment loads caused by grazing. This information may then be used to derive TMDLs.

To obtain this report please refer to Archive file 16 F 1405, box 4.

Agricultural Sector—Case Study Project QC-351

Evaluation of Agricultural Best Management Practices to Reduce Nonpoint Source Ground Water Nitrate in Southern Minidoka County, Idaho

Context

The two demonstration fields used in this project are located within the Eastern Snake River Plain (ESRP) in Minidoka County, Idaho. The ESRP is a volcanic trough consisting of Quaternary age basalt flows and sediments that are underlain by rhyolitic volcanic rocks. The Moncur field is four miles northwest of Burley and the Forgeon field is located four miles north east of Burley.

Problem Identified

Nitrate contamination from traditional farming practices has been responsible for 90 % of the nitrate found in ground water in southern Minidoka County. Since shallow aquifer water in southern Idaho is the source of the majority of the domestic drinking water, nitrate contamination is of great concern. High concentrations of nitrate in drinking water have been determined by the U.S. Environmental Protection Agency (EPA) to be associated with methemoglobinemia (blue baby syndrome) and non-Hodgekin's lymphoma.

Evaluations

A demonstration field was selected at each of two farms in southern Minidoka County for a pilot ground water project to monitor potential nonpoint source ground water nitrate contamination levels and to evaluate the effectiveness of two Best Management Practices (BMPs) designed to reduce nitrate levels. The BMPs evaluated were nutrient management through crop rotation and nutrient management through reduced irrigation water application. An EPA-suggested paired watershed approach was used to control monitoring of the two BMP experiments. For the paired watershed approach, each field was split into a control half and a treatment half and two periods of study were evaluated: a calibration period and a treatment period. Physical and chemical data collected for the sites, geostatistical analysis techniques, prior on-site investigations, well drillers' reports, and other geologic and hydrogeologic studies provided the basis for the evaluations.

Results of Evaluations

Results of these evaluations led to the determination that both of the BMPs had a positive influence on the ground water in the shallow, unconfined aquifer at both demonstration sites. However, hydrogeologic conditions also appear to play a role in nitrate concentrations, as the highest net changes in nitrate levels occurred in the fields where the soils are relatively sandy.

The final report may be found in Archive file 16 F 1403, box 2.

Urban Runoff Sector—Case Study Project QC-297

City of Pocatello Urban Runoff Treatment

Problem Identified

It has been suggested that nonpoint source storm water runoff has a larger impact on water quality in the Portneuf River than all other point sources in the Pocatello area combined. In particular, heavy metals have been identified as a major category of pollutants derived from storm water runoff. The project was undertaken to determine what particular pollution impacts storm water drainage has on the river and to demonstrate the use of biodetention for treating urban runoff.

Proposed Solution

In an effort to treat storm water prior to discharge to the Portneuf River, the city of Portland constructed a wetland system that receives urban runoff from the storm drain system in the vicinity of Idaho State University. Although the use of wetlands for filtering pollutants from storm water is not new, the use of this method in southeast Idaho's semi-arid climate had not been evaluated through a demonstration. The research involves the collection of background physical and chemical hydrologic data at the Pocatello wetland site.

Outcome

In order to evaluate the effectiveness of the wetland system in mitigating contamination and to assess the quantity of infiltrated water likely to become ground water recharge, this project addresses the following questions:

1 What quantity of storm water runoff can be treated by the constructed wetland system?

2 What is the relative importance of factors contributing to the hydrologic budget of the wetland site (evaporation, infiltration, etc.)?

3 What quantity of storm water infiltrating from the site may eventually reach the lower Portneuf aquifer and become ground water recharge?

4 Do any high permeability pathways exist that may serve as conduits for contaminated storm water migration to the lower Portneuf River?

5 What background contaminant concentrations exist in surface water, soil water, soils, and vegetation at the site? Do the contaminant concentrations represent a significant threat to the quality of the Portneuf River or the aquifer

6 What mechanisms control surface and soil water metals concentrations? Are there any implications for wetland management indicated by the physical or chemical hydrologic data?

The project only addresses the collection and analysis of background geochemical data since the wetland vegetation was planted less than a year prior to this study. A period of two or three years is likely necessary before the wetland vegetation is fully established. While the infiltration characteristics of soils are expected to change as the wetland matures, an effort has been made to estimate future infiltration rates.

Follow Up

In March 2002, Pocatello's environmental engineer Ms. Jenni Light was contacted to see if any subsequent sampling had been conducted after vegetation had a chance to mature. Ms. Light indicated that ongoing data collection has been recorded and is available through her office. In addition, the success of this initial project resulted in the completion of other similar wetland projects in the Pocatello area. For more information regarding Pocatello's wetland projects contact Ms. Light at (208) 234-6587.

The final report may be found in Archive file 16 F 1405, box 4.

Ground Water Sector—Case Study Project QC-438

City of Preston, Storm Water Runoff Study

Context

The City of Preston is the county seat for Franklin County, Idaho. Preston is located in the northeastern portion of Cache Valley, about 25 miles north of Logan, Utah. In 1998, through 319 funding, the Idaho Department of Environmental Quality commissioned Rocky Mountain Engineering from Pocatello, Idaho, to evaluate Preston's storm water system and make recommendations for improvements. Rocky Mountain Engineering submitted a report that identifies problems and recommends solutions.

