

# 2006 ANNUAL REPORT



## *Basin Environmental Improvement Project Commission*

February 2007

# Table of Contents

<b>Executive Summary .....</b>	<b>3</b>
<b>BEIPC Overview .....</b>	<b>4 - 5</b>
<b>Program Management .....</b>	<b>5 - 6</b>
<b>Coeur d'Alene Lake Activities .....</b>	<b>7</b>
<b>Public Outreach and Citizen Involvement .....</b>	<b>8 - 9</b>
<b>Calendar Year 2006 Work Accomplishments .....</b>	<b>10 - 52</b>

## **Work Funded with Superfund or Other Cleanup Funding:**

- Property Sampling and Remediation
- Water Treatment
- Mine and Mill Sites
- Phase II Component of OU-2 Remedy
- Recreation Areas
- Basin Environmental Monitoring
- Repositories
- Infrastructure Revitalization
- Remedy Protection and Flood Control
- Institutional Controls

## **Work Funded Through Clean Water Act Grants:**

### **FY 2002 Grant Projects**

- Coeur d'Alene Lake Monitoring Program
- Bank Stabilization Demonstration Project
- Coeur d'Alene Lake Education Program
- Sewer Collection Study in Mullan (Inflow and Infiltration)

### **FY 2003 Grant Projects**

- Woodland Park Groundwater Quality Monitoring
- Meyer Creek Flood Assessment
- Upper East Fork Ninemile Creek Water Quality Evaluation
- Metal & Nutrient Removal Pilot Page WWTP
- East Fork Pine Creek Revegetation Pilot
- Inventory and Evaluation of Private Lands for Restoration of Wetland Habitats
- Fish Response to Bank Stabilization
- Sediment Transport and Bed Evolution Phase 1
- Coeur d'Alene Lake Response to Watershed Remediation Phase 1

# Table of Contents

North Fork Coeur d'Alene River Hydrologic and Sediment Study  
Mica Bay Nutrient Reduction Project Phase 1  
Lower Lakes Aquatic Vegetation Survey  
Canyon Creek Groundwater Metal Source Characterization

## **FY 2004 Grant Projects**

Mica Bay Nutrient Reduction Project Phase 2  
Additional Water Quality Sampling in Selected Nearshore Areas  
Plummer Wastewater Treatment Pilot  
Plummer Creek Watershed Nutrient Load Assessment Modeling and Management Plan  
Pinehurst Flood Impact Study  
Silver Crescent Mine and Mill Complex Habitat Restoration  
Canyon Creek Treatability Study  
South Fork Sewer District Toxicity Reduction  
Coeur d'Alene Lake Response to Watershed Remediation Phase 2  
Sediment Transport and Bed Evolution Phase 2  
Assessment of the Economics and Effectiveness of Alluvium Sorting as a Mine Waste Removal Strategy  
Coeur d'Alene Lake Management Plan Implementation

<b>Challenges Ahead .....</b>	<b>52 - 53</b>
<b>Appendix A - 2006 Work Plan .....</b>	<b>54 - 68</b>

## *Executive Summary*

The Basin Environmental Improvement Project Commission (BEIPC) is a locally based organization responsible for overseeing environmental cleanup to address heavy metal contamination, natural resource restoration and water quality in the Coeur d'Alene Basin (Basin). The BEIPC also participates in securing funding along with guiding and coordinating infrastructure upgrades and improvements to protect the environmental cleanup remedy and enhance living conditions in the communities of the Basin. The Basin is defined as the watersheds of the Coeur d'Alene River, Coeur d'Alene Lake and the Spokane River within the counties of Shoshone, Kootenai, and Benewah, as well as the Coeur d'Alene Tribal Reservation within Idaho.

During Calendar Year 2006, the BEIPC continued implementation of an updated five-year operating plan; developed annual and updated five-year work plans for work funded through the Superfund, other cleanup appropriations, and Clean Water Act (CWA) grants; and monitored project accomplishments by various implementing entities. CWA work was managed by BEIPC staff from grants made by the U.S. Environmental Protection Agency (EPA) to the State of Idaho Department of Environmental Quality (IDEQ) acting as the BEIPC fiscal agent. The BEIPC also began the development of a consolidated Upper Basin infrastructure revitalization plan and a Flood Control Plan to deal with potential flood damage to remediated areas.



**Chain Lakes, Lower Coeur d'Alene River**

## *BEIPC Overview*

### **Authorization and Duties**

The BEIPC was established by the Idaho State Legislature and implemented through a Memorandum of Agreement (MOA) among implementing parties to direct, and/or coordinate environmental remediation, natural resource restoration, and related measures to address water quality and heavy metal contamination in the Basin.

The Basin is considered to be Operable Unit 3 (OU-3) of the Bunker Hill Mining and Metallurgical Complex Superfund Facility, originally listed on the National Priorities List in 1983. Operable Units 1 and 2 (OU-1&2) are the populated, industrial, and undeveloped areas in what is known as the “Bunker Hill Box.” The EPA and IDEQ are the implementing agencies for OU-1&2. This report also contains some information for OU-1&2 concerning activities in the property sampling and remediation section and the water treatment section.

The BEIPC’s primary purpose is to work with the EPA and IDEQ to implement the Record of Decision (ROD) for OU-3 designed to advance the cleanup of heavy metals contamination throughout the Basin. In addition, the BEIPC is involved in:

- Implementing Phase II of the OU-2 remedy;
- Coeur d’Alene Lake management planning and implementation;
- Heavy metal contamination cleanup efforts at mining sites in the North Fork of the Coeur d’Alene River;
- Development of an Infrastructure Revitalization Plan for the Upper Basin; and
- Development of a Flood Control Plan to protect areas remediated under Superfund and other cleanup programs.

Legislation creating the BEIPC authorized appointment of a seven-member board comprised of:

- Four members from Idaho, one representing the state, and one each representing the county commissions from Shoshone, Kootenai, and Benewah Counties, appointed by the Governor of Idaho;
- One representative of the state of Washington appointed by the Governor of Washington;
- One tribal council member of the Coeur d’Alene Tribe appointed by the council of the Coeur d’Alene Tribe; and
- One federal representative of the United States appointed by the President.

Implementing language directed the BEIPC to appoint an Executive Director to manage the activities of the BEIPC. The Executive Director is Terry Harwood.

## **Current BEIPC Membership**

<b>Name</b>	<b>Title</b>	<b>Representing</b>
Sherry Krulitz, Chair	Shoshone County Commissioner	Shoshone County
Jack Buell	Benewah County Commissioner	Benewah County
Rick Currie, Vice Chair	Kootenai County Commissioner	Kootenai County
Chief Allan	Chairman, Tribal Council	Coeur d'Alene Tribe
Jay Manning	Director, Washington Department of Ecology	State of Washington
Toni Hardesty	Director, Idaho Department of Environmental Quality	State of Idaho
Elin Miller	Regional Administrator, R-10 EPA	Federal Government

## ***Program Management***

The BEIPC continues to operate in accordance with the Idaho statute and MOA between the governing entities. It is responsible for coordinating the activities of federal, state and local government agencies implementing the cleanup and restoration efforts and is also involved in the coordination of efforts to protect the cleanup remedies, human health, and the environment from the release and migration of contaminants through the establishment and implementation of Institutional Controls in the Basin and development of an Infrastructure Revitalization Program for the Basin communities. The BEIPC works with these agencies to establish annual work priorities and operating plans and provides project oversight and fiscal management for the CWA program through the office of its Executive Director and his staff. The office of the Executive Director is also involved in the development of a consolidated infrastructure inventory and revitalization plan for the Basin communities and analysis of the potential for flood damage to remediated areas as part of a program to protect and enhance the Superfund remedy in those communities. To assist the Executive Director in program management, planning, and implementation, volunteer staff "on loan" to the BEIPC from the states of Idaho and Washington, the EPA, and the Coeur d'Alene Tribe coordinate with the Executive Director and provide routine intergovernmental input on technical and policy issues. Other support groups include the Technical Leadership Group (TLG) and the Citizen Coordinating Council (CCC).

### **Technical Leadership Group (TLG)**

The TLG with its Project Focus Teams (PFTs) is the BEIPC primary technical advisory group. It is comprised of federal, state, local and tribal representatives who provide expertise in science, engineering, logistics, regulatory aspects, and land management in the Basin. The TLG advises the BEIPC on work planning and implementation while striving toward consensus-based recommendations. In 2006, the PFTs and TLG developed the 2006-2010 five-year and Calendar Year 2007 work plans, reviewed and approved CWA project changes, final CWA project reports and deliverables, studied and developed project and program proposals to

implement the remedy in OU-2 and 3, and developed the draft Basin Institutional Controls Program for rule making by the Panhandle Health District and the State Legislature. The TLG is composed of representatives from 23 government entities.

### **Citizen Coordinating Council (CCC)**

The CCC serves as an information conduit to and from the BEIPC on citizen, community, and special interest issues, and on environmental cleanup and restoration concerns. It is comprised of diverse political and geographical representatives and was established to provide local citizen review and input on Basin related work to the BEIPC.

### **Community Involvement**

During Calendar Year 2006, the BEIPC held meetings and deliberations open to the public and maintained an up-to-date Basin web site at: [www.basincommission.com](http://www.basincommission.com). Meetings were held at various locations within the Basin with locations and dates posted in local newspapers and at the BEIPC office in Kellogg, Idaho. In August, the BEIPC hosted a field trip for all interested parties to various project sites in the Basin to review and discuss completed and in progress project work and to discuss approaches to work programmed for the next few years.



**August BEIPC Field Trip**

## *Coeur d'Alene Lake Activities*

The selected remedy for the Coeur d'Alene (CDA) Basin, OU-3, defers Superfund remedial actions for Coeur d'Alene Lake (Lake). The State of Idaho and CDA Tribe have management responsibilities for the Lake. The OU-3 ROD anticipates that the State and Tribe, coordinating with federal agencies and local governments, will prepare and implement a CDA Lake Management Plan (LMP) outside of the Superfund process using separate regulatory authorities. One of the primary goals of the management plan is to control nutrient introduction and sediment metals mobilization and their effects on water quality in the lake. A lake management plan was prepared in 1995 and approved by many parties in 1996. BEIPC activities include funding a LMP Implementation Audit under a Clean Water Act sub-grant to determine how well the original LMP is being implemented. During 2006, the State and Tribe have been involved in a two phase mediation process. The first phase has been completed and entailed assessing the global issues surrounding the current impasses to develop an updated joint LMP. The report on this assessment will be finalized in January 2007. The second phase will attempt to mediate the impasses and develop a joint Tribe and State LMP. The State and Tribe provided numerous updates to the BEIPC on these LMP activities in 2006.

In 2006, BEIPC and Clean Water Act sub-grant implementing agencies were involved in the following actions in support of lake management:

- Management of an intensive three-year environmental monitoring program to support lake management planning;
- Continued monitoring of a pilot CDA River bank stabilization project to reduce the introduction of lead-bearing sediment into the Lake;
- Support and management of an educational program to improve public awareness of the Lake and its needs for continued protection;
- Completion of a project to develop computer models to assess sediment transport and bed evolution in the lower CDA River;
- Continued implementation of a project to develop a simulation model to evaluate the Lake's response to watershed remediation;
- Implementation of a pilot project to reduce nutrients entering the Lake from Mica Bay;
- Continued implementation of a project to survey aquatic vegetation in Benewah, Chatcolet and Round Lakes, tributaries to the Lake; and their potential impacts on the vegetation in the Lake;
- Implementation of a wastewater treatment plant pilot study for the City of Plummer to reduce nutrient loading to Plummer Creek and the Lake; and
- Implementation of a project to perform a nutrient load assessment and modeling to develop a management plan for Plummer Creek tributary to the Lake.



**Coeur d'Alene Lake**

## *Public Outreach and Citizen Involvement*

To encourage public participation in Basin improvement projects, the BEIPC issues news releases and posts announcements of its upcoming meetings to its web site. The public is invited to BEIPC and CCC meetings. General public comment opportunities are scheduled at each meeting.

### **CCC Meetings and Communication**

CCC meetings were held in February, May, and November 2006. All meetings were open to the public. At CCC meetings, members were updated on ongoing BEIPC and TLG activities and asked to provide input on a variety of issues. The CCC kept the BEIPC informed of its activities by providing meeting minutes and comments to commissioners prior to BEIPC meetings and by making presentations at BEIPC meetings. When appropriate, CCC comments were also provided to the TLG.

Approximately twice a month, CCC members were provided with email and/or U.S. mail updates on relevant activities in the Basin. CCC members were also routinely provided with notes from regular TLG conference calls.

## **Chronology of Selected Citizen Input through the Citizens Coordinating Council to the Technical Leadership Group and the BEIPC in 2006**

### **January-February**

- CCC members reviewed, discussed and provided comments to the BEIPC on the Lake Management Plan development process, stream impairments, the proposed Institutional Controls Program for the Basin, and the 2006 BEIPC work plan.

### **March**

- The CCC Chair presented the results of the February CCC meeting to the BEIPC board.
- CCC members had the opportunity to attend a public meeting on the proposed East Mission Flats Repository.

### **April-May**

- CCC members reviewed, discussed and provided comments on the proposed Basin Institutional Controls Program, the Lake Management Plan implementation survey, and the BEIPC 2006-2010 Five-Year Plan.

### **June**

- The CCC Chair presented the results of the May CCC meeting to the BEIPC board.

### **July**

- CCC members joined a PFT formed to address potential contaminant management controls on CDA Lake and the Spokane River..

### **August-November**

- CCC members reviewed, discussed and provided comments on the draft 2007 work plan and the ongoing Lake Management Plan implementation survey
- The CCC began planning the voting process for CCC chair and vice-chair positions.
- The CCC Chair presented the results of the November CCC meeting to the BEIPC.

## **Additional Outreach Activities**

In addition to the activities of the CCC, the various government entities represented by the BEIPC continue to support the TLG and CCC by being involved in the activities of those groups. The government entities have been involved in outreach activities including meeting with citizen groups, giving technical presentations, assisting local teachers by providing information and science-related items for instruction, participating in Basin events, holding tours of Basin project areas, maintaining information repositories throughout the Basin, and publishing various information documents to provide updates on Basin activities and to give answers to common environmental cleanup and improvement questions.

As part of the public outreach program, the BEIPC Executive Director has made numerous presentations to local business and community groups concerning activities of the BEIPC and planned cleanup actions and activities required to protect the remedy, human health, and the environment. The Executive Director also hosted a number of field reviews by Congressional staff and other interested parties.

