

**DRAFT CLOSURE REPORT  
ON**

**ELIZABETH PARK STREAM BANK REMEDIATION PROJECT**

Submitted by:

Silver Valley Natural Resource Trustees  
Kellogg, Idaho

May 9, 2000

# ELIZABETH PARK STREAM BANK REMEDIATION PROJECT

A SOURCE CONTROL PROJECT TO REDUCE THE RELEASE OF METALS TO THE SOUTH FORK COEUR D' ALENE RIVER FROM HISTORIC DEPOSITIONS OF MINE TAILINGS IN THE AREA OF ELLIZABETH PARK, IDAHO.

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# ELIZABETH PARK STREAM BANK REMEDIATION PROJECT

## SECTION 1 - EXECUTIVE SUMMARY

### PRIMARY DOCUMENTS:

US Army Corps of Engineers Permit NPW No 920102310 issued in November, 1993

State of Idaho, Department of Water Resources, Stream Channel Alteration Permit No 94-S-401, issued in August 1993.

Shoshone County, Public Works Department, Construction Permit October, 1922.

"Final Construction and Certification Report," McCulley, Frick and Gilman, November, 1993.

"Construction Documents for Elizabeth Park Stream Bank Remediation Project." Silver Valley Natural Resource Trustees. Contractor Billing Worksheets, Daily Construction Reports, QA/QC, Consultant Reports and Team Meeting Reports. 1994-1999.

### PROJECT GOALS:

This source control project reduces the release of metals to the South Fork Coeur d'Alene River from historic depositions in the floodplain east of Elizabeth Park, Idaho, consistent with the general Remedial Action Objective of the Trustees:

"Restoration, to the maximum practicable extent, of water quality and aquatic habitat in the Coeur d'Alene River basin through limitation of the transport of dissolved and solid phase metallic contaminants originating from mining-related sources to and within the South Fork of the Coeur d'Alene River and its tributaries."

This source control project was chosen to improve water quality and improve habitat for fish and wildlife by consolidating tailings and floodplain materials into a 2100 foot dike on the South Fork Coeur d'Alene River approximately one mile upstream from Elizabeth Park Idaho along the I 90 corridor.

The primary objective of this remedial construction was to limit the release of metals, primarily lead, from the tailings along this reach into the river during normal flow and base flood (100-year) flow conditions. Prior to project tailings sloughed into the river from the embankment each spring runoff. Sediment sampling done by the Coeur d'Alene Tribe indicated CD at 56,600ppm, Pb at 40,800 ppm and Zn at 9,470ppm.

## **SPONSORSHIP:**

The remedial action was completed in 1995 at a cost of \$373,877 funded by the Silver Valley Natural Resource Trustees with Ms. Marti Calabretta serving as Activities Coordinator.

The primary consultant was McCulley Frick and Gilman Inc. of Osburn.

## **PROJECT ACCOMPLISHMENTS:**

Tailings present within the active floodplain of the SFCDR were excavated and placed within the south side constructed levee of 2100 feet. Over two seasons 1994 and 1995, a volume of approximately 13,585 cy of compacted materials required to complete the embankment. To armor the levee embankment 8,027 tons of rip rap was placed. An additional 256 tons of rock was placed into in-channel structures.

The cost of the project was \$375,169. Additional stabilization was done downstream in 1999 to curtail erosion downstream of the project. No further maintenance will be performed by the SVNRT.

Access agreement was reached with the owners. The portion of the site along the south bank of the SFCDR is owned by Zanetti Brothers, Inc. (approx. 3.7 acres), a portion of the site south of the constructed levee is owned by the Union Pacific Railroad Company (approx. 1.9 acres), and the northern portion of the site along the north bank of the SFCDR is within the right-of-way of Interstate Highway I-90. Verbal access was obtained from UPRR to cross the tracks at two locations during construction .

The Remedial design was accomplished by McCulley, Frick & Gilman, Inc. and stream habitat improvements designed by JMTS, Jack Matranga. The Construction Contractor was Zanetti Brothers, Inc. of Osburn, Idaho.

The following construction permits were required for the project, including:

Shoshone County, Public Works Department. Construction Permit No. 10-92-01 issued in October, 1992.

State of Idaho, Department of Water Resources. Stream Alteration Permit No. 94-S-401, issued in August 1993; and

US Army Corps of Engineers Permit NPW No. 920102310 issued in November, 1993.

The original application was filed in September 1992. Revision to the application based on comments received was submitted August 1993 and included in-channel stabilization measures, aquatic habitat enhancement measures, and riparian zone enhancement.

Comments were received that did not reflect on the design. In a letter to Michael T. Doherty, U.S. Army Corps of Engineers, dated November 23, 1992, the Coeur d'Alene Tribe: "We are also deeply concerned with the cumulative effects of the State Trustee's overall project goals and how those goals and actions will effect activities related to the Coeur d'Alene Basin Restoration Project." and "I personally thought the project was going to be put on hold until it was reviewed as part of and incorporated into the comprehensive CBRP...discarding all the questionable technical aspects of the project, prior to any issuance of a permit the project first needs to be endorsed by the CBRP."

The field remedial construction activities for the Elizabeth Park project began on September 9, 1994 and were completed in May, 1995. Maintenance of the remedy was performed in 1999.

# ELIZABETH PARK STREAM BANK REMEDIATION PROJECT

## SECTION 2 - INTRODUCTION

### 2.1 Selection of the Project

The Idaho Natural Resource Damage Trust Fund (Later renamed the Silver Valley Natural Resource Trust Fund ,SVNRT) was established in 1986. A \$4.5 million dollar natural resource damage claim was settled between the State of Idaho and several mining companies operating in the Silver Valley. Trustee membership was established by the settlement document. An account was formed in the Idaho Attorney General's office. The following Trustees met the first time on March 7, 1991 at the Coeur d'Alene Resort.

Chuck Moss, Executive Office of the Governor, Chairman  
Clive Strong, Natural Resource Division of the Attorney General Office  
Don Hayman, Chairman, Shoshone County Commission  
Eric Lassfolk, citizen  
Duane Little, citizen  
Trey Harbert, Pintlar, Gulf Resources  
J. Chris Pfahl, ASARCO

The account balance was \$5,229,131.

The need to determine loading sources up-stream of the Bunker Hill Sited was discussed and a sampling plan commissioned at an anticipated cost of \$94,310.

McCulley, Frick & Gilman, Inc. (MFG) did an Upstream Surface Water Sampling Program and prepared a report for the Trustees:

"Upstream Surface Water Sampling Program, Fall 1991 Low-Flow Event; South Fork Coeur d'Alene River Basin above the Bunker Hill Superfund Site, Report Prepared for the Trustees for the State of Idaho Natural Resource Damage Trust Fund and Hecla Mining Company, March, 1992."

At the May 6 meeting, the Trustees considered three projects "not to exceed \$200,000" at the Success Mine dump on Nine Mile Creek, the Gem Portal on Canyon Creek and work on the South Fork Coeur d' Alene River near Elizabeth Park. An Army Corps permit application to do work on the South Fork was submitted in September 1992. The project was designed to "remove tailings from erosion impacts." Bence Close MFG.

The Idaho Stream Channel Alteration Permit was required under the Idaho Stream Channel Protection Act (Title 42, Chapter 38, Idaho Code) and the USACE Permit was required under Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. These permits were applied for jointly under a cooperative program between the State of Idaho and the USACE.

## **2.2 Permitting History**

The project description in the permit application stated that the construction of a flood levee would isolate mine tailings in alluvial deposition from the erosive effects of the South Fork of the Coeur d'Alene River near Elizabeth Park. Soils and tailings were observed sloughing into the river during annual high water runoff events from the 2400 ft section. In the design the scope of work involved excavation of tailings from the river bed and bank into a constructed flood levee which would then be armored with riprap.

The comments received from the reviewing agencies uniformly stated concerns about the project. The Trustees requested a suspension of the application after receiving comments. The revised application was submitted on August 6, 1993. The Idaho DEQ issued the Certification Letter on August 27, 1993. The Department of Army faxed a copy of its Decision Document approving the project on October 4, 1993. The Trustees received notice by phone that the US Fish and Wildlife Service was elevating the decision as provided in a MOA between the agencies, providing a 75 day period to present FWS issues. The permit was issued in November 1993.

The Trustees worked to understand and accommodate the comments received from the agencies. The concerns expressed included:

The project had limited scope, addressing surface water erosion and did not consider potential ground water contamination at the site.

The project was a mid-point in the upper basin and a site in the headwaters would be more appropriate.

The project did not remove tailings from the floodplain, and in isolating them did not include in the design an impermeable liner or cap.

The project further constrained the riparian zone, did not improve structure of channel and did not include fish habitat or riparian planting features.

FWS indicated that an EIS/NEPA process was required.