Problems Identified

Portions of Preston's storm water system date back to the late 1800s. Preston's population has been increasing at a rate of 2.7% since the early 1990s; the city's current population is 3,710. Although the city's storm water system has grown with the population, the study found numerous areas where additional storm water infrastructure and policies should be implemented. The project also identified examples of improper contaminant disposal that could be corrected through public education and implementation of storm water best management practices (BMPs).

Recommended Solutions

Specific suggestions for infrastructure and policy improvements include:

- Construct a new drainage system on East 4th North
- Construct a new 8th North drain system to replace the old 8th North ditch
- Upgrade the old 1st East drain system
- Expand the 2nd South collector
- Purchase new equipment for preventive maintenance
- Construct a sediment pond at the west branch of Worm Creek drainage point
- Adopt requirements for new developments
- Protect natural drainage ways
- Detect and eliminate illicit/improper system connections
- Conduct public education and outreach
- Educate employees
- Inspection, monitoring, record keeping, and reporting
- Manage construction sites
- Implement modern BMPs

Follow Up

On March 27, 2002, DEQ contacted Preston's City Engineer and learned that to date none of the more costly physical improvements have been implemented due to lack of funding. However, the storm water capacity problem that existed with the 8th North ditch was remedied by sealing off artesian ground water flow to the ditch. All of the lower cost solutions that were recommended to include new development requirements, detecting and eliminating illegal connections, public and employee education, improved record keeping and requiring more construction/permanent BMPs have been implemented.

The report, "Storm Water Runoff Study, Preston City, Idaho" covers all of the above subjects in detail. For further information, the reader is referred to Archive file 16 F 1402, box 3.

Mining Sector—Case Study Project QC-440

Three Brief Reports Covering Results of Some Contaminant Removal Actions in the Coeur d'Alene Basin

Removal Actions on the South Fork Coeur d' Alene River System Near Osborn, Idaho was prepared by Silver Valley Natural Resources Trustees (March 6, 2000). This brief report describes the goals of a voluntary and cooperative effort by the Silver Valley Natural Resources Trustees, Coeur d' Alene Basin Restoration Project, the Bureau of Land Management, the Idaho Department of Environmental Quality (DEQ), Silver Valley Resources, Inc., the U.S. Environmental Protection Agency, Hecla Mining Company, the Idaho Department of Fish and Game, Zanetti Brothers, and the Coeur d' Alene Tribe.

The goals outlined in the report are:

- Continue a multi-agency and stakeholder approach to characterization and planning.
- Determine the sources of nonpoint source loading between Wallace and Big Creek, Idaho on the South Fork of the Coeur d' Alene River.
- Complete removals of contaminated flood plain soils in highest priority areas that have high recovery potential.
- Delineate potential project sites for action as funding becomes available.
- Make use of existing repository locations in Canyon Creek, Osborn, and the Central Impoundment Area during the brief time they are available.
- Work with local contractors on the most cost efficient planning and construction process available.
- Evaluate potential for passive, in situ soil treatments in test plots designed and located in the deposits on Osborn Flats.

The report, ***Physical and Chemical Stabilization of Streambank Sediments Containing Mine Wastes Lower Coeur d' Alene River, Idaho***, was prepared by DEQ (February 23, 2000) and describes two remedial techniques aimed at reducing metals loading to the lower Coeur d' Alene River. The first technique, bank stabilization by regrading and phytostabilization, was designed to reduce the erosional and mass-wasting component of sediment/metal loading to the river. The second technique, a geochemical treatment cell, was designed to geochemically scavenge metals from a localized seep discharging to the river.

The success of the stream bank stabilization project was evaluated in terms of its component parts. Cutting back the slope of the bank was deemed a success. It instantly reduced the spalling potential, provided a more habitable slope for vegetation, and removed contaminated sediments from areas susceptible to erosion. Phytostabilization using sedges, bulrushes, and willows was deemed to be highly successful. The use of biologs and pilings was found to be excessive in this particular situation. The success of a zero valent ion treatment zone was undeterminable at the time this report was written. Additional sampling performed subsequent to this report may provide conclusive results.

The report, ***Monitoring Results of the Effectiveness of Trace (Heavy) Metals Removal Projects at the Interstate Mill and Canyon Creek Sites***, was prepared by DEQ (2000) and describes results of mine tailings removal projects at two historic mining sites. The Interstate removal project involved a discrete mill site and an area of approximately 10 acres. At Canyon Creek, the removal encompassed approximately

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Mining Sector—Case Study Project QC-440 CONTINUED

Three Brief Reports Covering Results of Some Contaminant Removal Actions in the Coeur d'Alene Basin

six miles of floodplain and over 100 acres. Water quality of the streams crossing both projects was monitored upstream and downstream of the contaminant sources before and after project implementation. Lead and zinc were monitored intensively with three sampling intervals during high discharge spring runoff and again during low runoff. Sufficient data were gathered to make statistically valid conclusions for both sites. Findings indicate that at the Interstate Mill site, the zinc concentration has declined downstream in all flow conditions and the lead concentration declined under high runoff conditions, but not under low runoff conditions. At the Canyon Creek site, concentrations of both zinc and lead declined downstream under both runoff conditions.

For further information, all three reports can be found together in Archive (vault location) file 16 F 1402, box 3.