## Calendar Year 2006 Work Accomplishments

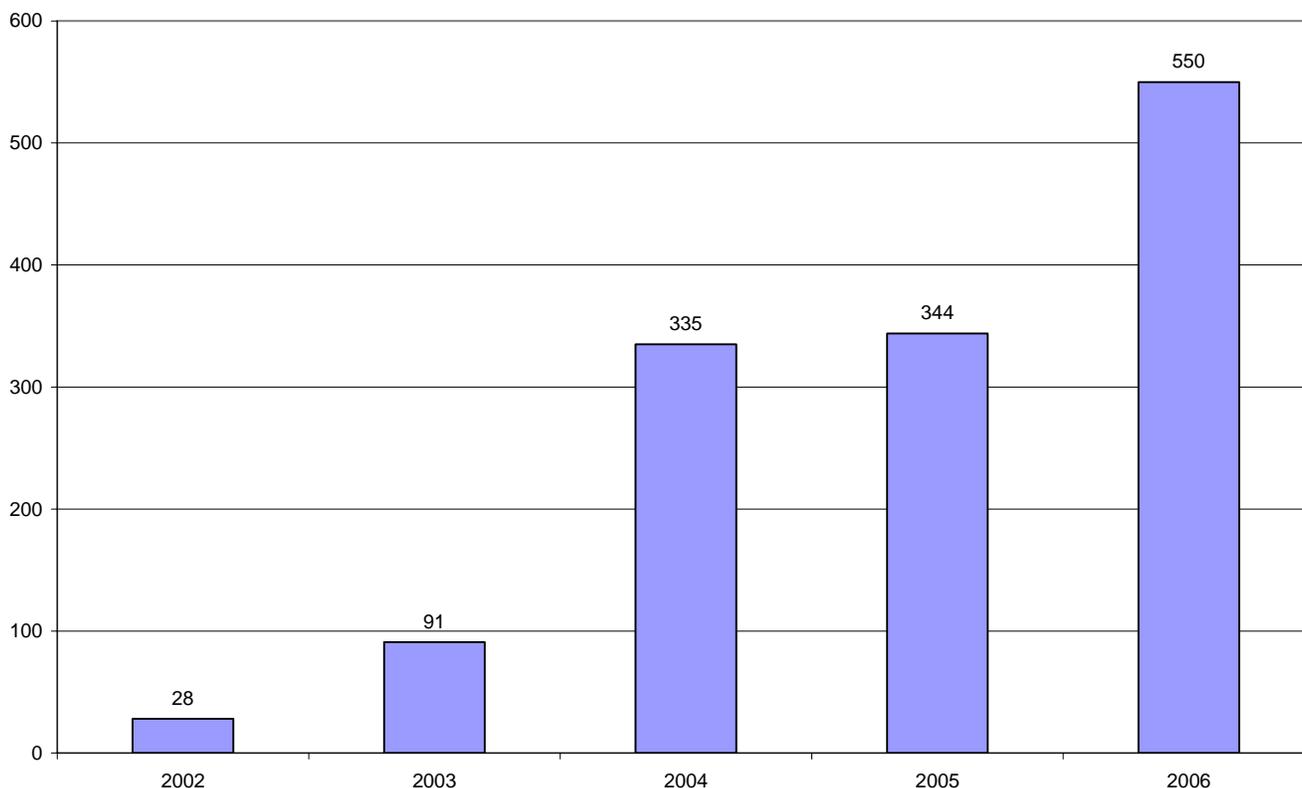
### Work Funded Through Federal Superfund Or Other Cleanup Funding:

#### Residential and Commercial Property Sampling and Remediation

##### 2006 IDEQ Basin Property Remediation Program (OU-3)

In 2006, the IDEQ remediated 550 residential and commercial properties through a cooperative agreement funded by the EPA and the State of Idaho. This accomplishment is the largest number of properties cleaned up (remediated) in any year since the Superfund Action in OU-3 began, a 60% increase over the 2005 season. 107 of those sites were considered high risk properties where the exposure risk was elevated because of the presence of small children or pregnant women. The total cost to clean up properties in 2006 was approximately \$11,000,000.

DEQ Basin Remediation 2002-2006



Because of the varying size of surface area for the properties requiring clean up, the number of properties remediated is not the only, and not the most meaningful, statistic to track. By property counting, a property with a small surface area (square feet) remediated would have equal weight as a property with a very large

surface area. Therefore IDEQ also tracks the surface area cleaned up on each property. The total surface area of the land cleaned up in 2006 was 2,600,000 square feet, about 60 acres, a 27% increase over 2005. IDEQ tracks the volume of contaminated soil and roadway or driveway material (gravel) excavated from each property and disposed of in waste repositories. The amount of contaminated soil and gravel excavated and placed in the Big Creek Repository was approximately 72,000 cubic yards. This contaminated material was hauled in 9,350 individual truckloads. IDEQ estimates the trucks drove a total of over 200,000 miles delivering contaminated material to the repository and returning to the individual property sites.

**2,600,000** Square Feet Remediated  
**72,000** Cubic Yards Removed and Disposed

Protection of the health and safety of the workers and the community is of prime importance to the Program. In 2006, IDEQ hired a Health and Safety Coordinator to work with contractors to emphasize safety during this busy field season. In cooperation with the contractors and consultants the number of incidents was minimized to about 30 for the entire season. None of the incidents caused serious injuries. Considering the size of the Program, the large work force employed, the truck traffic, and the location of the work in residential areas this safety record is excellent. Even so, the goal for the Program is “Zero Incidents”.

In addition to cleaning up properties each year, IDEQ consultants collect soil samples and send them in for analysis to determine which properties will require remediation in the future. In 2006, IDEQ sampled 1,068 properties. This sampling will become the basis for the 2007 and beyond property remediation programs. Almost 29,000 sampling holes were completed on those properties. After compositing to ensure representative samples 14,600 samples were sent to the EPA laboratories for analysis.

**1,068** Properties Sampled in 2006  
**14,600** Samples Sent for Analysis

Remediation contractors provide contractual warranties to IDEQ for their work. Replacement vegetation is warranted for one year and proper drainage for two years. In 2006, IDEQ made a serious effort at providing follow-up telephone calls and contacts by letter to remediated property owners and developed a computer database to track complaints, warranty issues, and the need for further remediation efforts. IDEQ contacted approximately 594 property owners whose properties were remediated prior to 2006. Approximately 1,150 properties are now in the database, inclusive of the 2006 completed properties. Of those on the database, IDEQ received 180 “complaints”. A complaint is defined as either identifying an actual warranty issue or a more

generic type of complaint. Of the 180 complaints, 67 properties were assigned as warranty issues needing additional field work. The work on 48 of those was completed. The Warranty Program will continue on an annual basis as new properties are added and old properties are removed from the list.

IDEQ encourages the employment of local workers for the program where possible. As in 2005, the Program generated about 250 jobs. The majority of employees were from the Upper Basin (Silver Valley).

**250 Local Jobs Provided**

**Companies Providing Goods and Services Locally**

Company	Location	Service
Ferguson Contracting	Kellogg	Remediation Contracting
McGillivray Environmental	Osburn	Remediation Contracting
NASCO	Smeltonville	Remediation Contracting
Stewart Contracting	Pinehurst	Remediation Contracting
Goodson Productions	Kellogg	Video Documentation
Hagaman Inc.	Page	Gravel Supplier
Zanetti Brothers	Osburn	Soil and Gravel Supplier
American Analytical	Osburn	Laboratory Services
SVL Analytical	Kellogg	Laboratory Services
Washington Group	Boise/Kellogg	Project Engineering and Management
TerraGraphics	Moscow/Kellogg	Environmental Consulting and Management
IDEQ	Boise/Kellogg	Project Management

**2006 UMG “Box” Remediation Program (OU-1)**

The Upstream Mining Group’s (UMG) “Box” Remediation Program completed cleanup in OU-1 in 2006 with a final total of about 3,200 residential and commercial properties and street right-of-ways remediated. UMG also began the site certification process in 2006 that will continue into 2007. This process is required before EPA can certify that the UMG cleanup in a community has been completed. Certification of the Box is expected to take a year.



**Property Remediation**



## **Water Treatment**

During 2006, the Water Treatment Project Focus Team (PFT) continued to focus on issues related to water treatment in the Canyon Creek drainage. To reduce zinc loads to the South Fork Coeur d'Alene River, the OU-3 ROD calls for treatment of up to 60 cubic feet per second (cfs) of Canyon Creek surface water. The ROD assumes a yearly average treatment reduction of 322 pounds per day of dissolved zinc load directly in Canyon Creek, and requires that treatment be demonstrated for water near the mouth of the creek. The focus of recent investigations and pilot studies has been on achieving this goal through remediation of groundwater in Canyon Creek.

In 2006, EPA continued the evaluation of various options to address surface water and groundwater quality impacts in the lower Canyon Creek area. Evidence from previous studies indicates that changes in Canyon Creek metal load occur in selected reaches where groundwater discharges to the creek. During 2006, EPA conducted a hydrologic investigation to characterize hydraulic properties of the alluvial aquifer system, established a series of new groundwater and surface water monitoring stations to support hydraulic and water quality monitoring, and evaluated surface water and groundwater interactions. Each of these activities is discussed in more detail below.

### Well and Stream Gauge Installation

As part of the hydrologic investigation additional information was required regarding the alluvial stratigraphy of the Canyon Creek drainage as well as groundwater levels and dissolved metals concentrations. The following activities were completed in 2006: Installation of eight 4-inch diameter aquifer test wells and thirteen 2-inch diameter monitoring wells in the alluvial aquifer system (shallow and deep completions) to support aquifer testing and groundwater monitoring; installation of three stream gauging stations along the edges of the existing Canyon Creek channel; and completion of minor stream channel modifications adjacent to the stream stage monitoring stations to facilitate more accurate stream flow gauging. The hydrologic data and information from these wells, stream gauges, and piezometers is being used in the development of a groundwater flow model.

### Aquifer Testing

An aquifer test was conducted in September 2006 to develop an understanding of the spatial distribution of aquifer transmissivity and storage properties throughout the contaminated portions of the aquifer targeted for possible remedial action. To a lesser degree, aquifer properties upstream and downstream of the possible remedial areas will also be evaluated to gain an understanding of the overall movement of water through the Woodland Park area

### Groundwater/Storm Water Interaction Monitoring study

Another critical component of the groundwater and metals loading budget is the quantity of groundwater, and therefore metals, discharging to the creek throughout the year. In order to better define this relationship, three monitoring well clusters located adjacent to the creek were equipped with pressure transducers and data loggers along with stream stage gauging stations to provide accurate stage fluctuation information. This also required, for comparison purposes, re-establishment and collection of data at previously used monitoring. The

information collected during this testing program is being used in the development of a groundwater flow model.

### Groundwater Flow Modeling

To support the overall analysis and interpretation of data collected at the Canyon Creek site, development of a three-dimensional finite element groundwater flow model of the drainage was initiated in 2006. The groundwater flow model grid will cover a significant portion of the Canyon Creek drainage area. This effort also required accurate base mapping for the Woodland Park area. Aquifer testing and surface water/groundwater interaction data is being used to further calibrate the model. The groundwater model will be an effective tool for assessing various types of hydraulic influences, and the overall effectiveness of a groundwater remedy at reducing the metals load to the Canyon Creek drainage and the South Fork Coeur d'Alene River. The modeling work will be completed early in 2007.

The overall results from the hydrologic investigations conducted during 2006 will be presented in a technical memorandum early in 2007 documenting the field efforts, conceptual model development, numerical modeling efforts, and screening of remedial alternatives.



**Canyon Creek**

## Mine and Mill Sites

During 2006, the Mine and Mill Project Focus Team (PFT) focused on remediation of the following four Upper Basin mine and mill sites:

- Upper and Lower Constitution - Pine Creek
- Golconda - South Fork CDA River
- Rex - East Fork Nine Mile Creek
- U.S. Bureau of Mines Site - Osburn

The OU-3 ROD identified at least 16 contaminated mine and mill sites with potential for human health exposures, primarily from recreational use. The above sites were selected from a screening process that incorporated a number of factors including site size, property ownership, complexity, and potential for human health exposures. Selected sites were incorporated into the BEIPC five-year work plan. During 2006, the following activities were conducted at the above sites:

**Constitution** – The Constitution site is located along Pine Creek approximately 7.5 miles south of Pinehurst. Work at the Constitution site was conducted by the U.S. Army Corps of Engineers (COE) through an Interagency Agreement with EPA and BLM. The COE completed the remedial action construction for the Upper and Lower Constitution during CY 2006. The remedy primarily involved consolidation of mine tailings from the upper and lower mine sites into a single capped repository at the Upper Constitution Mine. Construction began in May 2006 and was completed in October 2006. The construction activities focused on the mine and mill tailings areas, remediation of the waste rock areas, the mine adit, and stream and bank stabilization work.

**Golconda Mine** – This site is located along the South Fork Coeur d’Alene River near Wallace and is adjacent to the Trail of the Coeur d’Alenes. The remediation work at this site was conducted in two phases. During 2006, EPA completed the designs for both the Phase I and Phase II work. Construction of the Phase I surface water controls was implemented by IDEQ in the spring of 2006. The purpose of this work was to drain areas of the site to enhance drying in order to facilitate the Phase II work later in the summer. The Phase II design includes the following activities: Grading and capping of the tailings pond; armoring the base of the waste rock pile; excavation of the tailings in the mill area and re-location to upland capped disposal area; installation of erosion protection on the stream bank; and revegetation of the site. Construction of the Phase II work began in September 2006 with COE oversight. The majority of the remedial action work was completed prior to the onset of winter weather in December 2006. In the spring of 2007, the final grading and capping of the consolidated waste area will be completed along with site-wide hydro seeding.

**Rex Mine** – The Rex mine site is located near the East Fork of Nine Mile Creek and has historically been used for recreational purposes and ATV use. During 2006, EPA completed the design for the tailings dam toe buttress. The purpose of the buttress is to provide additional stability to the steep face of the tailings impoundment. Construction of the buttress was completed by the BLM in October 2006. The design for the remainder of the site is near completion. This design includes the following elements: installation of a surface/groundwater collection pond; consolidation of all tailings on site; diversion of adit and surface water flow (Rex Creek) away from the tailings impoundment; removal of debris and burial of mine concentrates at the site; overall grading of the site; capping of tailings; and revegetation. Construction for this work is scheduled to begin during the summer of 2007 with COE oversight.

**USBM** - This site is located along the South Fork of the Coeur d'Alene River near Osburn and was a demonstration site developed by the U.S. Bureau of Mines for disposal of tailings. It is currently an area actively used for ATV use. During 2006, EPA completed field work to characterize the site and fill data gaps for development of a remedial action design. Design completion and construction of the remedy is anticipated in 2007.



**Lower Constitution - Pre-Remediation**



**Lower & Upper Constitution Mine Remediation**



## **Phase II Component of OU-2 Remedy**

As part of the State Superfund Contract (SSC) for OU-2, a Comprehensive Cleanup Plan (CCP) was developed to define a path forward for remedy implementation in OU-2. The CCP calls for a phased approach to implementing the OU-2 remedy. In Phase I, the focus is on remedial actions aimed at removing and consolidating extensive contamination from various site areas, demolition of structures, development and implementation of an ICP for OU-1 and OU-2, future land use development, and public health response actions. Phase I work also includes support studies for long-term water quality improvement and evaluation of Phase I remedial action effectiveness.

Phase II of the OU2 remedy will be implemented following completion of source control, removal activities and evaluation of the effectiveness of these activities in meeting water quality improvement objectives. Phase II will consider any shortcomings encountered in implementing Phase I and will specifically address long-term water quality, ecological and environmental management issues. Both ROD and SSC amendments will be required prior to implementation of any Phase II remedial actions. EPA and IDEQ are the responsible parties for modifying the ROD and negotiating a State Superfund Contract.