## **2.3 Process of Resolving Issues and Redesign of Project**

The Trustee project coordinator joined a technical group of the Coeur d'Alene Basin Restoration Project with the task of developing a group of guidelines for remediation and restoration projects. Using these guidelines and on-site comments from DEQ and Fish and Game personnel, the Trustees redesigned the project to demonstrate in a "pilot" project the role of structure and habitat restoration in meeting "fishable/swimmable" goals. In an initial electrofishing event, 100 resident fish were counted.

The redesign included 1) a reconfiguration of the levee to increase area in the active river corridor, 2) provision of fish habitat enhancement and channel stability by adding two drop structures, two bank barbs and approximately 48 structure trees, and 3) provision for vegetation along the corridor.

FWS personnel indicated that an EIS/NEPA process should be conducted to include all present applications and proposed projects throughout the upper Basin. Projects would be delayed for a number of years. The Trustees felt it was unrealistic to expect that they or any applicant could anticipate all remediation activities under a voluntary stakeholder strategy.

The Settlement Document for the Trust indicated work would be done near and within the Bunker Hill Superfund Site. A better understanding of mining impacts over the decade since the settlement indicated the need for an inventory of sites impacted by historic mining practices in the headwaters of the SFCDR. The Trustee Sampling Event, and an Inventory were completed in 1993, and work had begun on a Trust Action Plan.

The permit having been received in early winter 1993, work on the project did not begin until 1994 construction season. Tailings present within the active floodplain of the SFCDR were excavated and placed within the south side constructed levee of 2,100 feet. Over two seasons a volume of 13,585 cy of compacted materials were required to complete the embankment. To armor the levee embankment, 8,027 tons of riprap was placed. An additional 256 tons of rock was placed into in-channel structures. The cost of the project was \$373,877.

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## SECTION 3 - HISTORY OF THE SITE

Alluvial deposits of tailings and contaminated sediments accumulated across the floodplain and collected in layers over several decades beginning with upstream mining activities in the 1880's . The earliest milling operations were inefficient so the tailings were high in concentrations of lead and zinc. Upstream of Elizabeth Park the river narrows at the Montgomery Gulch rock outcropping and the deposition area may have been maximized with some type of wood plank dam structure. The subsequent trapping of materials can be seen in distinct layers of different concentration and type along the rail road right of way. Floodplain soil sampling done by the Coeur d'Alene Tribe indicated Cd at 56,600 ppm, Pb at 40,800 ppm, and Zn at 9,470 ppm.

In the 1960's the Interstate corridor divided the floodplain roughly in half and the northern section has been developed by Shoshone County into a Municipal Waste Transfer Station. The dramatic change in the river corridor since the construction of the Interstate accelerated the erosion of the banked accumulated tailings, visible to any passerby. An area with comparable erosive actions is observed along the river banks upstream of the "Theatre Bridge", upstream of Smelterville.

In 1973 , a river cleanup activity was initiated to provide summer work for the Sunshine Mine Fire victims' families. All wood debris and stumps were removed the SFCDR floodplain and burned. Locals were pleased at the new aesthetic of "clear" water and no dead wood about; they did not like the sediments falling into the river at this location. In 1978, the Shoshone County Commissioners were approached with ideas for this location and the development of a park at Big Creek Flats which would control erosion there. The plan was funded by Idaho Department of Water Resources and not accomplished at that time despite the feedback from public hearings showing local support for improvements in the floodplain.

Of all the Trustee projects, the Elizabeth Park "Dike" has brought the most positive comments from the public since its completion and as recently as July 1, 1999.

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## SECTION 4 - PROJECT EXECUTION

### Elizabeth Park Time Line

Fall 1991	Stream Gaging
September 1992	Original Permit Application
November 6, 1992	Stream Gaging
January 12, 1993	1 <sup>st</sup> . Bid Refusal Letter
August 1993	Revised Permit Application
August 27, 1993	DEQ Certification Letter
August 1993	Work on Access Agreement
September 21, 1993	Access signed by Zanetti
October 4, 1993	Department of Army Decision Document
September 9, 1994	Work Begins
September 24, 1994	Insurance papers from Zanetti
	Zanetti Invoices (Oct, Nov, Dec 1994/ April, May 1995)
May 31, 1995	Work done
July 20, 1995	Final Retainage Release

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## SUMMARY OF REMEDIAL CONSTRUCTION ACTIVITIES

This section presents a summary of the remedial construction activities started at the project site in 1994 and completed in 1995. Included in this section are a general description of the remedial activities, the remedial construction schedule, equipment and personnel used in the remedial activities, the approved design changes and change orders during construction, the general quality control and assurance procedures, the survey control and as-built section data, air monitoring data during construction, and the quantities of materials used in the remedial construction.

### General Description of Remedial Activities

Tailings present within the active floodplain of the SFCDR were excavated and placed within and on the south side of a constructed levee and riprap armor was placed on the north side of the levee (adjacent to the SFCDR). The design of the levee embankment and riprap armoring described in previous documents (MFG, 1992c and 1994) was performed in accordance with generally accepted design criteria for such structures (USACE, 1970; State of Idaho, 1992). The levee embankment was constructed primarily of mixed tailings and alluvial materials that were placed in approximately 1-foot loose lifts and compacted. A heavy geotextile (non-woven polypropylene) was placed underneath the riprap armoring on the north levee side slope with overlaps of the fabric in the downstream direction. Riprap was then placed in a key trench at the toe of the levee and on the north facing slope of the levee to act as erosion armor for the levee during flood events. Two drop/sill and two river barb structures with structure trees and several tree revetments were placed in the SFCDR and along the south bank within the riparian zone. The design and construction oversight of these instream structures was performed by Mr. Jack Matranga. In the spring of 1995 a number of 6 to 7-foot tall cottonwood trees were planted on the south bank of the SFCDR throughout the project area. The issue-for-construction plans and

specifications presenting the detailed requirements of the remedial construction project are presented in Appendix A.

### Construction Schedule

The field remedial construction activities for the Elizabeth Park project began on September 9, 1994 and were completed in May, 1995. The primary construction of the levee and the stream stabilization structures occurred from September 9, 1994 to November 30, 1994. The contractor constructed the majority of the compacted levee embankment from September 9, 1994 to October 11, 1994. From October 12, 1994 to November 8, 1994 the majority of the geotextile fabric and riprap levee armor were placed. From November 9, 1994 to November 28, 1994 instream drop/sill and barb structures (with structure trees) were constructed, and revetment trees were anchored along the south bank. From April 12 to April 18, 1995 the construction contractor placed and compacted soil on top of the levee to finish grade, planted cottonwood trees in the riparian zone on the south side of the SFCDR, and hauled and placed additional riprap on the north side of the levee. Through the remainder of April and the month of May 1995, growth medium (with seed incorporated) was hauled and placed on the top of the levee.

### Equipment and Personnel

The primary equipment used on the site included two excavators, a Caterpillar 320 trackhoe and a Caterpillar EL-200B trackhoe, each of which were present on the site at different times. A vibrating roller (Ingersol Rand SD-70D) was used for the compaction of fill from September 14, 1994 to October 13, 1994. On April 17, 1995 a large compaction wheel pulled by a loader was used to compact the top lift of soil on the levee. Two bulldozers were present on the site at varied times: a Caterpillar D-5 or D-6 (both used at different times) was used for smaller tasks and a D-8 was used for larger tasks and at the riprap quarry to move larger rock material. A water truck was present on-site to aid in dust control and also to supply water to the

backfill to increase the moisture content for compaction, as necessary. Several 10 to 12 yard trucks were present on-site at various times for such tasks as hauling fill soils within the site, hauling import soils for gradation specifications, hauling riprap to the site and other tasks. A truck mounted compressor was used for driving duckbill anchors for anchoring revetment trees along the south bank of the SFCDR.

Personnel on-site included staff from the construction contractor (Zanetti Brothers, Inc.) to operate the construction equipment, personnel from MFG for construction oversight, and personnel from Jasberg Technical Services and JTM Services for construction oversight of the instream structures. Silver Valley Natural Resource Trustee members made periodic visits to the site. Periodic visits to the site were also made by State of Idaho DEQ personnel and Idaho Department of Fish and Game personnel were present on-site at various times.

#### Design Changes/Change Orders

Various design changes and change orders were approved during the course of the remedial construction depending upon field conditions encountered. Design changes during construction (approved by the Trustees Activities Coordinator and by the EOR) included:

- The western end of the levee was reduced in length, because of a lack of discrete tailings in this area, and to better fit the existing topography. The length was reduced by approximately 250 feet from the originally-designed western end of the levee. This change reduced the required volume of riprap;
- The toe of the levee was moved further south than shown at various locations on issue-for-construction Drawing No. 2291-C1 to achieve a minimum of 20 feet of riparian zone on the southern bank of the SFCDR and to limit, where possible, the amount of required fill based upon the actual topography. This change also improved the base flood hydraulics through the site floodway as described in Section 4, below; and
- The height of the levee was increased in several locations to accommodate the final hydraulic assessment based on a survey of as-built conditions of the levee, floodway and instream structures at the end of the 1994 construction season.