The BEIPC will participate in Phase II activities in OU-2 by providing technical input into the remedy alternative development and selection (including evaluation of technical reports, pilot studies, and feasibility study documents), providing input into the public processes associated with ROD modifications and educating the community and legislative bodies of the need for funding for this work.

The following provides a brief overview of EPA and IDEQ's concept for how the agencies will jointly move forward in conjunction with the BEIPC to set the stage for evaluation and potential implementation of an OU-2 Phase II remedy.

### Phase I Evaluation

The OU-2 Phase I evaluation is currently underway by EPA and IDEQ. The following documents have been developed to provide a road map to refine understanding of the OU-2 environmental system and facilitate Phase II remedy implementation:

#### **Revised OU-2 Conceptual Site Model (CSM)**

The CSM presents the current understanding and status of contamination within the OU-2 environmental system. Within this document, data gaps and uncertainties associated with the environmental system are presented. This is a living document and will be updated as required to refine the understanding of the OU-2 environmental system and to provide a basis for future actions.

#### **Statistical Trend Analysis of Groundwater and Surface Water**

A statistical analysis of water quality monitoring data generated through April 2004 as a result of OU-2 water quality monitoring has been performed to analyze contaminant data for trends on a location specific and, to the extent possible, on an OU-2-wide spatial basis. Included in this analysis is an evaluation of correlations between contaminants and parameters measured within OU-2.

### **Phase I Remedial Action Characterization**

This characterization of Phase I remedial actions includes identification of the extent of these cleanup activities and their impact on contaminant nature and extent and potential release mechanisms associated with these sources. This document refines the understanding of remedial actions performed as part of Phase I cleanup activities within OU-2.

### **Revised OU-2 Environmental Monitoring Plan**

This revised status and trends monitoring plan for groundwater, surface water, and ecological receptors within OU-2 provides data to evaluate the performance of the overall OU-2. Remedial action effectiveness monitoring plans have also been developed for the larger Phase I remedial actions. The revised OU-2 monitoring plan is coordinated with the OU-3 Basin Environmental Monitoring Program. Implementation of the revised monitoring plan began in spring 2006.

The above documents were made available to the OU-2 Phase II Project Focus Team and other interested parties. Presentations on the report findings were made to the TLG and BEIPC in early 2006.

The EPA and IDEQ are currently preparing an updated OU-2 water quality assessment which will include an additional two years worth of monitoring data. This analysis will include data collected from 2004 to mid 2006 and is expected to provide a better understanding of current site conditions. EPA and IDEQ are also preparing an assessment of the Phase I remedial actions which will build upon the aforementioned documents. This report will build on the information contained in the characterization and statistical analysis reports and, to the extent possible, present an evaluation of the impacts of remedial actions on water quality and ecological receptors in OU-2. The assessment is expected to be completed in early 2007.

### OU-2 Phase II Remedy Consideration

Following the above evaluation of Phase I remedial actions in OU-2, the next step is to further set the stage for consideration of Phase II remedy alternatives and potential implementation. The following evaluations will facilitate definition of OU-2 Phase II:

#### **Identification of OU-2 Source Areas of Concern**

Based on the results of the Phase I evaluation, source areas within OU-2 will be identified and ranked based upon a set of criteria to be established. The criteria will include a relative contaminant metal loading, impacts on environmental receptors and other factors to be determined. Data gaps that need to be filled to confirm and quantify source areas and their resultant impact on the environmental system may be identified and addressed.

#### **Identification and Evaluation of Potential OU-2 Phase II Remedial Actions**

Based on the results of the identification and relative ranking of source areas identified within OU-2, conceptual remedial actions (RAs) will be developed to address the sources and evaluated based on implementability, effectiveness and cost of supplemental remedial actions.

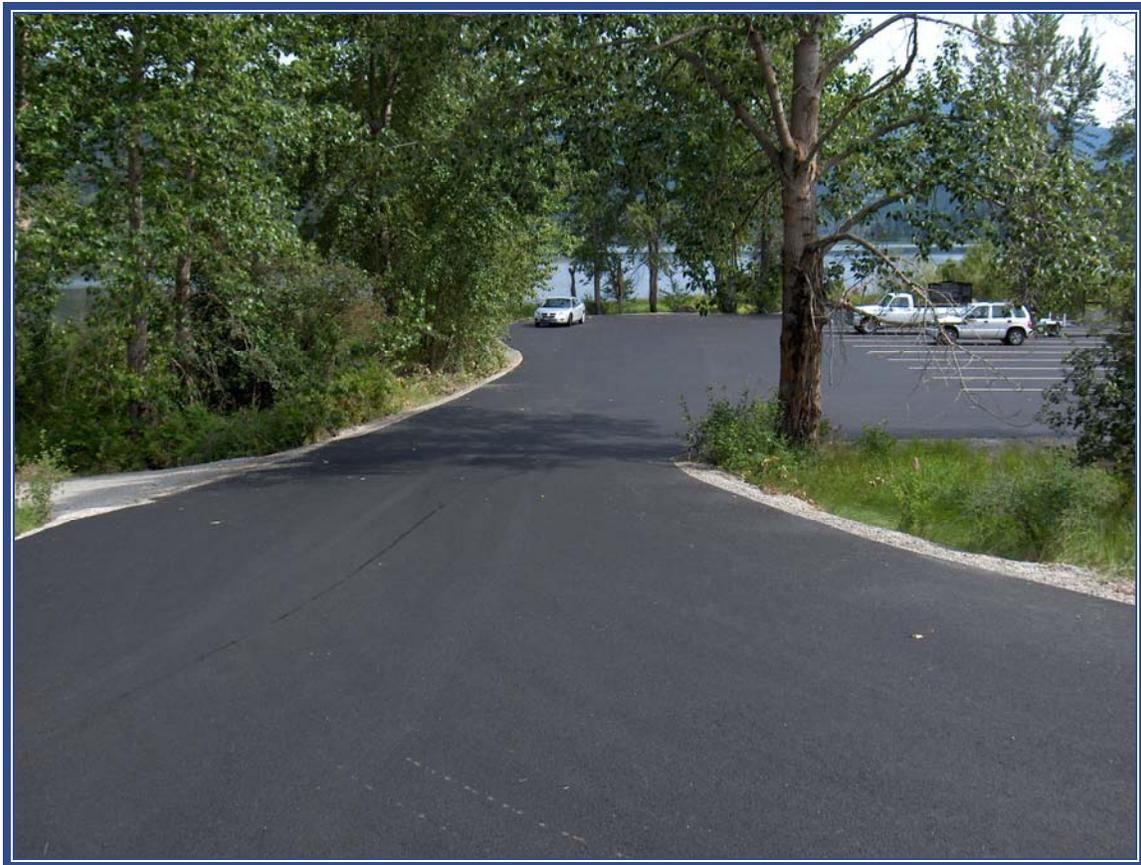
### **Recreational Areas**

The ROD for OU-3 states that developed recreational areas such as boat ramps, picnic areas, and campgrounds with surface soils containing elevated metals concentrations (lead > 700 mg/kg and arsenic > 100 mg/kg) will

be remediated. The EPA can use its CERCLA funding to remediate state, county, or local government owned recreational properties. However, EPA CERCLA funding cannot be used for sites on federal land managed by the Forest Service and the BLM. The primary challenge for the Recreational Area Project Focus Team (PFT) is successful identification of properties on which EPA or the State can conduct remedial actions.

The Rainy Hill Boat Launch area on federal land was paved by the Forest Service as a solution to the problem of recontamination of the area during spring runoff. In the past, the Forest Service had capped the area with crushed rock to remediate the contaminated surface. Spring runoff events would recontaminate the area each year with metals containing sediments deposited when the water receded. Experience at the paved East of Rose Lake Boat Launch found that paving recreation areas that are subject to recontamination is an acceptable solution for protecting the investment in a cap. The paved area can be washed off with a high pressure hose. This approach will be considered at other sites.

In the first quarter of 2006, members of the Recreational Area PFT and the Executive Director participated in a Kootenai County initiative to develop a Multiple Use Waterway Management Plan spearheaded by Kootenai County Parks and Waterways. Unfortunately, this initiative which had great promise for addressing recreational areas through a multi-stakeholder collaborative process has stalled due to personnel changes at the county.



**Rainy Hill Boat Launch**

## **Basin Environmental Monitoring**

### **Basin Environmental Monitoring Plan**

The Basin Environmental Monitoring Plan (BEMP) for OU-3 was issued in March 2004 with BEIPC approval. The monitoring program is required under the OU-3 ROD and is critical to the successful implementation and evaluation of the Selected Remedy. The BEMP is designed to obtain technical data for assessment of long-term project status and trends, evaluate overall effectiveness of the Selected Remedy, evaluate progress toward cleanup benchmarks, and future CERCLA five-year reviews.

The BEMP implements the environmental monitoring program established as part of the ecological component of the OU-3 Selected Remedy. The environmental media of focus in the BEMP are surface water, soil/sediment, and biological resources. The major goal of the BEMP is to monitor and evaluate the progress of the remedy in terms of improving ecosystem conditions. Consistent with that goal, the BEMP provides data relative to the following Basin-wide monitoring objectives:

- Assess long-term status and trends of surface water, soil, sediment, and biological resource conditions in the Basin;
- Evaluate the effectiveness of the Selected Remedy;
- Evaluate progress toward cleanup benchmarks;
- Provide data for CERCLA-required five-year reviews of the progress on remedy implementation; and
- Improve understanding of Basin processes and variability to improve the effectiveness and efficiency of subsequent remedial action implementation.

BEMP monitoring activities were initiated in CY 2004 and continued in 2006. The U.S. Geological Survey conducted surface water sampling and the U.S. Fish and Wildlife Service implemented the biological resource monitoring under Interagency Agreements with EPA. EPA's contractor, CH2M Hill, conducted the sediment sampling in 2006. Biological resource monitoring activities conducted during 2006 included waterfowl and songbird population surveys, riparian habitat analysis, fish diversity/abundance, and fish tissue metals analysis.

Results from surface water, soil and sediment sampling are included on EPA's web-based environmental data repository for the site at [www.storet.org](http://www.storet.org); biological resource sampling results are available separately on EPA's web page for the Site at the following web address: (<http://yosemite.epa.gov/r10/cleanup.nsf/sites/cda>).

### **Remedial Action Effectiveness Monitoring**

Remedial action effectiveness monitoring focuses on areas that have been addressed by remedial actions to assess the success and effect of a given remedial action. By comparison, the BEMP will address basin-wide status and trends by monitoring a limited number of strategic locations. Both the remedial action-effectiveness and long-term monitoring plans will be integrated by coordinating monitoring to generate comparable data (same timeframe or synoptic) and using common sampling locations where possible. Effectiveness monitoring, while not detailed in the BEMP, will incorporate similar monitoring hypotheses as those included in the BEMP. The adaptive management approach will maximize the utility of effectiveness monitoring data through comparison of results to expectations.

Remedial action effectiveness monitoring is being included in the designs and implementation plans for OU-3 ecological-related remedial actions. Remedial action effectiveness monitoring is being implemented at the human health-related remedial action implemented at the East of Rose Lake Boat Launch and Highway 3/Trail of the Coeur d'Alenes recreation site. Remedial action effectiveness monitoring plans are being established for mine and mill site cleanups and the Canyon Creek water treatment project.

## **Repositories**

### **Big Creek Repository**

Disposal of wastes for the Basin cleanup continued during 2006 at the Big Creek Repository (BCR). This repository is being developed on a reclaimed tailings pond near the confluence of Big Creek and the South Fork of the Coeur d'Alene River. While IDEQ and EPA collaboratively manage the site, IDEQ, with funds from EPA, has assumed the lead role to manage construction and daily activities.

During 2006, the Basin Property Remediation Program generated approximately 72,000 cubic yards of excavated contaminated materials from many sites. This material was placed and compacted at the BCR resulting in the use of 52,000 cubic yards of repository capacity. Waste haulers to the BCR are responsible for dumping their waste in designated areas and performing the appropriate decontamination on their haul vehicles. IDEQ's contractor oversees these activities. In 2006, the water quality monitoring program at the site found that it had not impacted adjacent surface or ground waters, some of which were previously impacted by historic mining activities.

In addition to on-going operations, a new decontamination station was constructed to replace the current station in order to accommodate more trucks and improve traffic flow. In another effort to improve operational efficiency at the repository, a design modification for final site configuration was completed. The new configuration plan increases the total capacity by approximately 175,000 cubic yards. The increased capacity of the new plan was dependant on raising high-voltage transmission lines located across the site. Some of those lines were raised in 2006, the remainder are planned to be raised in 2007. The modified design for the final configuration would result in a total capacity of approximately 425,000 cubic yards. Assuming the BCR currently contains about 190,000 cubic yards generated during the five previous construction seasons (2001-2006), the site is now nearly 1/2 full. The repository should last roughly another 4-5 years; assuming a continued fill rate of approximately 50,000 cubic yards per year.

### **New Repositories**

As summarized above, the BCR has limited capacity requiring a new facility to be available for use within the next 4-5 years. Therefore, the task of siting a new repository location has been a priority function of IDEQ and EPA. The agencies worked collaboratively to produce a Waste Management Strategy (WMS) that will be used as a tool for siting and developing repositories throughout the Coeur d'Alene Basin. IDEQ has been funded through a cooperative agreement with EPA to complete the WMS and to identify additional viable repository sites.

The most promising site found during 2004 was the East Mission Flats Site (EMF) located on private land. This site was purchased by the State of Idaho in July 2006. The EMF site covers approximately 19 acres. In addition to numerous presentations and discussions conducted during 2005 - 2006 with the Repository PFT,

IDEQ and EPA presented the EMF concept to the Kootenai County Planning representatives, the TLG, the CCC, and twice to the BEIPC. Based on input from the BEIPC, public meetings were held at the Mission State Park to present preliminary information on the siting of the proposed facility to local residents. The public provided key input to the EPA and IDEQ regarding the Coeur d'Alene River's floodplain behavior near this site. Consequently, IDEQ and EPA worked with the U.S. Army Corps of Engineers to further analyze potential flood impacts to the proposed repository. In 2006, those impacts were quantified and conceptual designs completed. IDEQ completed a 30% design of the facility in the fourth quarter of 2006. That information will be shared with the Repository PFT, TLG, and BEIPC. It is anticipated that EPA and IDEQ will complete preliminary designs for the facility in the spring of 2007, so that a small portion of the EMF will be open to accommodate Institutional Controls Program wastes from the Basin.

In addition to EMF, the agencies have conducted limited geotechnical analysis of the Osburn Ponds Site near the city of Osburn. Preliminary results indicate that the site is generally stable enough to accommodate significant volumes of waste materials. Additional technical analyses will be required for this site and will likely be conducted in 2008 or 2009, as there is no longer an urgent need for new repository development in the Upper Basin because the capacity at BCR has been increased. Based on current information, repository needs in the Lower Basin are not immediately pressing. Consequently, the agencies are focusing future evaluations for repository sites in the Upper Basin, which will include the Osburn Ponds Site.

### **Infrastructure Revitalization**

During 2006, the BEIPC completed an inventory of Upper Basin community infrastructure including streets and roads, drinking water and waste water systems, and natural gas systems. This is the first phase of a project to develop an Infrastructure Revitalization Plan for the Upper Basin. This effort will be combined with the efforts of the Funding PFT to evaluate funding sources and present an assessment of funding availability. Infrastructure revitalization and its effects on the Superfund remedy must be coordinated, and in some cases, infrastructure revitalization can be included in the remedy.

### **Remedy Protection and Flood Control**

In 2006, the BEIPC completed a flood control structure inventory and developed maps that indicate the potential for flood damage to remediated areas in the Basin upstream from Harrison, Idaho. Based on this data, the BEIPC with funding support from EPA, is developing a Flood Control Plan to protect the remediated areas.

### **Institutional Controls**

Enforcement rules for an Institutional Controls Program (ICP) administrative area from the confluence of the CDA River and CDA Lake to the headwaters of the South Fork CDA River in OU-3 were developed by the Executive Director, TLG and Panhandle Health District (PHD) staff. The draft rules have been approved by the BEIPC and PHD Board and submitted to the Idaho Legislature for approval. When approved, PHD will implement the new ICP program in conjunction with the ICP in OU-1 and 2. Implementation of the Basin ICP is anticipated in 2007.

The BEIPC formed a PFT to study the need for contaminant management on a site specific basis in the CDA Lake and Spokane River portions of OU-3. The PFT began work in August 2006 and will be working with the

TLG and CCC to formulate final recommendations concerning the need for contaminant management in these areas of OU-3 in 2007. The need for further action will be determined after these recommendations have been presented to the BEIPC.

## *Calendar Year 2006 Work Accomplishments*

### **Work Funded Through CWA Grants**

Funding from the appropriations for Federal Fiscal Years (FY) 2002, 2003, and 2004 under the Clean Water Act (CWA) Section 104(b) (3) has been made available for BEIPC project work. Under the CWA, these funds are to be used to demonstrate how *“federal, state, and local agencies can cooperatively conduct and promote the coordination and acceleration of research, investigation, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of pollution.”*

Funding available for FY 2002 projects totaled \$2,000,000; FY 2003, \$1,788,300; and FY 2004, \$1,988,200. Following is a summary of work accomplished to date on these projects:

### **FY 2002 Grant Projects**

Title and Implementing Entity	Sub-Grant	Costs as of 12/31/06
Lake Monitoring Water Quality Studies USGS, CDA Tribe, USFWS	\$675,000	\$620,063.74
Streambank Stabilization IDEQ BLM	\$445,000 \$15,540	\$467,226.80
Lake Education and Information Outreach Program CDA Tribe and KSSWCD	\$80,000	\$77,148.73
Mullan Inflow and Infiltration Assessment South Fork CDA River Sewer District	\$800,000	\$764,010.48
Grant Total	\$2,000,000	\$1,928,449.75

Note that the budget for the Streambank Stabilization project has been augmented by an additional grant in 2003.

### **Lake Monitoring Water Quality Studies**

**Sub-Grant Amount** - \$675,000 (a. \$515,000 USGS, CDA Tribe; b. \$160,000 USFWS)

**Costs as of 12/31/06** – a. \$486,427.52 & b. \$133,636.22

## **Portion (a)**

**Estimated % Complete** – 95%

**Purpose of Project** – Conduct monitoring of lake water quality to assess nutrient, sediment, and metal loading, and status of and potential trends in lake water quality; to assess improvements/impacts from upstream environmental clean-up projects; and assess impacts from further development projects along the lakeshore.

**Methodology** – Utilize highly focused sampling of physical, chemical, and biological characteristics over a wide range of spatial and temporal conditions in order to evaluate the interaction of metals, nutrients, lake productivity, and ecological conditions. Sampling stations included five open-lake stations that were visited eight times per year by USGS and twelve near-shore stations visited four times per year by the CDA Tribe.

**Status of Project** – As described in the work plans, three water years (2004-2006) of monitoring at the 5 open-lake sites have been completed by USGS, two years (water years 2004-2005) of sampling 12 bays, and the one year (water year 2005) of near-shore metals sampling (funded by a supplemental 2005 CWA grant, South Lake Sampling Project #B402) at 6-8 additional sites along the southeastern shore of the lake have all been completed by the CDA Tribe and USGS. A draft report titled “*Coeur d’Alene Lake, Idaho: Insights Gained from Limnological Studies of 1991-92 and 2004-06*” by Paul Woods and Mike Beckwith has been completed. However, Dr. Woods retired from USGS in March 2006, substantially delaying completion of the final report. Completion of the final report is expected by June 2007. The cooperative agreements governing these Clean Water Act / BEIPC projects between the CDA Tribe and USGS and the BEIPC have been modified to reflect this delay in report completion, with ending dates now of 6/30/2007.

**Conclusions** – The year-round sampling program has successfully tracked the annual cycle of lake productivity in relation to inputs and outputs of nutrients and metals. These projects will provide (in a USGS report) a characterization of current water quality conditions and trends, a comparison with conditions found in the early 1990s studies, and a strategy for efficiently and effectively monitoring lake water status and trends over the long-term.

## **Portion (b)**

**Estimated % Complete** – 80%

**Purpose of Project** – Ecological monitoring of Coeur d’Alene Lake under this Clean Water Act grant is designed to identify baseline conditions for ecological receptors in the Lake. This information is necessary to determine present conditions and future changes in the ecological condition of the lake. These studies include: (1) an evaluation of bull trout health based on water quality parameters collected by other parties from the lake; (2) an evaluation of waterfowl health through an assessment of lead (Pb) concentrations in waterfowl blood and sediment Pb concentrations in waterfowl feeding areas; and (3) an evaluation of metal residues in whole fish as a baseline of metal bioavailability.

**Status of Project** – A final report evaluating the exposure of waterfowl to Pb in CDA Lake was provided to the BEIPC in May 2005. This report was subsequently presented to the BEIPC during the February 2006 BEIPC meeting. A final report evaluating CDA Lake fish exposure to metals of concern and the potential risk to

ospreys as a representative piscivorous ecological receptor was provided to the BEIPC in June 2006. This report was subsequently presented to the BEIPC during the November 2006 BEIPC meeting.

**Conclusions** - Lead concentrations in palustrine and lacustrine sediment from several CDA Lake bays were higher than those in other Lake reference areas, and were also higher than Bunker Hill Superfund Site target action levels and suggested site-specific toxicity thresholds for swans. Mean blood lead from mallard and wood ducks sampled from bays were within lead toxicity ranges for waterfowl associated with clinical and severe clinical lead poisoning. Based on correlations between blood lead and the sediment ingestion index, waterfowl using CDA Lake appeared to be exposed to lead by ingesting contaminated lake sediment.

Mean lead and zinc concentrations observed at all fish sampling locations were above 1971-1986 averages observed elsewhere, as were mean cadmium in all locations except for Round Lake. Fish testing results corroborated waterfowl data in concluding that mining-related metals from the Coeur d'Alene Basin have been transported to CDA Lake and are being accumulated by organisms associated with the Lake. The locations of Harrison Slough, Powderhorn Bay and Cottonwood Bay at the mouth of the CDA River, Beauty Bay, Mica Bay, and Blackwell Island and Cougar Bay near the Spokane River outflow of CDA Lake were the areas studied with the greatest concern for ecological receptor exposure to sediment contaminated with metals.

### **Streambank Stabilization**

**Sub-grant Amount** - \$445,000, \$15,540 BLM Funding

**Revised Sub-grant Amount** - \$460,540 IDEQ

**Costs as of 12/31/06** - \$467,226.80

**Estimated % Complete** – 100 %

**Purpose of Project** - Construct and monitor the effectiveness of several techniques to protect the CDA River banks from the erosive forces of boat wakes.

**Status of the Project** – All work complete in 2005 with the exception of project effectiveness monitoring. The site was surveyed prior to construction, monitored in 2005 and 2006 and will be monitored in 2007 to document changes. Monitoring activities will include measuring cross-sections, bathymetry, fish surveys and erosion pins and photo documentation.

**Conclusions** - All treatments are performing well. Once the monitoring phase is complete, more definitive conclusions are likely. Monitoring is funded in a 2003 sub-grant and the results of the monitoring will be reported in a monitoring results report to augment the final construction report already approved.

### **Lake Education and Outreach Program**

**Sub-grant Amount** - \$80,000 (\$50,000 to the Coeur d'Alene Tribe, \$30,000 to the Kootenai/Shoshone Soil and Water Conservation District (KSSWCD))

**Costs as of 12/31/06** – \$49,632.91 CDA Tribe, \$27,515.82 KSSWCD

**Estimated % Complete** – 100%

**Purpose of Project** - This project seeks to improve water quality in CDA Lake by developing an information and education program that will educate the public on ways to reduce the amount of nutrients entering the Lake and its tributaries. Develop and present an educational power point presentation that contains historical and current information on how communities established and flourished within the basin as well as provide ways to ensure the water quality of the Lake, and produce and distribute an educational lake map.

**Status of Project** - All work complete, 2006.

**Conclusions** - The Coeur d'Alene Tribe and KSSWCD prepared a brief summary of their perception of the effectiveness of this public education outreach, and if directed by the BEIPC, will assist in the development of a funding proposal for further lake education public outreach including another printing of the lake education map.

### **Mullan Inflow and Infiltration Assessment**

**Sub-grant Amount** - \$800,000 South Fork Sewer District (SFSD)

**Costs as of 12/31/06** - \$764,101.48

**Estimated % Complete** – 100 %

**Purpose of Project** - This project evaluated sources of metals loading to treatment facilities, investigated the potential reduction of metals loading to the South Fork Coeur d'Alene (SFCDA) River, determined the efficacy of infiltration and inflow (I/I) removal projects to reduce peak plant flows, and advanced the current state of knowledge with regard to the cause and effect of such efforts to reduce pollution, transaction costs, and community coordination.

**Status of Project** – All work complete, 2006.

**Conclusions** – The key to I/I removal is the ability to repair both main lines and service lines. In the past service lines had been neglected and they often contribute a significant portion of the I/I. Targeting the worst areas for rehabilitation produced the greatest relative benefits. In addition to service lines, all main line connections were redone so the system was tight which resulted in a significant reduction in flow. The construction methods employed were found to be equally effective at removing I/I from the system, provided the approach was followed through fully. Results to date show a flow reduction of 43% to 78%, with an average reduction of 58%.

The reduction in flows has made an impact on metals concentrations and loads in terms of averages and scatter. Complete removal of I/I from the collection system would not allow the SFSD to meet the limits proposed in the SFCDA River without implementing a metals removal process. The source of drinking water for Mullan is a tributary of the SFCDA River. The drinking water raw source and the potable water delivered to the City do not satisfy the discharge requirements imposed under the Total Maximum Daily Load (TMDL) for discharge at the Waste Water Treatment Plant (WWTP). Therefore, it is not believed that further I/I reduction will significantly reduce metals loading due to current drinking water contributions.

The reduction in flows, results in a positive net effect for the WWTP. Because the flows are lower and exhibit less scatter, metals loading on average appears lower and less variable. If a metals removal process is required; the smaller peak flows will result in smaller basins, related equipment and chemical usage, resulting in a lower capital and Operation and Maintenance (O&M) investment for the SFSD. Consequently, this project has been successful for the Mullan WWTP with regards to reducing its overall treatment requirements for metals.

For Mullan, it is recommended that further I/I reduction be pursued only to reduce capital improvement and O&M costs at the WWTP. It is not believed that further I/I reduction will significantly reduce metals loading due to current drinking water contribution. The results of this study are applicable to other communities in the valley in construction approach, anticipated flow, and metals loading reductions. Metals levels for groundwater and drinking water should be reviewed in other communities that are considering implementing this approach to determine the potential for metals removal.

### **FY 2003 Grant Projects**

<b>Title and Implementing Entity</b>	<b>Sub-Grant</b>	<b>Costs as of 12/31/06</b>
Woodland Park Groundwater Quality Monitoring, IDEQ	\$35,948	\$36,270.57
Meyer Creek Flood Control, IDEQ	\$31,521	\$26,071.48
Upper East Fork Ninemile Water Quality Evaluation, INL	\$193,652	\$194,048.29
Metal & Nutrient Removal Pilot Page WWTP, South Fork River Sewer District	\$179,763	\$178,891.30
East Fork. Pine Creek Revegetation, BLM	\$61,624	\$61,410.44
Inventory and Evaluation of Private Lands for Restoration of Wetland Habitats USFWS, IF&G, Ducks Unlimited	\$152,406	\$12,472.62
Fish Response to Bank Stabilization IF&G, USFWS, U of I	\$107,550	\$89,257.78
Sediment Transport & Bed Evolution Phase 1, USGS	\$193,706	\$193,832.12
CDA Lake Response to Watershed Remediation Phase 1, USGS	\$190,406	\$157,540.59
North Fork CDA River Hydrologic & Sediment Study, IDEQ	\$165,810	\$99,925.60
Mica Bay Nutrient Reduction Phase 1, IDEQ	\$20,000	\$20,006.14
Lower Lakes Aquatic Veg. Survey, CDA Tribe	\$143,275	\$127,621.00
Canyon Creek Groundwater Metal Source Characterization, INL	\$190,253	\$190,005.49
Stream Bank Stabilization Addition, IDEQ	\$122,386	\$67,457.40
Grant Total	\$1,788,300	\$1,454,810.82

## **Woodland Park Groundwater Quality Evaluation**

**Sub-grant Amount** - \$35,948; \$33,921 IDEQ, \$2,027 BEIPC

**Costs as of 12/31/06** - \$36,270.57

**Estimated % Complete** – 100 %

**Purpose of Project** – Canyon Creek is a tributary to the SFCDA River. Based on probabilistic modeling, it is estimated that the Canyon Creek drainage contributes approximately 456 pounds per day of dissolved zinc to the SFCDA River. The ROD for OU3 calls for treatment of up to 60 cubic feet per second of Canyon Creek water. In an effort to develop the most effective alternative for the Canyon Creek drainage, it is necessary to look at ground water and surface water contributions. The Water Treatment Project Focus Team (PFT) requested that additional sampling be conducted to add groundwater data to the database in order to help facilitate treatment option decisions in the future. To address this, a quarterly monitoring program was implemented at selected groundwater sites in the Woodland Park area of the Canyon Creek Drainage.

**Status of Project** – All work complete, 2005.

**Conclusions** – The project successfully sampled groundwater. The data will provide valuable information needed to make responsible treatment option decisions.

## **Meyer Creek Flood Control**

**Sub-grant Amount** - \$31,521; \$30,000 IDEQ, \$1,521 BEIPC

**Costs as of 12/31/06** -\$26,071.48

**Estimated % Complete** –100 %

**Purpose of Project** – To assess the condition of the Meyer Creek diversion system and propose possible alternative remedial recommendations and order of magnitude cost estimates to prevent recontamination of the Superfund remedy in the City of Osburn during a flood event.

**Status of Project** – All work complete, 2005.

**Conclusions** - The results of this study show that that the risk of failure of the Meyer Creek pipe is moderate. Four possible solutions were evaluated. The preferred alternative consists of constructing a combination pipeline and open channel system, partly in the current alignment and partly in a new one. The open channel portions have the added benefit of creating opportunities for linear parks.