Change orders (approved by the Trustees Activities Coordinator) included removal of additional tailings-impacted soils from the north side of the levee toe at various locations. Such additional tailings-impacted soils were located during the excavation of the toe trench for the riprap. Rounded gravel to cobble material with some organics was placed and spread south of the levee and north of the UPRR embankment toe, west of approximate Station 12+00.

### Quality Control and Assurance

Releases of tailings sediment to the SFCDR were restricted during the construction activities due to the use of structural and non-structural best management practices (BMPs) including the use of silt fencing and construction primarily during the low-flow season. Personnel from the State of Idaho DEQ were on-site at various times throughout the project to monitor the release of sediment to the SFCDR. The contractor placed silt fence between the SFCDR and the work area as necessary to avoid sediment releases. The only time sediment was visibly released downstream was during the installation of the instream stabilization structures when equipment was required to enter the stream channel. During such times the DEQ personnel were present or aware of the activities, and the time period during which such releases occurred was limited to the extent possible. In addition, an oil boom was used across the river during instream construction to capture potential oil or fuel leaks from equipment required to work in the river channel. No significant equipment leaks were encountered during this portion of the construction.

Compacted backfill was tested for in-place density and moisture content approximately every 480 cubic yards of fill placed and compacted (Appendix C). Areas that did not meet the 95 percent compaction requirement (3 tests out of 31 total) were reworked until the areas were retested and indicated equal to or greater than 95 percent compaction. These compaction QC tests are discussed in more detail in Section 3.1.2 below.

Quality control and assurance during construction also included compilation of material data confirming compliance with the specifications for such materials as riprap and geotextile.

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## **SECTION 5 - PROJECT MILESTONES: VARIATIONS FROM INITIAL SCOPE**

This section presents a summary of the remedial construction activities started at the project site in 1994 and completed in 1995. Included in this section are a general description of the remedial activities, the remedial construction schedule, equipment and personnel used in the remedial activities, the approval design changes and change orders during construction, the general quality control and assurance procedures, the survey control and as-built section data, air monitoring data during construction, and the quantities of material used in the remedial construction.

### **5.1 General Description of Remedial Activities**

Tailings present within the active floodplain of the SFCDAR were excavated and placed within and on the south side of a constructed levee and riprap armor was placed in the north side of the levee (adjacent to the SFCDAR). The design of the levee embankment and riprap armoring described in previous documents (MFG, 1992c and 1994) was performed in accordance with generally accepted design criteria for such structures (USACE, 1970; State of Idaho, 1992). The levee embankment was constructed primarily of mixed tailings and alluvial materials that were placed in approximately 1-foot lifts and compacted. A heavy geotextile (non-woven polypropylene) was placed underneath the riprap armoring on the north levee side slope with overlaps of the fabric in the downstream direction. Riprap was placed in the key trench at the toe of the levee and on the north facing slope of the levee to act as erosion armor for the levee during flood events. Two drop/sill and two river barb structure with structure trees and several tree revetments were placed in the SFCDAR and along the south bank within the riparian zone. The design and construction oversight of these instream structures was performed by Mr. Jack Matranga. In the spring of 1995 a number of 6 to 7-foot tall cottonwood trees were planted on the south bank of the SFCDAR throughout the project area. The issue-for-construction plans and specifications presenting the detailed requirements of the remedial construction project are presented in Appendix A.

### **5.2 Construction Schedule**

The field remedial construction activities for the Elizabeth Park project began on September 9, 1994 and were completed in May, 1995. The primary construction of the levee and the stream stabilization structures occurred for, September 9, 1994 to November 30, 1994. The contractor constructed the majority of the compacted levee embankment from September 9, 1994 to October 11, 1994. From October 12, 1994 to

November 8, 1994 the majority of the geotextile fabric and riprap levee armor were placed. From November 9, 1994 to November 28, 1994 instream drop/sill and barb structures (with structure trees) were constructed, and revetment trees were anchored along the south bank. From April 12, to April 18, 1995 the construction contractor placed and compacted soil on top of the levee to finish grade, planted cottonwood trees in the riparian zone on the south side of the SFCDAR, and hauled and placed additional riprap on the north side of the levee. Through the remained of April and the month of May 1995, growth medium (with seed incorporated) was hauled and placed on the top of the levee.

ELIZABETH PARK STREAM BANK REMEDIATION PROJECT

A SOURCE CONTROL PROJECT TO REDUCE THE RELEASE OF METALS TO THE SOUTH FORK COEUR D' ALENE RIVER FROM HISTORIC DEPOSITIONS OF MINE TAILINGS IN THE AREA OF ELLIZABETH PARK, IDAHO.

**SECTION – 6 SUMMARY OF COSTS (thru 4-30-00)**

Remedial design through 8-31-94

Remedial action/Construction management after 9-1-94

SVELIZ-01, 02

Remedial Design	\$ 52,379
Remedial Action	\$302,597
Construction Management	<u>\$ 20,193</u>
TOTALS	\$375,169

# ELIZABETH PARK STREAM BANK REMEDIATION PROJECT

## SECTION 7 - DIFFICULTIES ENCOUNTERED

7.1. This project was not accepted as needed and appropriate by the reviewing agencies. A delay of two years from original proposal to construction was costly.

The Elizabeth Park Levee was the first project proposed by the Trustees and it drew the full interest and concern of the Coeur d'Alene River Basin Restoration Project Steering Committee. Since there were limited funding opportunities for remedial work outside of the box, all interested stakeholders felt they would have some voice in the projects selected by the Trustees. The parties did not have knowledge of the Settlement Agreement documents which provided the guidance to the Trustees for this project. In an apparent inconsistency, the agencies stated that the State had been holding the money and doing nothing since the settlement in 1986, but held this project for two additional years.

The review and comments on the Corps application were the process mechanism used by the stakeholders to stop the Trustee project and force an understanding of the collective interest in the expenditure of the fund.

7.2 The construction season for river work is short, beginning in August after the runoff and ending in November with the onset of winter rain.

7.3 Erosion has accelerated along the railroad right of way immediately downstream of the levee. In 1999 four barbs were placed in this area to redirect the flow. At the termination of the Trust, it is unclear how future O & M responses will be met. Monitoring of the SFCDR river is projected by the Idaho DEQ.

7.4 The opportunities for clarification and shared information and planning that grew from the permit conflict were compromised by the realities of the NRD litigation.

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## SECTION 8 - RECOMMENDATIONS

In order to avoid the transaction costs this permit process involved, the Trustees explored how to expedite permitting and long term liability in future projects. The Trustee Activities Coordinator participated in teams working on guidance for projects sponsored by CBIG and CBRP.

The stakeholder interest in the trust moneys lead the Trustees to complete an inventory of problem areas in the headwaters which was done collaboratively with SAIC (EPA contractor) 1993. The Trustees then drew an Action Plan for Trustee activities and put it out for comment (1994). This seemed to reassure parties that there was some understanding that the upper system would need multiple actions and provided information about the types of projects the Trust fund would be directed to.

Stabilization of the railroad right of way below the levee will be done with rip rap as a part of the UP negotiated settlement.

While it is understood that in the best of all worlds, the plans and funding for a total comprehensive remedial approach would promote a logical and sequential group of actions, it is not acceptable to the State to do nothing for years waiting for the eventual settlement of litigation.

# ELIZABETH PARK STREAM BANK REMEDIATION PROJECT

## SECTION 9 - INDEX OF DOCUMENTS OF SITE

Department of the Army Corps of Engineers. 1993. Permit Evaluation and Decision Document, Application # 920102310.

Department of the Army Corps of Engineers. 1993. Permit number 920102310.

Idaho State Natural Resource Trustees. 1993. South Fork Coeur d' Alene River Inventory File, Remediation Sites.

Idaho State Natural Resource Damage Trust Fund. 1994. Trustees Action Plan – 1994, South Fork Coeur d' Alene River.

Idaho State Natural Resource Trustees. 1994. Contract Documents for Streambank and Channel Remediation Along the South Fork Coeur D' Alene River near Elizabeth Park, Idaho.

McCulley, Frick & Gilman, Inc. 1992. Conceptual Design for Streambank Remediation South Fork Coeur d' Alene River near Elizabeth Park.

McCulley, Frick & Gilman, Inc. 1992a, Upstream Surface Water Sampling Program, Fall 1991 Low-Flow Event; South Fork Coeur d' Alene river Basin above the Bunker Hill Superfund Site, Report Prepared for the Trustees for the State of Idaho Natural Resource Trust Fund and Hecla Mining Company, March, 1992.

McCulley, Frick & Gilman, Inc. 1995. Final Construction and Certification Report. Remedial Program at the South Fork Coeur D' Alene River Near Elizabeth Park. Idaho.

Matranga, Jack. 1993. Elizabeth Park Fish Habitat and Stability Project Conceptual Design.