## **Upper East Fork Nine Mile Creek Water Quality Evaluation**

**Sub-grant Amount** - \$193,652; \$193,029 INL, \$623 BEIPC

**Costs as of 12/31/06** - \$194,048.29

**Estimated % Complete – 98 %**

**Purpose of Project – Success Mine Passive Water Treatment:** 1) Reduce plugging in the Success Mine Apatite Barrier by making design modifications to the sediment chamber and injecting air into the Apatite to break up clogging in the media; 2) Perform a tracer study to determine hydraulic flow paths and residence times; 3) Analyze Apatite to determine forms of metals precipitates and where the reactions occur; and 4) Modify the East Reactor and add new media to the barrier

**East Fork Ninemile Creek Monitoring:** Conduct monitoring of the East Fork of Ninemile Creek to assess where metal loadings occur; how seasonal flows affect metals loading; evaluate overall water chemistry; and determine forms of metal precipitates.

**Status of Project – Historical description of work performed to date:**

#### Success Passive Water Treatment

- 1) Modification of the Sediment Chamber was completed in 2004.
- 2) Air injection into the Apatite to break up clogging in the media was completed in May 2005. This demonstrated temporary success at the Nevada Stewart site. It also improved the flow at the Success Mine Reactive Barrier.
- 3) Analysis of Apatite to determine forms of metal precipitates and where the reactions occur was completed in 2005. The results show that almost all of the deposition occurs in the first three cells of the barrier. The types of precipitates formed indicate that metal precipitation is occurring both due to biological activity forming metal sulfides and chemical reactions with the Apatite forming metal phosphates.
- 4) Based on the results of the tracer study completed in 2004 and other decisions made by EPA and the BEIPC, Arcadis decided not to demonstrate the nutrient addition to facilitate in situ metal reduction and precipitation at this site. The funding for this activity was used to install new media in the Apatite II barriers.
- 5) New Apatite was added to the east side of the reactive barrier. This has resulted in better flow through the reactive barrier and as a result more water being treated.

#### East Fork Ninemile Creek Monitoring

This project consisted of sampling the physical, chemical and biological characteristics of a stretch of the East Fork of Ninemile Creek about 3 - 4 miles long to determine seasonal changes in metals loading, where the loading occurs, and what forms the metals are in. Sampling occurred quarterly with two sample events occurring at the beginning and end of the spring runoff event in 2005. The results indicated that most of the metals loading occur near the Success Mine and Mill site. Spring flows dramatically increase the amount of water as expected, and are also the time of the highest metals loading. Even though the concentration of metals is lower in the high flows, the overall metals loading are higher. The buffering capacity of the creek is able to keep the pH near neutral.

#### Final Report

The first draft of the Final Report is complete and was provided to the BEIPC for review in December 2006.



**Success Mine Adit Discharge**

### **Metal & Nutrient Removal Pilot Page WWTP**

**Sub-grant Amount** - \$179,763 SFSD

**Costs as of 12/31/06** - \$178,891.30

**Estimated % Complete** – 100 %

**Purpose of Project** - Evaluate two emerging technologies for precipitation and/or adsorption for removal of heavy metals (lead, cadmium, zinc, and copper) and phosphorus from point source discharges in the Silver Valley, especially the Page WWTP. Determine if the results of this study can be extended to other dischargers in the valley including the mining companies.

**Status of Project** – All work complete.

**Conclusions** – Many of the WWTP effluent samples collected prior to the two pilot plants studied under this project satisfied the NPDES Permit concentration-based conditions. If not for the load-based limits, a “Do Nothing” approach to the WWTP may be feasible. Abandonment of the load-based limits is not likely. This may necessitate implementing additional treatment processes. Removal of heavy metals is attainable to Site Specific Criteria as defined in the Page WWTP NPDES permit. Removal to Gold Book Criteria is not consistently possible. Based on the results of the study, the membrane bio-reactor appears to be the most appropriate choice for use at this time. The probable cost of a full scale system installation in 2006 dollars is \$14 million with annual operating and maintenance of 5 to 10 % of the capital cost. The study resulted in the following recommendations:

- Investigate the ability to reduce capital expenses by attenuating peak flows at the WWTP by reducing infiltration/inflow to the collection system;
- Evaluate blending options to meet concentration and load based limits;
- Continue to explore methods of simultaneously meeting the metals and phosphorous removal targets;
- Determine an acceptable method for final disposal of the wastes generated from this facility and identify probable construction costs; and
- Revisit the permit conditions to develop more reasonable loading limits during peak flows such as a tiered permit based on actual stream flow.

The results of the study appear to be directly transferable to other dischargers in the valley utilizing lagoon-based wastewater treatment.

### **East Fork Pine Creek Revegetation Pilot Project**

**Sub-grant amount** - \$61,624; \$61,218 BLM, \$406 BEIPC

**Costs as of 12/31/06** - \$61,410.44

**Estimated % complete** – 50 %

**Purpose of project** – The project will help identify practical and cost-effective methods to accelerate natural revegetation processes. Vegetation is needed to ultimately stabilize many stream reaches within the CDA Basin. The project is intended to help identify and contrast the relative “bang for the buck” of several locally applicable revegetation methods.

**Status of project** – Additional plantings within the project area in the spring of 2006 included trench planting of 500 nursery-grown cottonwood whips, in order to evaluate effects of three types of backfill. Results will provide a comparison to the 2004 test plots using bare root cottonwood stock.

In addition, approximately 400 containerized dogwood and willow plants were planted with an excavator to evaluate success along a heavily compacted reach of the project area. Additional plantings and monitoring are planned for the spring and fall of 2007. A completion report will be prepared in 2008 and monitoring will continue through 2009.

### **Inventory & Evaluation of Private Lands for Potential Restoration of Wetland Habitats**

**Sub-grant Amount** – \$152,406; \$152,000 USFWS, \$406 BEIPC

**Costs as of 12/31/06** – \$12,472.62

**Estimated % complete** - 50%

**Purpose of Project** – The proposed survey will inventory private wetlands and associated agricultural lands to determine: (1) their value as wetland habitat, (2) what modifications may be necessary to restore to optimal habitat, (3) landowner acceptance of wetland restoration on the property, and (4) level of lead contamination on

the property. Landowners will be surveyed to determine interest in wetland creation or enhancement on their respective properties. Properties identified as potential remediation/restoration projects will be assessed for their habitat quality. USFWS will investigate the extent of contamination relative to the known level of toxic effects to waterfowl in the CDA Basin. The designs for restoration of existing wetlands or creation of new wetlands will be prepared for those properties that have low toxicity to waterfowl and may provide high quality wetland function.

**Status of Project** – Ducks Unlimited (DU) biologists began inventorying privately owned agricultural and wetland areas in the CDA Basin identified as having potential for creation or enhancement of wetland habitat in early 2005. DU and USFWS identified 10 target areas within which to assess landowner interest based on size, potential wetland attributes and available toxicity data. More than 70 such landowners have been contacted. USFWS performed a soil metals screen on one interested landowner in a target area, which concluded that soil lead levels were too high for enhancement consideration at that time. Landownership, potential project location and toxicological surveys will continue through 2009 based on need and project status. An update on the project was presented to the BEIPC during the November 2006 BEIPC meeting.

The completed project will provide a comprehensive inventory that identifies private land that may be suitable for wetland remediation and restoration projects in the CDA Basin. This inventory will be useful for identifying agricultural and wetland habitats that could be remediated or restored as part of the ROD, through use of settlement dollars currently available to the federal natural resource trustees and CDA Tribe, or through existing federal and state grant/cost-share programs aimed at restoring and protecting wetland habitat.

### **Monitoring Fish Responses to Bank Stabilization in the Coeur d'Alene River**

**Sub-grant Amount** – \$107,550; \$41,739 USFWS, \$60,000 U of I, \$5911 Id. Fish & Game & BEIPC

**Costs as of 12/31/06** – \$89,257.78

**Estimated % Complete** – 90%

**Purpose of Project** – Bank stabilization efforts will likely be proposed to treat more than 20 miles of the CDA River banks in coming years. Resource management agencies will be asked to evaluate the impact of several bank stabilization project proposals for the CDA River. The objectives of this monitoring effort are: (1) establish baseline fish community structures, (2) evaluate variability in fish community structures over time, (3) evaluate the effect of existing bank stabilization projects on fish communities, (4) determine appropriate monitoring strategies for future bank stabilization projects, and (5) recommend bank stabilization techniques that have positive effects or minimal adverse effects on fish communities.

**Status of Project** – Field sampling efforts have been completed. A total of 24 sites and 3 boat ramps were sampled in each of three sampling events. Those events occurred in August 2005, May 2006, and October 2006, thereby encompassing three seasons (summer, spring, and fall) of sampling. Sampling included gill netting and electrofishing techniques. Results will include an evaluation of fish species composition, length and age structure, and relative abundance (Catch per Unit Effort) by habitat type and season. Data analysis, interpretation, and preparation of the final report are underway with a draft report anticipated by May, 2007.

## **Computer Models to Assess Sediment Transport & Bed Evolution in the Lower Coeur d'Alene River – Phase 1**

**Sub-grant Amount** - \$193,706; \$193,300 USGS, \$406 BEIPC

**Costs as of 12/31/06** - \$193,832.12

**Estimated % Complete** – 100 % Phase 1

**Purpose of Project** – See narrative for Phase 2 funded in 2004

## **Simulation Model to Evaluate Coeur d'Alene Lake's Response to Watershed Remediation – Phase 1**

**Sub-grant Amount** - \$190,406, \$190,000 USGS, \$406 BEIPC

**Costs as of 12/31/06** – \$157,540.59

**Estimated % Complete** – 100 % Phase 1

**Purpose of Project** – See narrative for Phase 2 funded in 2004.

## **North Fork Coeur d'Alene River Hydrologic & Sediment Study**

**Sub-grant Amount** - \$165,810; \$165,000 IDEQ, \$810 BEIPC

**Expenditures as of 12/31/06** - \$99,925.60

**Estimated Percent Complete** – 90%

**Purpose of Project** - Provide a watershed assessment in document form that will effectively aid and support the future development of a Sediment TMDL Implementation Plan for the North Fork Coeur d'Alene River sub-basin (a plan that will be developed by a Watershed Advisory Group).

**Status of Project - Work performed in calendar year 2006**

1. The IDEQ contractor for this project, Watershed Professionals Network (WPN), completed a draft document, *Summary of Existing Knowledge and Information within the North Fork Coeur d'Alene River Sub-basin*. This draft report was reviewed by the North Fork Technical Advisory Team (TAT), and discussed in a meeting between WPN and the TAT in February 2006. During this meeting, WPN also presented a draft recommendations document which detailed the scope and goals to conduct the next phase of the contract (Task 2), a Watershed Assessment of selected sub-watersheds within the North Fork drainage. Input was given by the TAT, with some changes made to the recommendations, and then the document was accepted as the agreed work plan.

2. WPN continued to collect information (data mining) from the U.S. Forest Service and other sources for Task 2, and then conducted an in-office watershed analysis. A draft Watershed Assessment report was produced and reviewed by the TAT.
3. WPN staff conducted two weeks of field surveys, inventories, and investigations within the North Fork drainage during August. IDEQ and Forest Service staff accompanied WPN during this field work.
4. During the fall of 2006, WPN worked on the final watershed assessments and analysis utilizing the field information collected in August.
5. IDEQ extended the WPN contract expiration date to June 30, 2007, in order to give WPN sufficient time to finalize the two contract deliverables, *Summary of Knowledge* and *Watershed Assessments*, and to ensure contract time for final invoicing and payments.

### **Mica Bay Nutrient Reduction Project – Phase 1**

**Sub-grant Amount** - \$20,000; \$19,000 IDEQ, \$1000 BEIPC

**Costs as of 12/31/06** – \$20,006.14

**Estimated % Complete** – 100 %

**Purpose of Project** – Demonstration and training project for wetland landowners to restore out-of-bank flows in tributary streams as they enter CDA Lake. Restoration of delta wetland functions will reduce nutrient loading to the Lake and encourage ground water recharge. Nutrient loading to the Lake must be minimized to insure that metals remain bound to sediment particles rather than dissolving in the water column. A unique combination of conditions exists at the project site that, if overcome, will translate to success at most other sites around the Lake.

**Status of Project** - It was decided to conduct a feasibility study to answer some basic questions about the hydrology of the area, design alternatives and the expected benefits of the project. This study titled, *Mica Bay Design Alternatives* was completed and submitted to IDEQ on October 5, 2005. It was reviewed by the BEIPC Executive Director and TLG resulting in a recommended change in the project approach. The BEIPC considered the recommend change and the project was amended by vote of the BEIPC in November 2006. (See narrative of project funded in Phase 2.)

### **Lower Lakes Aquatic Vegetation Survey Project**

**Sub-grant Amount** - \$143,275 CDA Tribe

**Costs as of 12/31/06** - \$127,621.00

**Estimated % Complete** – 85 %

**Purpose of Project** - The primary purpose of this study is to develop baseline data on submersed aquatic plant species distribution and biomass in Benewah, Chatcolet and Round Lakes. The secondary purpose is to

estimate nutrient (primarily phosphorus) release from the existing plant beds into the water column of these lakes and, subsequently into CDA Lake. The tertiary purpose is to inspect these lakes for the presence of invasive, noxious aquatic species.

**Methodology** - Specific methodologies are to perform SCUBA diver collection of submersed aquatic vegetation species along set transects using standard-area quadrats, and to perform additional sampling at randomly selected grid intersections using a weed rake. All diver-collected samples will be sorted by genus (or species when possible) and each sub-sample dried and weighed to obtain a standard biomass estimate. Representative sub-samples of diver-collected plants will also be analyzed to determine nutrient (phosphorus and nitrogen) content. Samples collected at grid intersection sites shall be sorted to identify genus / species present. Based on the nutrient content data and published literature on species-specific nutrient release rates, estimated nutrient loading from submersed plants will be calculated.

**Status of Project** - The planned two years of field sample collection have been completed for transects and grid points. Laboratory analyses of samples collected during both years' transect sampling and the survey for noxious aquatic plants have been completed. The literature search for information describing nutrient release from aquatic plants has also been completed.

**Findings** - Submersed aquatic vegetation was found between 2 -14 foot depths throughout the study area. Generally, plant growth was found to be dense with different species occupying most depths from the bottom to near the surface. A total of 12 different species or genus groups were seen during this survey work with seven of these being found in a large number of samples. The pondweeds (*Potamogeton* species) were visually dominant, as was common waterweed (*Elodea* species). Identifiable Pondweeds included Richardson's (*P. richardsonii*), Fern-leaf (*P. robinsii*) and Big Leaf (*P. amplifolius*). The thin-leafed pondweed species (which were grouped together because of the difficulty of separating these similar appearing and often intermixed species) were the most prevalent of the pondweeds. Other species found frequently were Coontail (*Ceratophyllum demersum*) and Nyad (*Najas* sp.). An important finding of this work was of the presence, and wide distribution, of the noxious aquatic weed, Eurasian watermilfoil (*Myriophyllum spicatum*). This plant was not only widely distributed, but was strongly dominant in certain areas which were estimated to total approximately 200 acres.