Matranga, Jack. 1999 Interim Erosion Control Design.

Union Pacific Railroad Company. 1993. Contractor's Road Crossing Agreement.

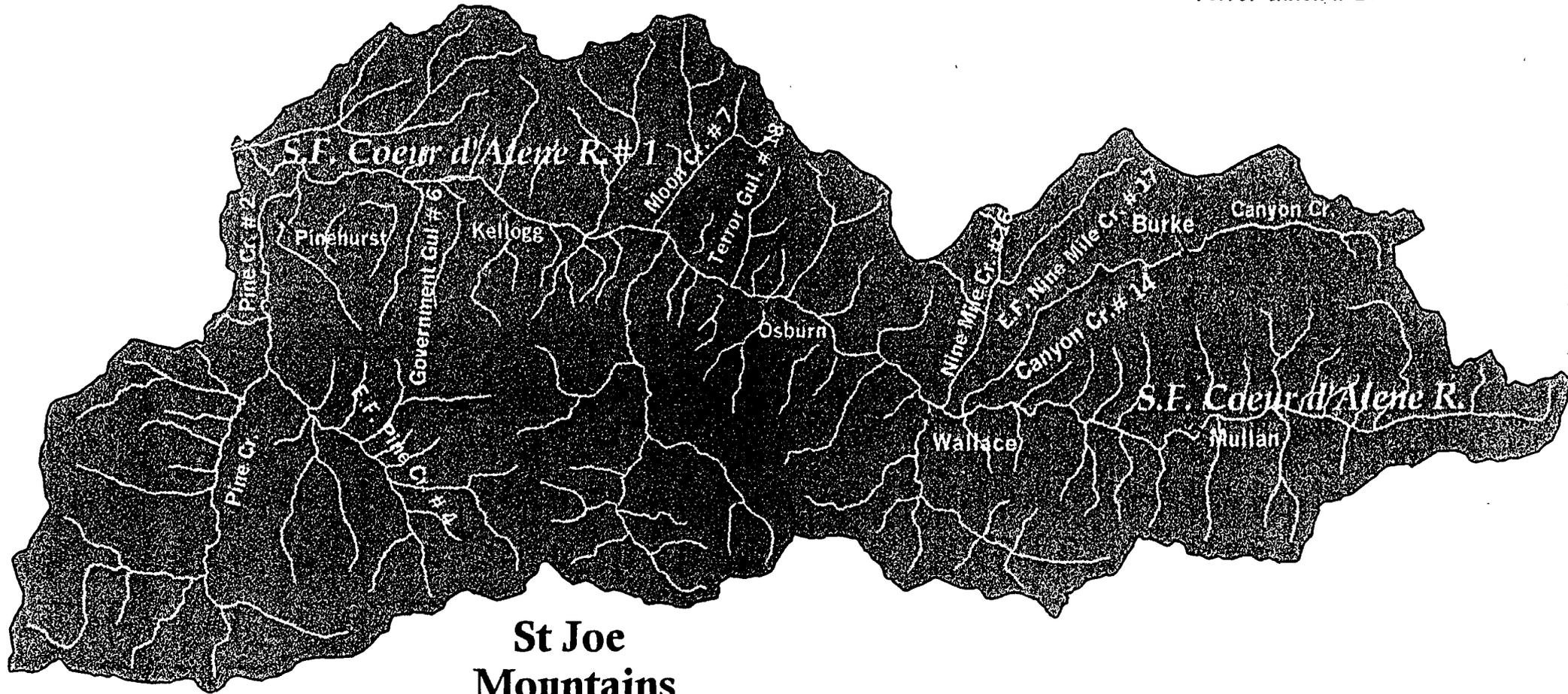
# Figure 1. S.F. Coeur d'Alene Watershed Huc # 17010302

Huc # 17010302-(#)

Water Quality Limited Segments

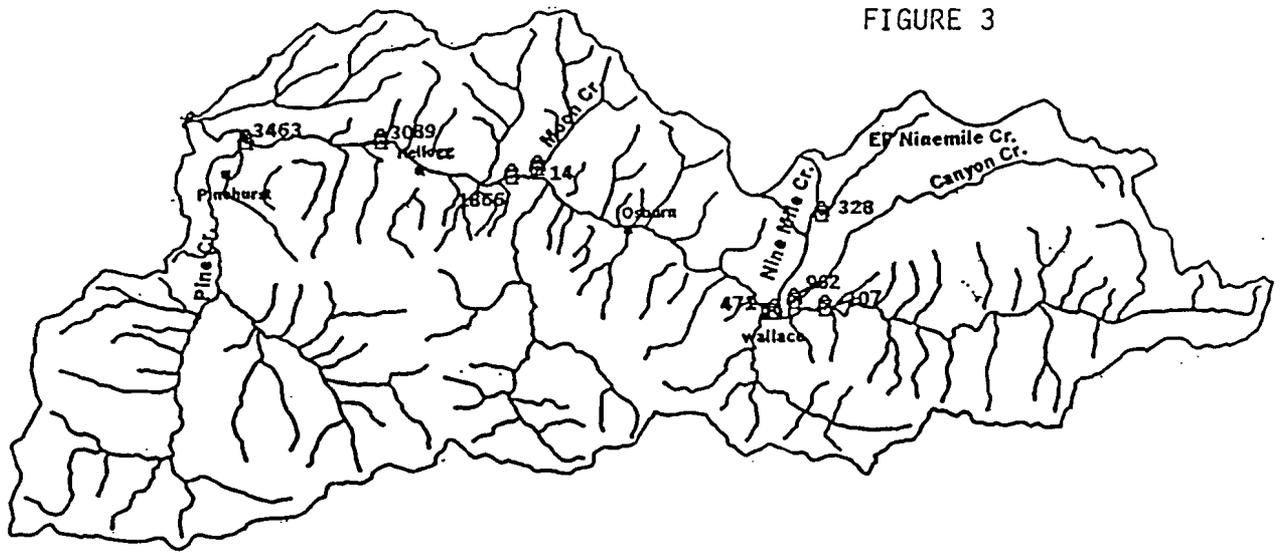
- S.F. Coeur d'Alene R.# 1
- Pine Creek # 2
- E.F. Pine Creek # 4
- Government Gulch # 6
- Moon Creek # 7
- Canyon Creek # 14
- Nine Mile Creek # 16
- E.F. Nine Mile Creek # 17
- Terror Gulch # 18

Coeur d'Alene  
Mountains



St Joe  
Mountains

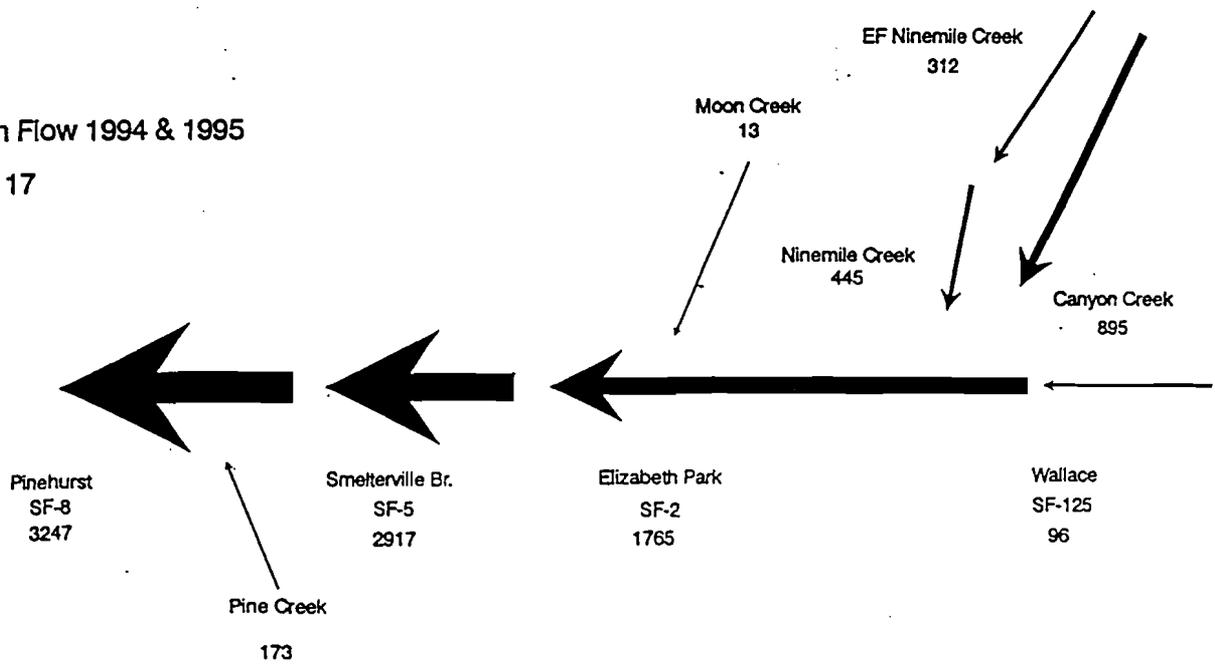
FIGURE 3



SF Coeur d'Alene River  
Total Zinc Load (lb/d)