## Canyon Creek Groundwater Metals Source Characterization

**Sub-grant Amount** - \$190,253; \$189,847 Idaho National Laboratory (INL), \$406 BEIPC

**Costs as of 12/31/06** - \$190,005.49

**Estimated % Complete** – 90 %

**Purpose of Project** – This project is designed to determine how (in practical terms) zinc and other metals are distributed between different physical and chemical states in the Canyon Creek alluvium. This information will be used to help understand how natural processes can affect the movement of contaminant metals through Canyon Creek and how engineered processes can impact contaminant metal mobility or sequestration.

**Status of Project** – Cores were collected in early November 2004. An aliquot of each core was segregated and centrifuged to separate the pore water from the solid. Pore water was analyzed as to its chemical composition

and pH. The remainder of each core was freeze-dried and sieved. The <2mm fraction of each core was set aside for further analysis.

Sequential extractions using the Tessier method were performed on each core sample to determine under what chemical conditions leaching occurs, and to define operationally the chemical state of the contaminants. These extractions have been completed. In addition, whole-rock digestions and analyses were performed on the core samples to provide mass balance constraints on the sequential extractions.

A draft report detailing results from this project was submitted to the BEIPC and commented on in February 2006. Based on the review comments, an additional scope of work was developed to expand the understanding of the Canyon Creek groundwater metals source. This scope of work was reviewed and approved and initiated in March 2006.

The new scope of work on the core samples involved creating a composite core sample and then subjecting this sample to various chemical regimes possible in a natural site or during treatment in an effort to determine how metals leach. The first test subjected the composite sample to high and low ionic strength simulated groundwater in a low-oxygen environment, and the second test subjected the composite sample to neutral and low pH simulated ground water in a low-oxygen environment. The tests have been completed and the samples analyzed.

The final test for this project is a column-leaching study in which the core material is subjected to a flow regime. This is in contrast to previous tests, which were batch-type studies. The test allows for the determination of leach rates under typical environmental conditions, as opposed to the extreme conditions already studied in the batch studies. Column tests should be completed in January 2007. Final sample analysis and data interpretation will be included in the written final report to be submitted in February 2007.

**Findings to Date** - The pH measured on an aliquot of the water and the remaining water was analyzed to determine the concentrations of Al, As, Cd, Cu, Fe, Mn, Ni, Pb, S, and Zn. The pH values ranged from 1.67 to 6.83. One core did show a trend of increasing pH with depth; however, the pH appeared to be random in the other two cores. Metal concentrations in these oxidized sediments were relatively high, often exceeding recommended standards and guidelines for drinking water. As expected, most of the metal concentrations are pH dependant with concentrations being higher at low pH.

Metal concentrations in the sediment were obtained for a sequence of five extractions. Aluminum and iron accounted for the bulk of the elemental composition of the samples as expected based on the mineralogy of the alluvium components. Iron and manganese were probably present as oxide coatings on the grain surfaces as shown by their elevated concentrations in fraction 3 of the sequential extraction where the reducible metal oxy-hydroxides are expected to be released. Although iron in fraction 3 accounts for only 5-10% of the total iron in the samples, the high surface area and reactivity of iron coatings are important with respect to adsorption and co-precipitation of other metals. Manganese oxide coatings are also effective scavengers of divalent and trivalent metals. The extractable manganese in fraction 3 represented a higher fraction of the total manganese in the samples, which suggests that manganese is more concentrated as surface oxy-hydroxide coatings. Therefore, iron and manganese oxides are likely to contribute to the temporary sequestration and release of metals, particularly under acidic conditions or where competition with other cations is significant. The metals might also be released under reducing conditions where iron oxides are dissolved, although subsequent formation of metal sulfides would be expected to immobilize the metals if sufficient reducible sulfur is present.

Copper, nickel and zinc appear to be broadly distributed among the extraction fractions with somewhat high abundance in the residual (bulk) fraction 5, and somewhat less in the easily extractable fraction 1. Fraction 5 probably represents metals that leach very slowly over time and may not contribute significantly to the yearly loadings to the CDA River. Abundances for copper, nickel and zinc in fractions 2, 3 and 4 that exceed or are comparable to fraction 1 indicate that these metals may be released slowly over time if the current hydrologic and hydrogeochemical conditions persist, or could be released more rapidly if low pH conditions are established (e.g., through the oxidation of sulfide minerals). As mentioned earlier, reducing conditions might cause initial release of metals associated with iron or manganese oxide coatings, but the reducing conditions in the presence of sulfur would also immobilize metals as insoluble sulfide minerals. The near-surface sample in Core 2 appears to be somewhat anomalous in that there is a higher abundance of metals in fraction 5, which represents the bulk phase. It can be speculated that this result could be a consequence of an inhomogeneous sample where part of the sample dominated the results.

Arsenic was found primarily in fractions 1 and 5. The high abundance in fraction 1 may indicate that arsenic as an oxy-anion could be adsorbed to the mineral surfaces or coatings, such as iron and manganese oxides, as a result of the lower pH values and likely positive charge on the surfaces. That arsenic was found to be removed in fraction 1 indicates that arsenic is not bound covalently to the surfaces. A rise in pH, or competition by other anions such as carbonate or organic acids, may result in the release of arsenic.

A relatively high percentage of cadmium is also present in fraction 1, although unlike arsenic, there are also comparable percentages associated with fraction 2, 3 and 5. This study clearly demonstrates that the alluvium contains significant amounts of metals that have the potential of being released to the pore water when they are oxidized. Therefore, these sediments may act as long-term sources of metals to subsurface waters and ultimately to Canyon Creek.

### **Streambank Stabilization Addition**

**Sub-grant Amount** - \$122,386 IDEQ

**Costs as of 12/31/06** - \$67,457.40

**Estimated % Complete** – 60%

**Status of the Project** – The purpose of this project is to monitor the effects of previously constructed stabilization treatments that emphasize bioengineering approaches. The treatments constitute research into controlling sediment releases into the river and CDA Lake while supporting wildlife goals. Factors affecting this performance include boat wake impacts; extent of re-vegetation; ability to adjust to changes in the river; and two flow regimes. The treatments are being monitored with this project to assess their performance. To date they are performing well.

## FY 2004 Grant Projects

Title and Implementing Entity	Sub-Grant	Costs as of 12/31/06
Mica Bay Nutrient Reduction , IDEQ	\$121,000	\$120.04
Additional Water Quality Sampling in Selected Nearshore Areas Southern CDA Lake, CDA Tribe	\$13,000	\$12,987.80
Plummer Wastewater Treatment Plant, City of Plummer	\$129,900	\$83,168.43
Plummer Creek Watershed Nutrient Load Assessment and Management Plan Development, CDA Tribe	\$165,700	\$3,863.00
Pinehurst Flood Impact Study, IDEQ	\$330,000	\$16,893.13
Silver Crescent Complex Habitat Restoration, USDA Forest Service	\$318,000	\$315,975.32
Canyon Creek Treatability Study, IDEQ	\$100,000	\$49,912.70
South Fork Sewer District Toxicity Reduction Study, SFSWD	\$115,900	\$38,335.26
Simulation Model to Evaluate CDA Lake Response to Watershed Remediation, USGS	\$210,000 \$11,800 Peer Review	\$165,730.03
Lower river Sediment Transport Model and Bed Evolution Phase 2, USGS	\$128,000	\$127,264.60
Assessment of the Economics and Effectiveness of Alluvium Sorting, IDEQ	\$207,000	\$198,337.85
CDA Lake Management Plan Implementation, CDA Tribe and IDEQ	\$137,200	\$14,668.06
Grant Total	\$1,988,200	\$1,027,256.22

### Mica Bay Nutrient Reduction Project - Phase 2

**Sub-grant Amount** - \$121,000; \$119,020 IDEQ, \$1,980 BEIPC

**Costs as of 12/31/06** - \$120.04

**Estimated Percent Complete** – 1%

**Purpose of Work** – The original work planned was intended to be a demonstration and training project for use by wetland delta landowners. It was intended to encourage them to consider altering management of unusable lands for the purpose of providing public benefits by lowering nutrient delivery to near shore areas of CDA Lake. The feasibility study resulting from the first phase of this project indicated that more land and considerable more funding was needed than originally anticipated to implement a meaningful project. IDEQ

and the U.S. Fish and Wildlife Service (USFWS) were unsuccessful in their attempts to secure cooperation from enough landowners to implement the project as originally planned.

In August 2006, a willing landowner upstream from the Mica Creek Delta on the lower North Fork Mica Creek contacted the USFWS and IDEQ indicating interest in a stream bank and bed stabilization project to control sediment and nutrient impacts to the Mica Creek Delta. Field investigation has confirmed that there is significant and active streambank mass failure and erosion on sections of the North Fork Mica Creek located on the landowner's property. IDEQ has confirmed that a meaningful stream stabilization project can be completed with the funds available. IDEQ drafted an amended project proposal for Mica Creek that was presented to the BEIPC on November 29, 2006. The BEIPC approved the amended Mica Creek project.

### **Status of Project - Work performed in calendar year 2006**

1. In October, IDEQ held a consultation meeting with staff of the Kootenai/Shoshone Soil & Water Conservation District, NRCS – Coeur d'Alene office, and Idaho Soil Conservation Commission (ISCC). The owners of the project property (800 acres) had previously participated in cost-share agriculture projects, such as cattle exclusion fencing. The ISCC had already developed a farm conservation plan for the property. The agricultural agency staff agreed that meaningful and effective streambank and streambed stabilization methods for Mica Creek could be applied within this property.
2. In December, this amended project was presented to the KSSWCD Board for their approval and they agreed to be the sponsor and contract administrator for the project. IDEQ and the agricultural agency staff will meet with the landowners to confirm their commitment to this project. IDEQ will develop a contract and work plan with the KSSWCD, with review and approval by the Executive Director.



**Mica Creek**

## **Additional Water Quality Sampling in Selected Near shore Areas of Southern CDA Lake**

**Sub-grant Amount** - \$13,000; \$12,752 CDA Tribe, \$248 BEIPC

**Costs as of 12/31/06** - \$12,987.80

**Estimated % Complete** – 100 %

**Purpose of Project** – See narrative for Lake Monitoring Water Quality Studies funded in 2002

**Status of Project** – Work Complete, 2006, report to be incorporated into report for Lake Monitoring Water Quality Studies.

## **Plummer Wastewater Treatment Pilot**

**Sub-grant Amount** - \$129,000; \$127,918 Plummer City, \$1,982 BEIPC

**Costs as of 12/31/06** - \$83,168.43

**Estimated % Complete** – 90%

**Purpose of Project** - The objective of this project is to show the viability of a wastewater infiltration treatment wetland in Plummer. A successful wetland would benefit water quality in Chatcolet and CDA Lakes by reducing nutrients that now flow into Plummer Creek from the Plummer Wastewater Treatment Facility. Nutrients, particularly phosphorus, contribute to the eutrophication of Chatcolet by promoting algal growth, which in turn reduces the available oxygen in the water column. Low dissolved oxygen promotes the chemical reduction of metals in the sediment, thus releasing those metals into the water column. Microorganism growth due to high nutrients also directly liberates iron and other active metals into the water, as metal-reducing bacteria populations increase when nutrients are at relatively high concentrations. This is supported by strong positive correlations between iron and TP concentrations during the summer in shallow, eutrophic lakes.

**Status of Project** - The flow rate for the pilot project, set at 1,000 gallons per day, had to be halted January 6 through February 10, 2006 due to extraordinarily high rainfall during that period. Since February 10, 2006, the flow rate, set at 1,000 gallons per day, has been continuously discharging into the wetland cells.

No sampling from Well No. 2 has been possible, since that well has been dry throughout the project life to date. Second quarter sampling from the other monitoring wells shows that nitrate levels decreased with every monthly sample. This indicates that the nitrate level introduced into the groundwater is lower than background concentration in combination with some denitrification between the discharge and infiltration into the soil. The sample results from April indicate that the levels of phosphorous and nitrate were undetectable in the downgradient well. With an average travel time of 68 days to the downgradient well, there have been several months of infiltrate from the pilot wetlands flowing past the monitoring well, indicating that nutrients are not entering the aquifer from the pilot wetland.

In the fourth quarter, NO<sub>3</sub> levels remained constant, only varying between 1.8 mg/L to 1.9 mg/L. Well #3 showed a nitrate level that rose for the first 3 months of collection, but then leveled off to a constant rate of

between 1.8 mg/L and 2.0 mg/L. There was a substantial spike in influent nitrate levels in the report for November 2006, but the reading at well #3 over the same time period remained consistent with the previous data. This indicates the nitrate introduced into the groundwater is cleaner than background concentration in combination with some denitrification between the discharge and infiltration into the soil.

Phosphorus concentrations had gone up in the third quarter of the testing period indicating that P ions are not sorbing as much to soil particles, but still significantly lower than in the wastewater effluent. With an average travel time of 68 days to the downgradient well, there have been several months of infiltrate from the pilot wetlands flowing past the monitoring well, indicating that nutrients are not entering the aquifer from the pilot wetland. The third quarter of testing showed an increase in phosphorus during August 2006, but then the levels drop back down below the 0.5 mg/L mark. This drop in the fourth quarter is in spite of the increase in the influent total phosphorus.

Total suspended solids of the wetland influent have been erratic during the second half of the collection period, but are currently trending downward.

Biological oxygen demand has remained fairly consistent throughout most of the 12-month period, but recently had a spike in September 2006. The most recent data however shows downward movement in this value as well.

The project to date is successfully treating the influent flows. However, in balancing the wasteflow to the wetland with the available infiltration rate, the required area for the entire flow projected from the wastewater treatment facility for the City is very large. The pilot project is handling 1,000 gallons per day through a bottom area of about 10,000 square feet, and a total bermed facility area of approximately 20,000 square feet. The available net infiltration rate is approximately 0.05 gallons per square foot per day.

At this rate, to dispose of the projected flows of 400,000 gallons per day, the City would require 8,000,000 square feet, or approximately 200 acres of land to dispose of its effluent using the wetland infiltration method. The City currently controls 27 acres for its permitted seasonal land application of wastewater. An additional 173 acres at the recent price of \$5,000 per acre would cost the City approximately \$856,000 for the land alone, and approximately an additional \$4,000,000 to develop it into a usable system, based on accelerating and scaling up the cost of the pilot project construction.

**Conclusions:** Aside from the quarterly conclusions summarized above, overall project conclusions will be provided upon completion, approximately year-end 2007.

## **Plummer Creek Watershed Nutrient Load Assessment, Modeling and Management Plan Development**

**Sub-grant Amount** - \$165,700; \$162,730 CDA Tribe, \$2,970 BEIPC

**Costs as of 12/31/06** - \$3,863.00

**Estimated % Complete** – 20 %

**Purpose of Project** - The purpose of this project is to develop a Watershed Nutrient Management Plan which will include appropriate and specific point nutrient source control efforts for the Plummer Creek watershed.

To accomplish the project purpose, the specific objectives of the proposed project are:

- To characterize nutrient (nitrogen and phosphorus) and sediment concentrations and transport throughout the Plummer Creek watershed and into Chatcolet Lake through a two-year monitoring effort.
- To use the Generalized Watershed Loading Function (GWLF) or similar model to establish nutrient loadings from sources and land uses throughout the watershed.
- To review previously developed nutrient control project options and develop an updated set of recommended projects.
- To prepare a Watershed Nutrient Management Plan for use by the Tribe, the City of Plummer, Benewah County and other environmental resource agencies.

**Methodology** - Field water quality and constituent concentration data will be collected at key “nodes” and potential pollutant sources in the Plummer Creek watershed. These data will be used for input to an appropriate hydrologically-based constituent concentration and transport model that will be useful for developing Total Maximum Daily Loads (TMDLs) for key constituents, and for evaluating wastewater treatment and other pollution abatement technologies in the Plummer Cr. watershed. Modeling and a final Management Plan report will be completed by the end of the project’s third year. The modeling results will support development of the management plan through characterizing existing nutrient source loads and evaluating management alternatives.

**Status of Project** - Final planning for the field work was conducted by the Project Leads and a Quality Assurance Project Plan (QAPP) was prepared covering field data collection, laboratory analyses and modeling and the QAPP was approved by IDEQ and EPA. The first of two years of field data collection has been completed.

**Findings** - Field and laboratory data is being tabulated as it is collected; data interpretation will be performed following completion of the monitoring effort.

### **Pinehurst Flood Impact Study**

**Sub-grant Amount** - \$330,000; \$327,030 IDEQ, \$2,970 BEIPC

**Costs as of 12/31/06** - \$16,893.13

**Estimated % Complete** – 5 %

**Purpose of Project** – Develop stream channel and drainage infrastructure techniques to control and mitigate water pollution and protect property from recontamination and flood impacts.

**Status of Project** – Met with the City of Pinehurst to review project options and developed design options for consideration by Executive Director. Final design approach will be selected by February 2007. Construction is planned during the field season of 2007.

## **Silver Crescent Complex Habitat Restoration**

**Sub-grant Amount** - \$318,700; \$315,730 FS, \$2,970 BEIPC

**Costs as of 12/31/06** - \$315,975.32

**Estimated % Complete** – 15%

**Purpose of Project** - This project is a demonstration project to study the feasibility and economics of watershed restoration in areas where the original stream type has been severely altered by mining and environmental cleanup activities. Innovative high gradient stream restoration techniques will be further adapted for the unique circumstances in the East Fork Moon Creek. Work to be implemented and studied includes actions converting stream types from unstable to more stable types while accounting for site features such as a large repository located in floodplain. Various revegetation approaches on and adjacent to the waste repository as well as the reestablishment of wildlife and fish habitat through the use of constructed or installed structures will also be applied.

**Status of Project** - Final design and contract package preparation was accomplished in early 2006. Additionally, the QAPP was approved by EPA. Construction started in September 2006 with an update mailed to local residents and delivery of materials such as topsoil to the site. The Forest Service has successfully gained an additional partnership with the Silver Mountain Corporation on the project. Additional wetland creation and enhancement will be accomplished at the project site using funding provided by Silver Mountain. This work in turn will satisfy Silver Mountain's mitigation requirements under their current 404 permit for new development at the ski area and village. This added wetland work will further enhance the overall restoration effort at the site. Additions to the design for the project have been integrated into the Forest Service contract(s).

A primary construction contract award and implementation start is planned for early 2007. Stream channel construction with wildlife and fish habitat structure installation will encompass the bulk of the construction phase at the site. Comprehensive native vegetative restoration at the site which will include treatment for noxious weeds will follow, possibly utilizing a second contract in 2007 or 2008. A post construction report will outline the entire project and any changes that were made. This report will include an evaluation of successes and a section dedicated to "lessons learned". Site maintenance and a 5-year monitoring effort will start at the close of the construction phase.

## **Canyon Creek Treatability Study**

**Sub-grant Amount** - \$100,000; \$99,010 IDEQ, \$990 BEIPC

**Costs as of 12/31/06** - \$49,912.70

**Estimated % Complete** – 80 %

**Purpose of Project** – Develop an alkaline precipitation design as a low cost method of achieving a substantial improvement toward ROD goals, and determine if the proposed water treatment technology is implementable in the SFCDA River.

**Status of Project** – The contractor has developed a preliminary design and support documents. This material was presented at a Water Supply PFT meeting and the contractor is continuing with the design process. A second contract was awarded to provide technical oversight for the project.

### **South Fork Sewer District Toxicity Reduction**

**Sub-grant Amount** - \$115,900; \$114,415 SFSD, \$1,485 BEIPC

**Costs as of 12/31/06** - \$38,335.26

**Estimated % Complete** – 30%

**Purpose of Project** - A Toxicity Reduction Evaluation (TRE) is a stepwise process or plan by which a wastewater treatment plant (WWTP) investigates and identifies agents of toxicity in its effluent, and evaluates the effectiveness of toxicity control options. The SFSD Page WWTP has failed previous Whole Effluent Toxicity (WET) testing. The effluent characteristics of the Page WWTP are similar to effluents from other treatment plants with the exception of the high metals concentrations. As a result, it is believed that the metals in the influent stream are directly responsible for the effluent toxicity which impairs receiving water quality. As an example, *daphnia magna sp.* exhibits chronic effects from 0.15 µg/l of cadmium based on data from EPA's Quality Criteria for Water 1986 (EPA 440/5-86-001), while the Page WWTP has historically discharged 2.6 µg/l. Currently, limited data exist presenting the concentrations of metals, especially in combination, that are likely to cause chronic effects in *ceriodaphnia dubia sp.* This problem also impacts other discharges in the basin including the active mining companies and inactive mining claims that will also have difficulty meeting the new limits. Understanding the impact of metals on chronic toxicity is of keen interest to all of the dischargers in the Upper Basin.

**Methodology** – A TRE will identify the components which are causing the Page WWTP's effluent toxicity and present a plan for addressing them. The general process is described in EPA's Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants (EPA/833B-99/002). The first step will be a preliminary evaluation of the existing facility. WET testing will follow with a Toxicity Identification Evaluation (TIE) to isolate the most likely toxicant or combination of toxicants. The final step is a Toxicity Control Evaluation (TCE) in which potential treatment processes are identified and evaluated for implementation.

**Status of Project** – Page WWTP performance and typical effluent characteristics are being compared against typical potential toxicant levels. Two WET tests have been completed in 2006. Both WET tests showed toxicity as defined in the SFSD's discharge permit; however, the most severe toxicity was observed in mid-winter when metals levels were higher. The next step in the TRE is a Phase I TIE, which will be initiated with another failing WET test. The Phase I TIE will indicate the likely toxicant or group of toxicants in the Page WWTP effluent. Our current schedule for the next round of WET tests is January 2007, to coincide with the highest observed toxicity last year. Following completion of the TIE, source evaluation and control options will be explored.

## Simulation Model to Evaluate CDA Lake Response to Watershed Remediation - Phase 2

**Sub-grant Amount** - \$221,800; \$11,800 Peer Review, \$1,980 BEIPC, \$208,020 USGS

**Costs as of 12/31/06** - \$165,730.03

**Estimated % Complete** – 95 % Phase 2

**Purpose of Project** – Provide the entities responsible for management of CDA Lake with a sophisticated computer modeling system with which to simulate the lake's long-term responses to a wide range of remediation strategies to be implemented under the ROD and the Lake Management Plan.

**Status of Project** – Phase 1 is complete. The phytoplankton bioassays to assess zinc toxicity in the lake and the development of modeling algorithms for enhanced simulation of benthic-flux geochemical processes are complete and the results published in:

*James S. Kuwabara, Brent R. Topping, Paul F. Woods, James L. Carter, and Stephen W. Hager, 2006, Interactive effects of dissolved zinc and orthophosphate on phytoplankton from Coeur d'Alene Lake, Idaho: U.S. GEOLOGICAL SURVEY Scientific Investigations Report 2006-5091*

<http://pubs.usgs.gov/sir/2006/5091/>

Phase 2 - Draft documentation of the ELCOM and CAEDYM models, prepared by the Centre for Water Research, has been provided to the BEIPC. After review of the documentation, the models will be provided, thus completing the project. In Review: *Simulation Model to Evaluate Coeur d'Alene Lake's Response to Watershed Remediation: Volume 1: Hydrodynamic modeling using ELCOM* by Chris J. Dallimore, Matthew R. Hipsey, Ryan Alexander, & Sebastian Morillo.; and *Simulation Model to Evaluate Coeur d'Alene Lake's Response to Watershed Remediation Volume 2: Water quality modeling using ELCOM-CAEDYM* by Matthew R. Hipsey, Ryan Alexander & Chris J. Dallimore. Peer review to be completed by June 30, 2007.

**Conclusions** - Using the validated lake models, the processes controlling zinc fate and transport within CDA Lake were explored. Algae play a large role in zinc cycling throughout the lake. Roughly the same amount of dissolved zinc that is released from lakebed sediments into the overlying water column is incorporated into algal biomass in the euphotic zone (the sunlit zone above the summer thermocline), which is then redeposited on the lake bed as the algae dies and sinks to the lake bottom.

The validated models also were used to examine the response of the Lake to a range of long-term scenarios to provide insights into the effects of remedial actions. A combination of low phosphorus concentrations and zinc toxicity is currently keeping the lake's algal biomass at an acceptable level. Efforts to reduce zinc loading from the CDA River are unlikely to result in a significant reduction in zinc toxicity to algal growth in the near term. The Kuwabara *et al* data (2006) suggest that even if zinc concentrations were reduced by an order of magnitude, continued loading from the watershed (although reduced) and also from the lakebed sediment will continue to cause toxicity to non-diatom species).

Decision-makers should pay careful attention to nutrient loading to the Lake as it may respond significantly to increased phosphorus input – with or without zinc toxicity. The shallow southern portion of the Lake is already showing signs of this and if the phosphorus loading is not effectively managed there is potential for the

symptoms of eutrophication to progress farther into the deep northern body of the Lake. The model simulations suggest that increased phosphorus loading will either produce increased diatom biomass should zinc toxicity remain, or increased biomass of a mixed assemblage including more green and blue-green algal species should the zinc concentrations within the water decrease considerably. However, the overall algal biomass in the Lake should remain below 5 micrograms per liter of chlorophyll-a if phosphorus loading is appropriately managed.

## **Lower River Sediment Transport Model and Bed Evolution – Phase 2**

**Sub-grant Amount** - \$128,000; \$127,010 USGS, \$990 BEIPC

**Costs as of 12/31/06** - \$127,264.60

**Estimated % Complete** – 99 % Phase 2

**Purpose of Project** – Develop a set of tools that can be used by resource managers for evaluating proposed projects designed to minimize the transport of metal contaminated sediments in the Lower CDA River. Objectives include the utilization of existing data and collection of additional data to develop and calibrate computer models of the river between Cataldo and CDA Lake. These models would be capable of simulating the hydraulic and sediment transport characteristics of the River over a wide range of stream flow and lake elevation conditions. The models would be used to test proposed projects prior to implementation with the goal of improving their design and avoiding unanticipated and costly mistakes.

A 1-dimensional (1-D) sediment transport model will be constructed to simulate sediment transport and bed evolution in the main River channel reach between Enaville (North Fork) and Pinehurst (South Fork) and the inlet to CDA Lake (Harrison). This model simulates the transport of sediments including sand, gravel, and cobble and quantifies average erosion and deposition rates in the bed throughout the reach. A 2-dimensional (2-D) hydraulic and bed shear stress model will be constructed and calibrated to a short reach in and around the Dudley area (river mile [RM] 156.2). The 2-D model will be nested within the 1-D model thus providing a useful exchange of information between the two models.

**Status of Project** - Calibration and development of the 1-D sediment transport model is complete. The modeled reach extends approximately 35-miles from the Enaville gaging station on the North Fork and Pinehurst gaging station on the South Fork to the Harrison gaging station near CDA Lake on the main stem. More than 200 cross sections were used in the 1-D model. Cross sections downstream of the Cataldo Mission were mainly developed by combining bathymetry data from Avista Corporation and USGS LIDAR data taken in August 2004. These cross sections were approximately space ¼-mile. However, in the Dudley area, cross-section spacing was decreased to about 350 ft to provide a greater amount of information in a reach of concern. Upstream of the Cataldo Mission, cross sections were mainly taken from field surveys in 2004 for this study. Cross sections also from the Mike11 model (Borden, Goodwin, Mink, and Liou, 2004), and from the Four Pt model (Woods and Beckwith, 1996) were used in this study. Cross-section spacing in this reach ranged from ¼-mile to ½-mile.

The model also required roughness coefficients (Manning's n) at every point in the cross section. Roughness coefficients established from the previous 1-D models of the river were used as the starting values for this study. Only values for the channel portion were later adjusted during "model calibration".

Suspended and total sediment load curves of Clark and Woods (2001) at the Enaville, Pinehurst, Cataldo, and Harrison gaging stations were updated with the latest collected suspended sediment samples. However, bedload curves were not updated because no bedload data were collected since the Woods and Clark (2001) study. Then total sediment load, which is needed by the 1-D model, was calculated by adding the suspended and bedload curves.

The 1-D model was calibrated using measured water-surface elevations and bedload and suspended-sediment transport. The model was used to simulate management alternatives to assess erosion and deposition under varying hydraulic conditions especially in the Dudley area.

The development and calibration of a 2-D hydraulic and bed shear-stress model was completed last year. The 2-D model extends from RM 154 to RM 159, a 5-mile reach in and around the Dudley area. The model grid is curvilinear and follows the river. Grids in the center of the river are approximately 2.5 meters (8.2 ft). The width of the grid was extended to more than 300 ft beyond the river so that large discharges can be simulated in the model. Bathymetry and LIDAR data were combined and mapped to the coordinates of the grid through a “nearest-neighbor” approach to determine the topography for each model node (grid corners).

The model was calibrated to water-surface elevations at five specific discharges based on two gaging stations. Elevation at the downstream boundary was based on water-surface elevation data from the Rose Lake gaging station (12413810), and discharge at the upstream boundary (RM 159) was based on discharge data from the Cataldo gaging station (12413500). Water-surface elevations throughout the 2-D model were calibrated against results from the 1-D model. Calibrated discharges ranged from 10,500 cubic feet per second to 28,900 cubic feet per second, and water-surface elevations at the downstream boundary (near Rose Lake) ranged from about 2130.0 ft to about 2139.5 ft.

In these simulations, the highest flow velocities were usually centered in the river. Velocities greater than 6.5 feet per second were found with a river discharge of 28,900 cubic feet per second. These simulations showed that as discharge increased, average velocity increased. The 2-D model also showed recirculation currents especially at the larger bends. These and other model results will be presented in a report.

The hydraulic and sediment characteristics of the river and results from the 1-D and 2-D models have been documented in a final report that is in final preparation for publication. The report should be published and available on-line by mid January 2007. The results of this study will be presented to the BEIPC in May 2007.