High Flow 1994 & 1995

n = 17



Low Flow 1994 & 1995

n = 17

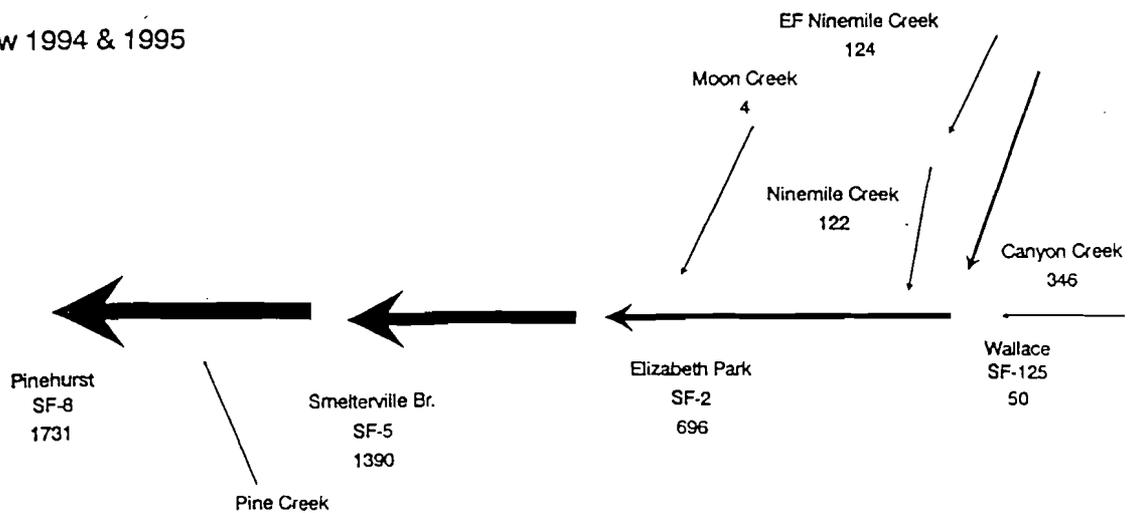
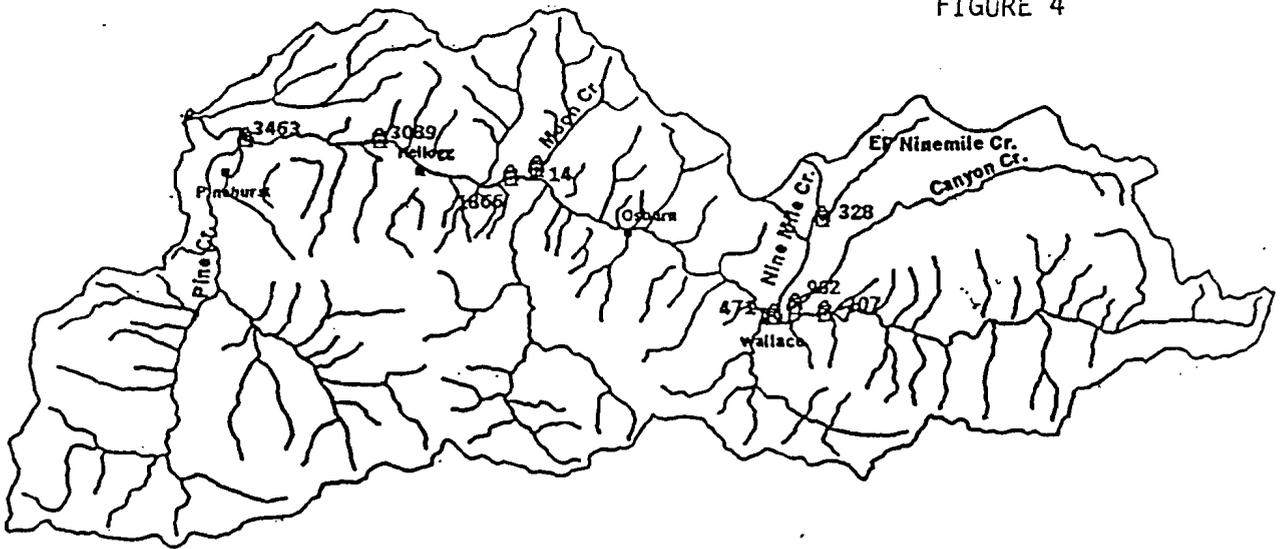
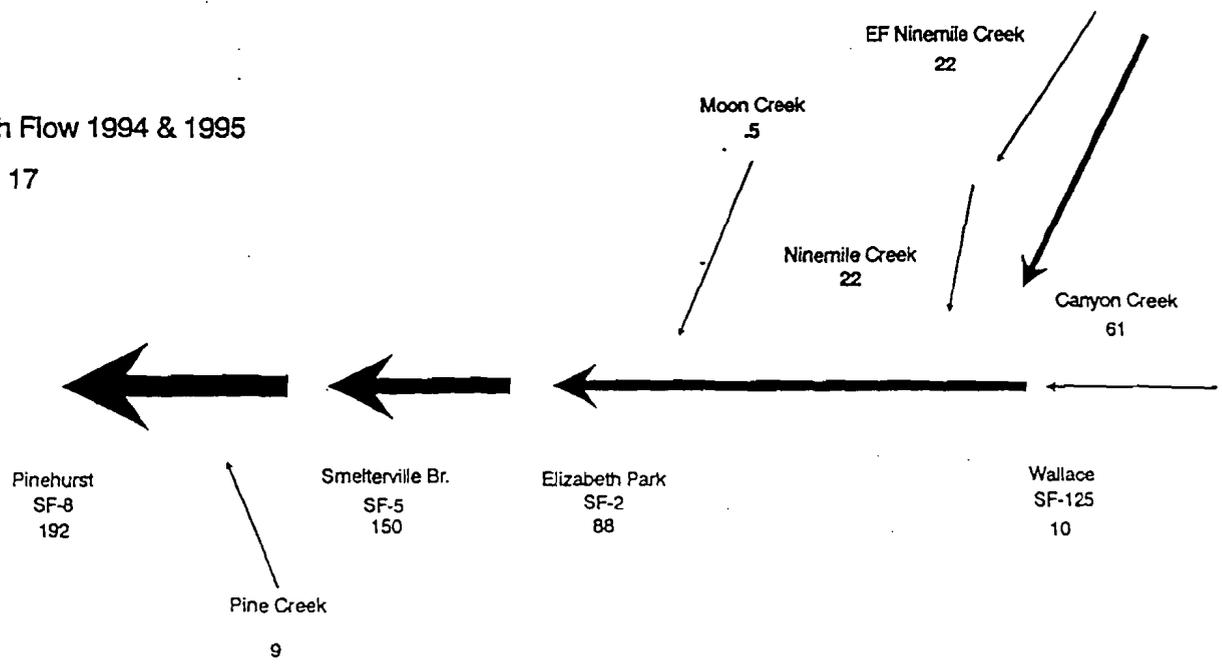


FIGURE 4

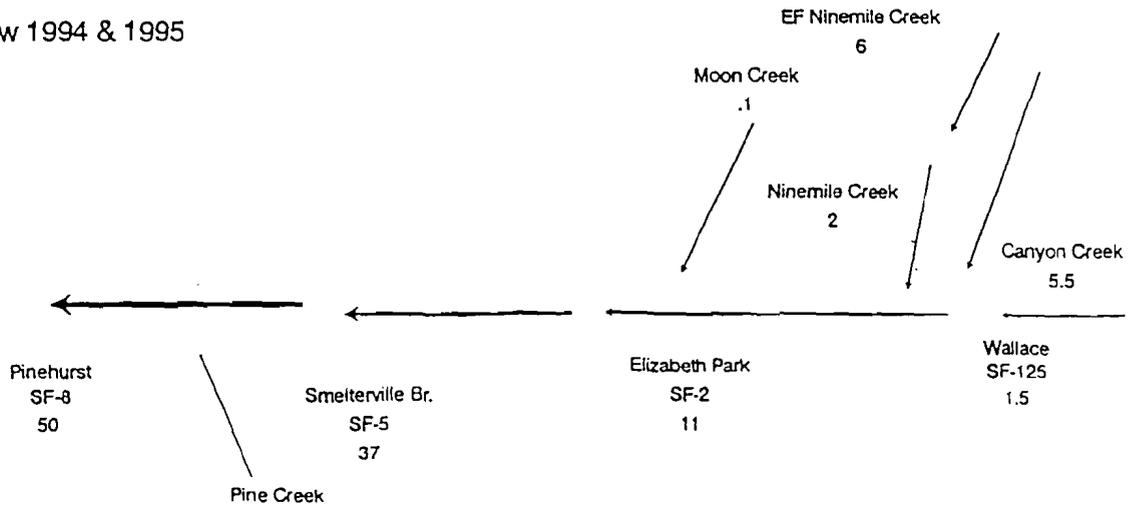


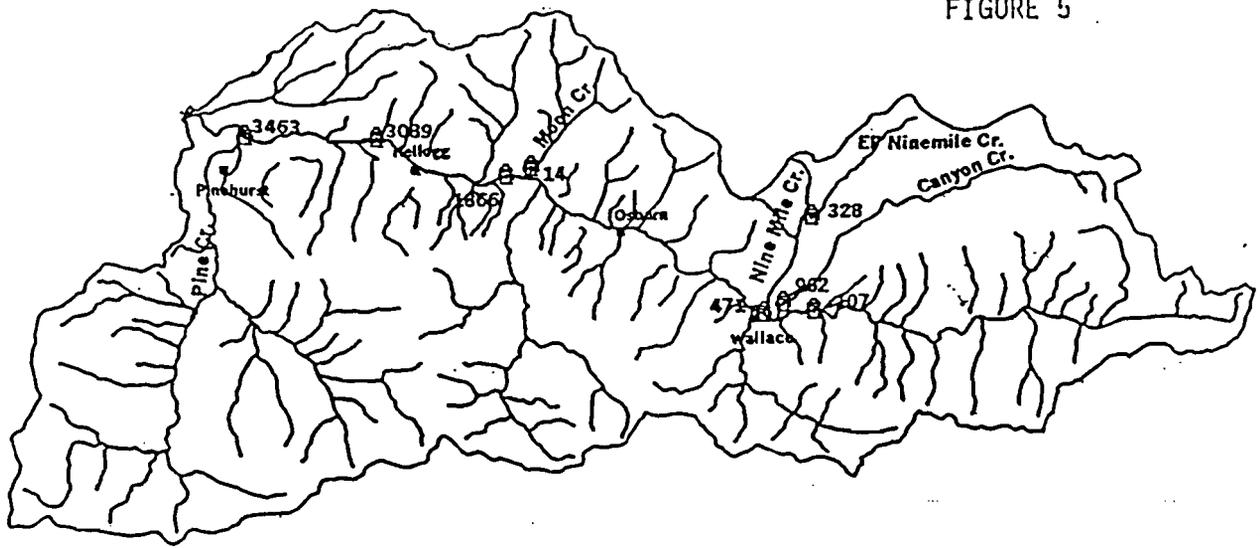
SF Coeur d'Alene River  
Total Lead Load (lb/d)

High Flow 1994 & 1995  
n = 17



Low Flow 1994 & 1995  
n = 17

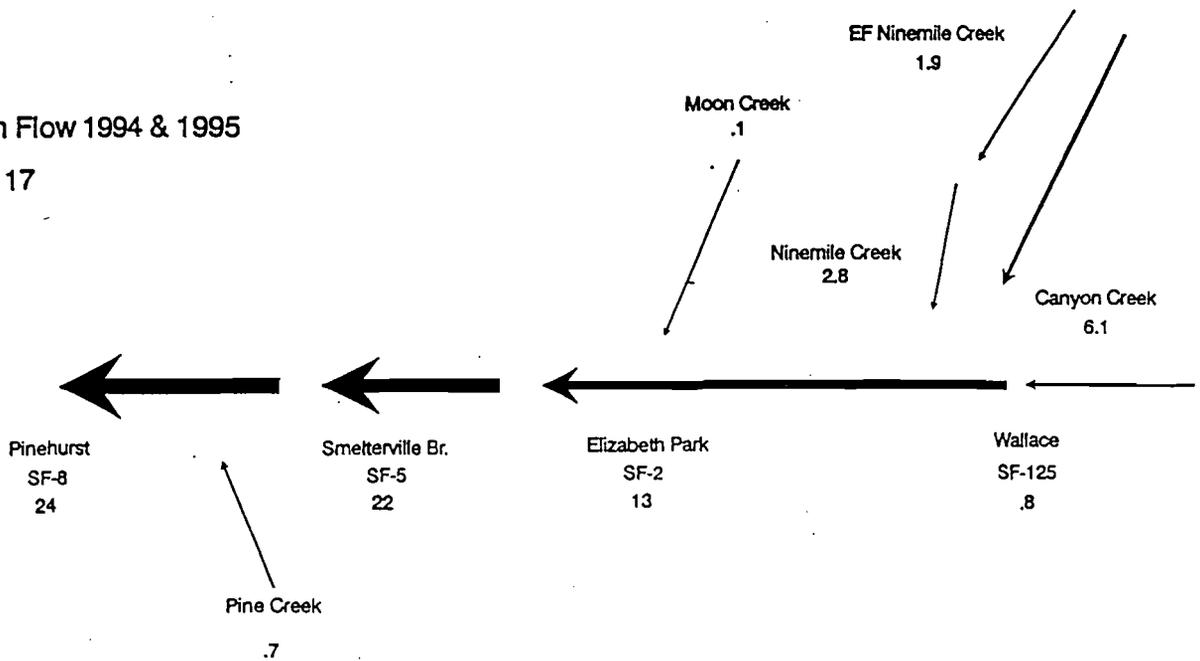




SF Coeur d'Alene River  
Total Cadmium Load (lb/d)

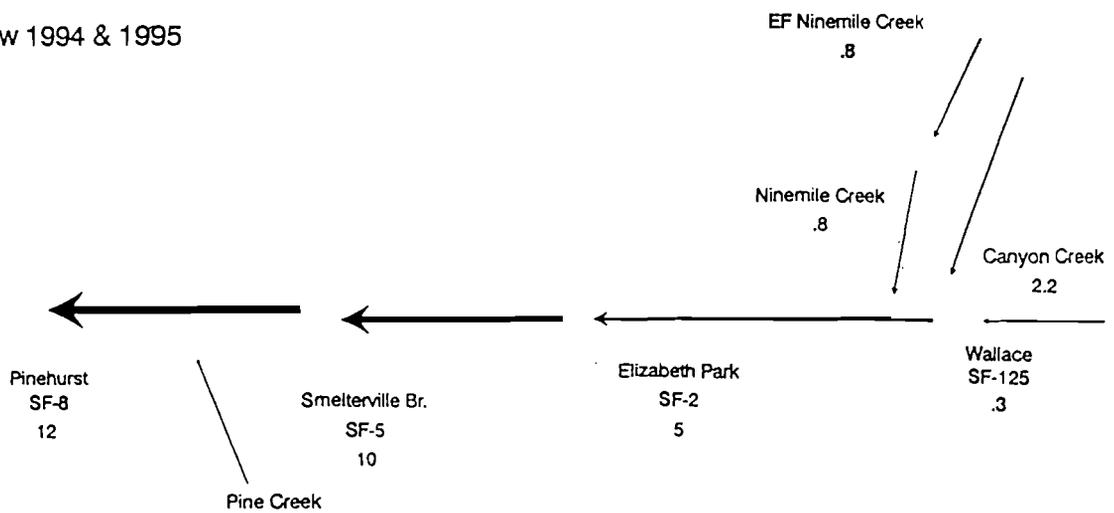
High Flow 1994 & 1995

n = 17



Low Flow 1994 & 1995

n = 17



TOTAL METALS LOADING DATA

SF CdA River  
Total metals Load (lbs/d)  
Low Flow

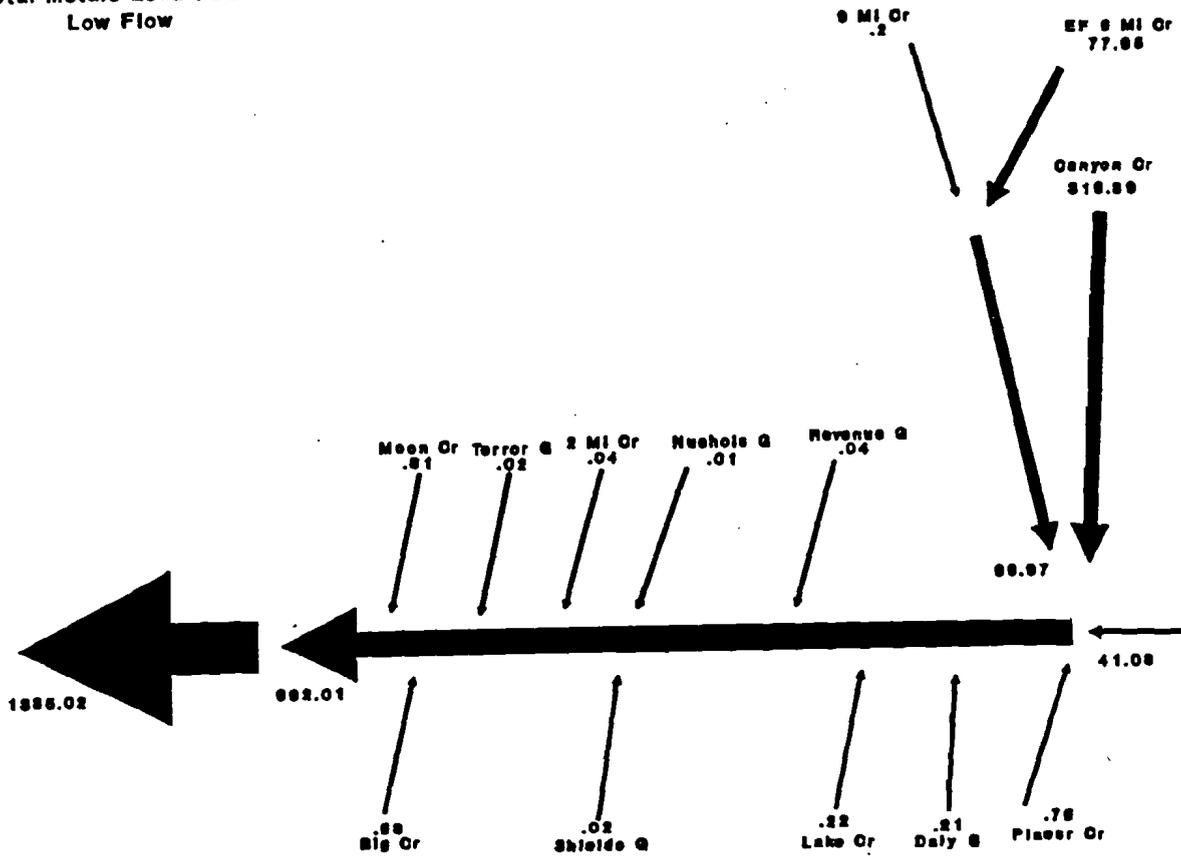
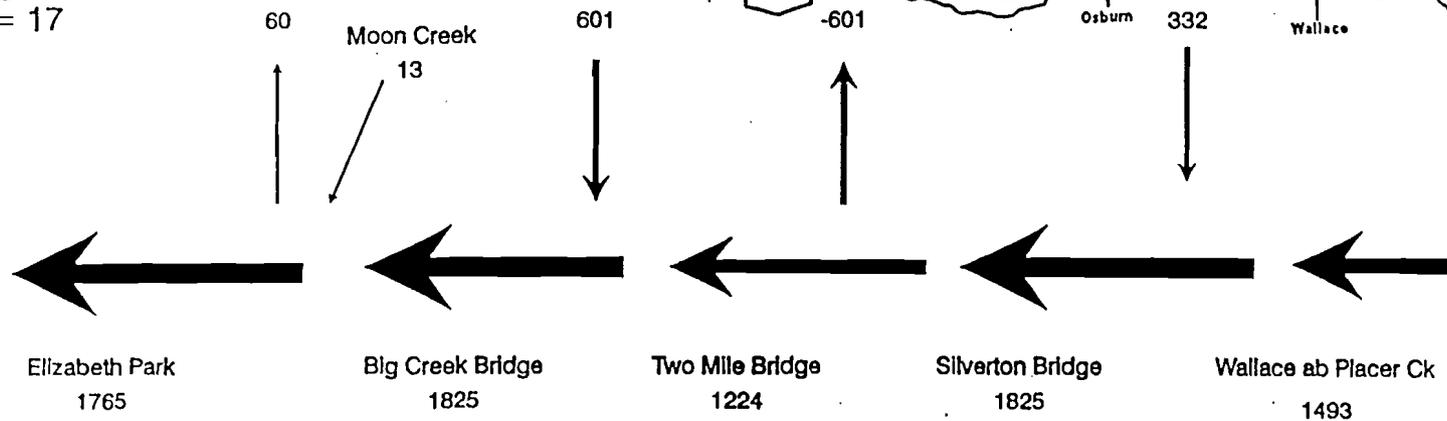


FIGURE 1

SF Coeur d'Alene River  
Wallace to Elizabeth Park  
Total Zinc Load (lb/d)

High Flow 1994 & 1995  
n = 17



Low Flow 1994 & 1995  
n = 17

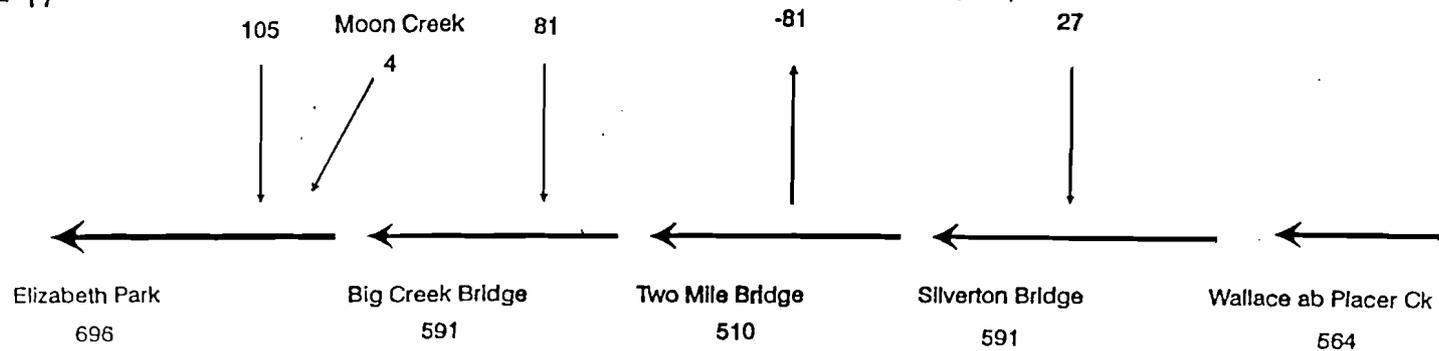


FIGURE 15

SF Coeur d'Alene River  
Wallace to Elizabeth Park  
Total Lead Load (lb/d)

High Flow 1994 & 1995  
n = 17



Low Flow 1994 & 1995  
n = 17

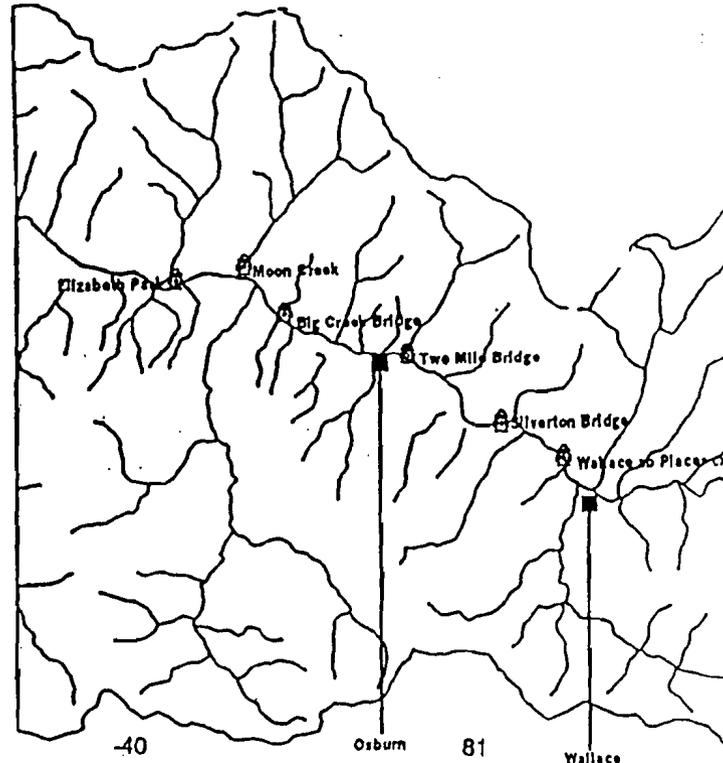
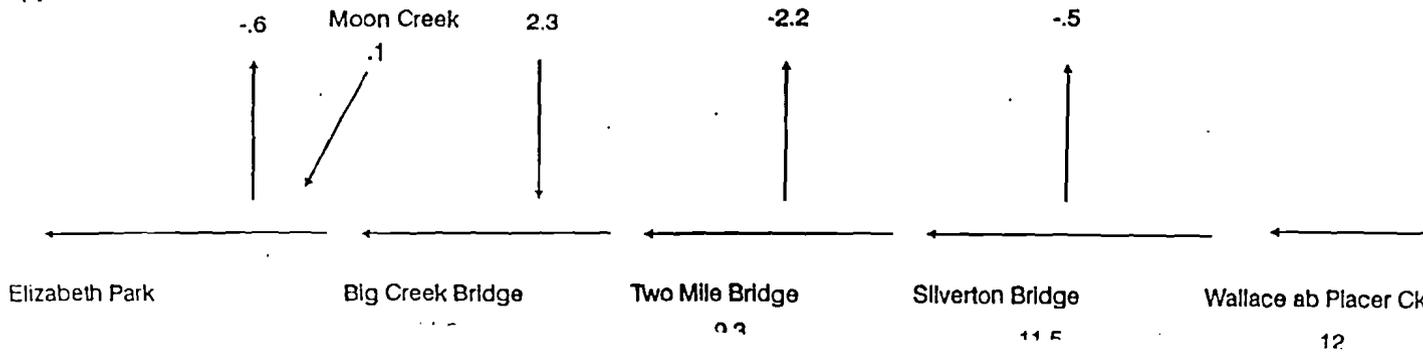
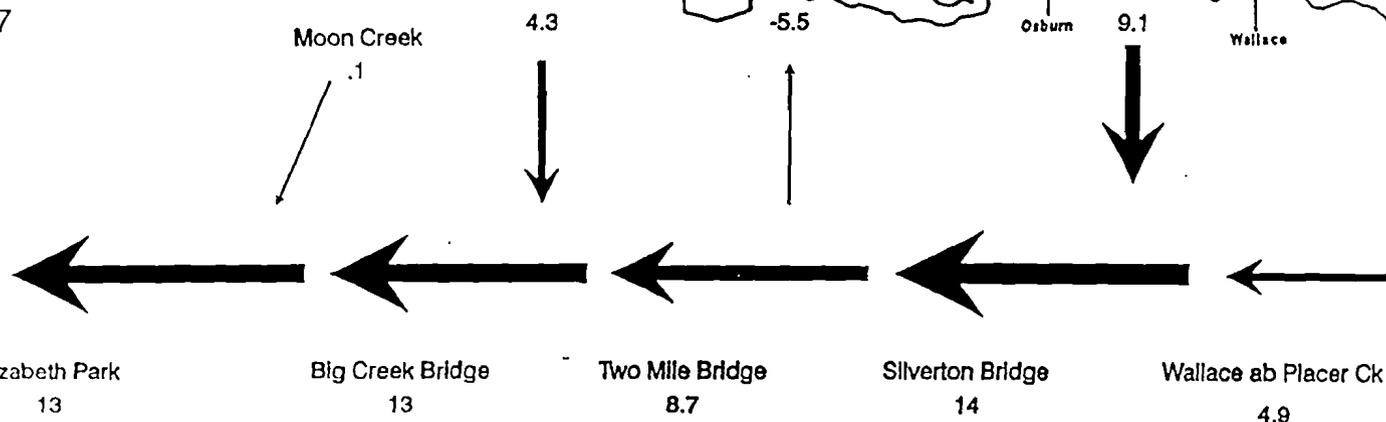


FIGURE 16

SF Coeur d'Alene River  
Wallace to Elizabeth Park  
Total Cadmium Load (lb/d)

High Flow 1994 & 1995  
n = 17



Low Flow 1994 & 1995  
n = 17

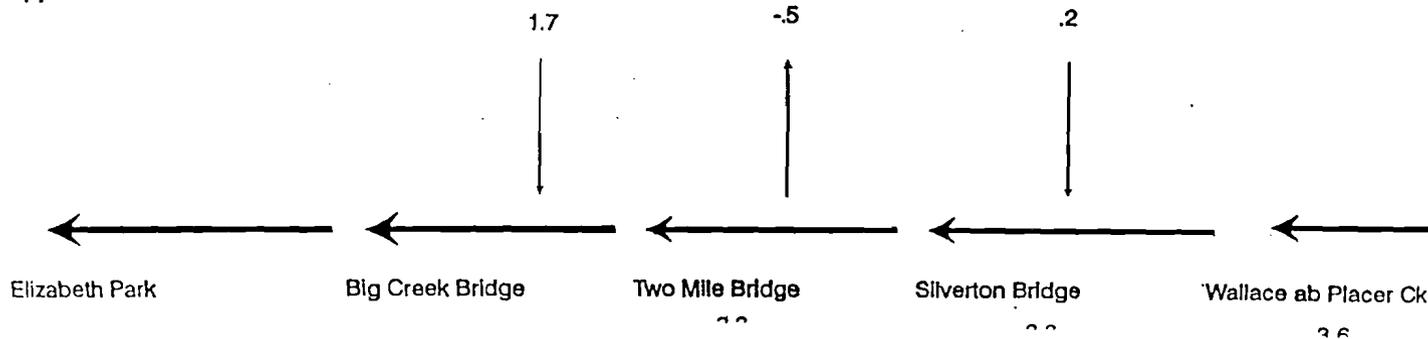


FIGURE 17

92-0808

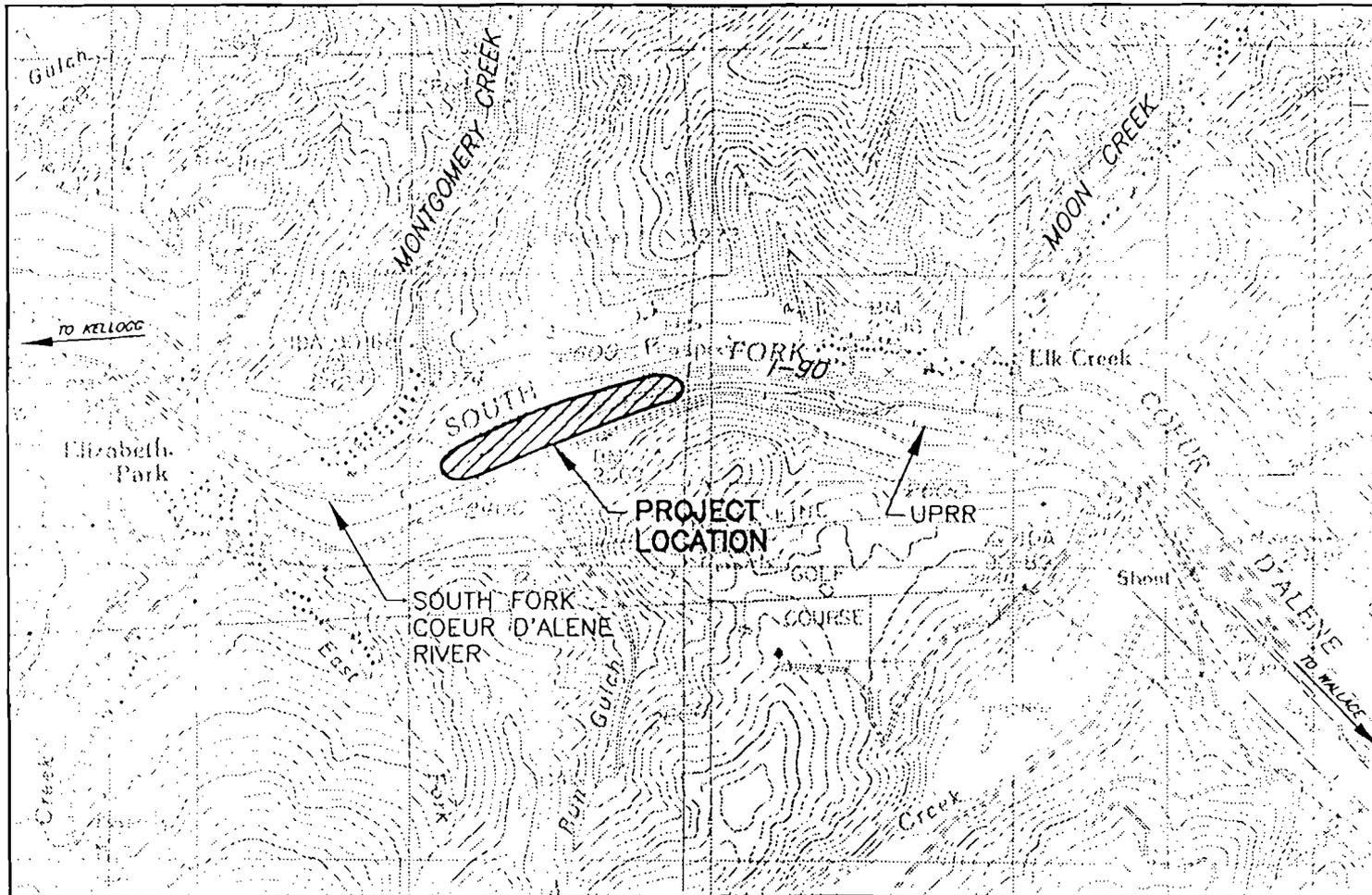
9-29-92

1"-500'

14 221-



507



**PLAN**

SCALE IN FEET



**REFERENCE:**

-USGS 7.5 MIN. QUADRANGLE MAP,  
KELLOGG EAST, IDAHO, 1985.

<b>SILVER VALLEY NATURAL RESOURCE TRUSTEES</b>	
<b>ELIZABETH PARK REMEDIAL PROGRAM PROJECT LOCATION MAP</b>	
PROJECT: 229112	DATE: JANUARY, 1995
REV:	BY: BCG   CHK: JHR
<b>McCULLEY, FRICK &amp; GILMAN, INC.</b> <i>providing environmental consulting and engineering services</i>	