## Coeur d'Alene River Lower Basin

### Assessment of Economics and Effectiveness of Alluvium Sorting as a Mine Waste Removal Strategy

**Sub-grant Amount** - \$207,000; \$205,019 IDEQ, \$1,981 BEIPC

**Costs as of 12/31/06** - \$198,337.85

**Estimated Completion** - 87%

**Purpose of Project** - The pilot work was implemented to answer a number of questions concerning the alluvium sorting approach to mine waste removal and disposal from watersheds in the Basin: Is the additional cost of sorting stream bed materials contaminated with mine wastes balanced by savings in transportation and repository volume costs; and is there an added benefit because sorting results in a more homogeneous waste material that reacts to compaction better and ultimately results in lower permeability of compacted waste in the repository? The project also includes a monitoring component. Using a gravel quality monitoring approach, the amount of mine waste contamination will be assessed in the gravels of Prichard Creek at the removal sites pre- and post-project implementation.

**Status of the Project** - Mine waste removal using a sorting strategy was completed at the Monarch Mill site during 2005. Monitoring of project costs, waste compaction and the trace (heavy) metals in stream alluvium prior to removal were completed during 2005. An interim report on the project results was completed and

submitted to the BEIPC in early 2006. During the winter and spring of 2006, sufficient snow pack developed in the watershed above the project area to support sustained bank full discharge in Prichard Creek for a substantial period of April, May and early June 2006. These conditions were necessary to support turnover of the stream bed and potential change in the metals contamination concentration of the stream alluvium. During August 2006, low discharge conditions re-established in Prichard Creek. Streambed gravel samples were collected at the sampling locations along Prichard Creek and submitted for analysis by the University of Idaho. Analytical results were received in December 2006.

During calendar year 2007, the analytical results of the 2006 alluvium sampling will be assessed. An interim report on these results will be prepared for the BEIPC. If at least one bank full discharge event occurs during the 2006-2007 winter precipitation or 2007 spring snow melt events, the second streambed gravel sampling will be completed during the summer of 2007.

**Preliminary Conclusions** - An interim report on the economic and physical (density/permeability) consequences of sorting alluvium was developed by IDEQ and submitted to the BEIPC. Calculations demonstrate that sorting strategy for alluvium-tailings material resulted in a small savings in transportation costs and a large savings in repository construction costs. These savings far offset the added expense of sorting. Large cost savings were obtained despite some inefficiency in the project that could be rectified in subsequent projects. Having a commercial outlet for the oversize material would save additional funds, even if the material was donated. Disposal in the aggregate market will also remove a material from the floodplain that, if not handled properly, will negatively affect re-vegetation efforts. Sorted material compacted in the repository achieved significantly lower permeability (20 times) than the bulk material with equal compaction treatment. The result was a waste deposit less prone to groundwater percolation independent of the capping system employed.

## **CDA Lake Management Plan Implementation**

**Sub-Grant amount** – \$137,200; IDEQ - \$36,711, CDA Tribe - \$99,500, BEIPC - \$989

**Costs as of 12/31/06** - \$14,668.06

**Estimated Percent Complete** - 30%

**Purpose of Project** – As a joint project between the IDEQ and CDA Tribe, conduct a survey audit of measures taken by various agencies, organizations, and industries to fulfill the management actions recommended and specified in the 1996 Coeur d'Alene Lake Management Plan (LMP). The CDA Tribe and IDEQ will also use this opportunity to identify implementation actions taken within watersheds of the CDA Basin which have EPA approved sediment TMDLs. The results of this survey of accomplishments is viewed as directly tied to current efforts by IDEQ and the CDA Tribe to develop a joint update document to the 1996 LMP, and then with community partners, actively implement a LMP for CDA Lake.

### **Status of Project - Work performed in calendar year 2006**

1. This became a joint project between IDEQ and the CDA Tribe in March 2006. Initial work was to jointly review the 1996 LMP tables of recommended action items (as modified in 2002), and then develop customized questionnaires from these action items for the various Lead Groups identified to each item.

2. An initial group of lead agencies were contacted by phone, and then mailed an introduction letter and customized questionnaire. Face-to-face interviews were conducted based on the questionnaires, and other information gathered on how agency programs relate to water quality issues within the CDA Lake Basin.

3. For 2006, the following agencies and groups have been interviewed:

Idaho Dept. of Lands – St. Maries	Shoshone County Departments
Idaho Dept. of Lands – Coeur d’Alene	Benewah County staff & Commissioners
Idaho Transportation Department	Benewah S&WCD – Plummer NRCS
Idaho Dept. of Fish & Game	Kootenai/Shoshone S&WCD – CDA NRCS
Idaho Dept. of Parks & Recreation	Idaho Soil Conservation Commission
Idaho Dept. of Water Resources	Farm Services Agency
DEQ Engineering staff	Panhandle Lakes RC&D
Panhandle Health District	University of Idaho Extension Service
Kootenai County Departments	Citizen Group from south-east CDA Lake

4. A 3-day shoreline inventory by boat of CDA Lake was conducted. A primary purpose of this inventory was to photo-document new shoreline construction projects and the degree in which Best Management Practices were installed and maintained, and instances of non-compliance of the Kootenai County Site Disturbance Ordinance.

5. CDA Tribe and IDEQ staff gave a joint update presentation to the CCC, WCAC, and TLG and will continue to do so throughout the life of the project.

## *Challenges Ahead*

The BEIPC process has matured as it has guided environmental cleanup and restoration activities in the CDA Basin. In addition to cleanup and restoration, the BEIPC is now involved in developing a program to protect remediated areas from flooding and an infrastructure revitalization program for the communities in the Upper Basin. Although there has been a great deal of progress in cleanup and restoration, the added activities along with a number of ongoing issues will continue to challenge the BEIPC process.

Fundamental to the success of the BEIPC process as well as the environmental remediation and restoration efforts is a commitment for long-term federal CERCLA and state funding. Secure funding sources are necessary to insure implementation of the ROD human health and ecological objectives for OU-2 Phase 2 and OU-3, and to support CDA Lake management and protection actions. The EPA funding stream for human health related remedies has been steady, but there is a need to convince EPA Headquarters and Congress that funding streams for ecological cleanup and remedies need to be supported. The State of Idaho Legislature has appropriated funding for both human health and ecological needs. Assuring sustainable funding intended to advance cleanup and restoration actions as planned in the RODs and operation and maintenance of the implemented remedies represents a significant challenge. For a number of years, EPA has funded the support contractor for the CCC. Funding for this activity will need to continue to insure that the CCC is successful in its operations. The Idaho Legislature provided funding for TLG representatives for the county governments in 2006. That funding can be spread over three years, but a source for continued funding will need to be identified.

Other major challenges include implementing the Basin Institutional Controls Program (ICP) developed in 2006; resolving other institutional controls issues in OU-3 outside the administrative area for the Basin ICP; locating and developing waste repositories for disposal of remedial action and ICP wastes; developing and implementing methods to deal with contaminated ground water; implementing an infrastructure upgrade and flood control program in the Box (OU-1&2) and Basin (OU-3) to insure protection of the remedy; and coordinating BEIPC Lake related projects with the CDA Tribe and State's efforts to mediate and implement, if deemed appropriate, an updated Lake Management Plan.



**BEIPC Meeting Discussion of Basin ICP**

## Appendix A: 2006 Work Plan

**Table 1 Summary of Activities for 2006 Work Funded with Superfund or Other Cleanup Monies**

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Evaluation of PRE ROD OU-3 Removal Actions (see EPA 5-year Review Report)	Various parties have performed CERCLA removal actions. Results of these activities need to be evaluated and if warranted, incorporated into the OU-3 remedial action program.	Begin evaluation of these sites in context of the ROD and its schedule and incorporate into remedial action program as warranted.	EPA, IDEQ, BLM, USDA Forest Service, CDA Tribe
Repositories	Develop, as needed, repositories to support remediation and Institutional Controls Program (ICP). Plan, secure properties and be ready for remediation and ICP waste in Upper and Lower Basin anticipated in the next 5-10 years.	Utilize Big Creek for Basin remediation and ICP waste. Procure one new site in the upper Basin and one in the lower Basin. Finalize technical evaluations, goal to purchase East Mission Flats site and have it operational in 2006. Continued evaluation for potential acquisition of the Osburn Tailings Ponds site. Complete O&M cost requirements evaluation for candidate sites. Outline needs for the ICP.	IDEQ and EPA
Basin Institutional Controls Program (ICP)	Develop a program to manage activities in OU-3 to protect remediated areas from recontamination and to protect human health and the environment in areas requiring cleanup actions where no remedy is yet in place.	Implement the ICP in the CDA River Watershed portion of OU-3 by December 31, 2006.	IDEQ, PHD
Residential and Commercial Area Sampling and Remediation	Protect human health by continuing property sampling and property remediation program.	Complete sampling on 800 properties and remediate 400-500 properties in CY 2006.	IDEQ

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Drinking Water Supply	Protect human health by providing adequate drinking water supplies by continuing the sampling and remediation program.	For properties sampled in CY 2006 with private drinking water supplies, sample water supplies and implement remediation actions if necessary.	IDEQ
Recreational Areas	Continue to identify contaminated recreation use areas along the CDA River and remediate areas or develop substitute clean areas. Develop a Lower Basin recreational management plan.	Update contaminated recreation use area inventory. Begin the Lower Basin recreational management planning process. Complete work noted in Table 1-2 for CY 2006.	EPA with state and federal land management agencies
Mine & Mill Sites	Clean up priority sites that contribute to human health risks, are currently utilized for recreation activities, and contribute to water quality impacts. Continue to evaluate and prioritize additional mine and mill sites identified in OU-3 ROD and begin designs so remedial actions can be initiated as funds become available.	Complete Phase 1 and 2 remedial actions at Golconda site and remedial actions at Constitution Site. Complete design and begin remedial action at Rex site and prepare priority list for remaining sites noted in the ROD.	EPA, IDEQ. With BLM in Pine & Ninemile Creeks.
Phase II Component of overall OU2 remedy	The effectiveness evaluation of the Phase I source control and removal activities to meet water quality improvement objectives for the OU-2 ROD will be used to determine appropriate Phase II implementation strategies and actions. Implementation of future Phase II remedial action may require a ROD amendment and a State Superfund Contract (SSC) between EPA and IDEQ.	The following documents concerning the OU-2 Phase I evaluation will be available Winter 2006: Revised OU-2 Conceptual Site Model; Statistical Trend Analysis of Groundwater and Surface Water; Phase I Remedial Action Characterization; and Revised OU-2 Environmental Monitoring Plan	EPA, IDEQ

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Blood Lead Screening in Children	The Human Health PFT will explore alternative approaches to integrating universally available blood lead testing into the regular health care services received by Basin children aged 1-4 years with a part of the work being to identify an education outreach program. Such exploration will include examining alternative methods for implementing an integrated blood lead testing approach as reflected in those present in other states elsewhere in the nation. The goal will be to craft a two-year pilot program for the delivery of blood lead testing via this new approach. This goal may be modified as the Human Health PFT works on this issue.	EPA, IDEQ, IDOH, and PHD will continue to offer a universally available blood lead screening program in 2006. That program offers universal screening to children 0 to 6 years in age in the sense that screening is offered to all children for free and in the case of the Basin the program offers a \$20 incentive. Idaho Department of Health and Welfare, Division of Medicaid will work with participating physicians in the Basin to comply with requirements to perform blood lead screening during “well child checkups”. In addition, the TLG will also develop an approach to encourage and facilitate the provision of blood lead testing to children covered under Idaho’s Medicaid program.	IDEQ PHD
Upper Basin Ecological Remedies	Continue to evaluate approaches and technologies for water treatment in Canyon Creek that include pilot projects to develop design criteria and operational information. Remediate mine wastes along Denver Creek tributary to Pine Creek. Monitor previous remediation in East Fork of Ninemile, and water treatment pilot projects. Monitor existing growth media plots, assess biostabilization methods and develop media for capping waste material. Plan and prioritize remedial actions for other source areas.	Finalize development of water treatment approaches for surface and groundwater in Canyon Creek. Coordinate work with study performed under the CWA Grant Program. Continue to monitor completed remediation actions in Pine Creek. Complete Constitution site remediation and other projects noted under the Mine/Mill program for human health remedies. Prepare for remediation in future planning periods.	EPA and IDEQ. With BLM in Pine & Ninemile Creeks. EPA and USFWS have lead in soil cleanup standard.

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Lower Basin Ecological Remedies	Develop a pilot project for conversion of agriculture land into waterfowl habitat. Complete a pilot project on soil amendment to reduce bioavailability of lead. Design wetland remediation approach. Design splay remediation approach. Perform numerical modeling of River processes and sediment. Collect data on river bank conditions and metal concentrations. Monitor bank stabilization pilot projects and evaluate effectiveness. Develop lead cleanup level for riparian soil. Incorporate findings from AVISTA studies into remediation strategies. Develop lead cleanup level for riparian soil.	Continue to implement the Lower Basin CWA sub-grant projects and monitor the results to have a better understanding of the complex and dynamic system in the Lower Basin. Complete development of the lead cleanup level for riparian soils. Continue EPA and USFWS collaboration on perpetual protection, conversion and remediation of agricultural land, followed by restoration to wetland habitat ecologically safe for use by waterfowl.	EPA, IDEQ, USFWS and Coeur d'Alene Tribe
Basin Environmental Monitoring	Continue to implement long-term monitoring and make results available via <a href="http://www.storet.org">www.storet.org</a> . Implement remedial action effectiveness monitoring as appropriate.	Assess the effectiveness of remedial actions and trends in overall ecological improvement due to remediation and natural attenuation. Public outreach needed to assist in data access.	EPA working with other agencies including IDEQ, USFWS, and USGS

**Table 2 Summary of Activities for 2006 Work Funded with CWA**

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Lake Monitoring Water Quality Studies	Conduct monitoring of lake water quality to assess nutrient, sediment, and metal loading and trends in lake water quality; to assess improvements/impacts from upstream environmental improvements projects; and assess impacts from further development projects along the lakeshore.	Collect samples at five pelagic stations and 18 near-shore samples at intervals through October 2006. Publish 2005 water year data. Compile and evaluate data and publish evaluation of limnological data and riverine inflow/outflow data and physical, chemical, and biological interactions.	CDA Tribe, USGS
Ecological Monitoring of Coeur d'Alene Lake	Identify baseline conditions for ecological receptors in CDA Lake in order to determine future changes in the ecological condition of the lake. This information may be used in the future to determine if actions implemented under the OU-3 ROD and management actions implemented under the Lake Management Plan are effective.	Perform statistical analysis of lab results. Prepare report evaluating a metal bioavailability baseline for fish, health of fish receptors, and risk of exposure of piscivores to lead, cadmium and zinc.	USFWS
Stream Bank Stabilization	Construct and monitor the effectiveness of several techniques to protect the Coeur d'Alene River banks from boat wake erosive forces.	Continue monitoring cross-sections, bathymetry, erosion pins, and photo points.	IDEQ

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Lake Education and Outreach Program	Develop and implement a public information and education plan. The objective of such a plan is to provide the public with information to help them better understand the ecology of the Lake and ways they can better protect the Lake while they enjoy it.	Make educational map available through various vendors. Revise map if deemed necessary. Print remaining copies of map. Continue to present powerpoint program in schools.	CDA Tribe, KSSWCD
Mullan Inflow and Infiltration Groundwater Metal Loading Study/Demonstration Project	Evaluate sources of metals loadings to wastewater treatment facilities, investigate the potential reduction of metals loadings to the South Fork Coeur d'Alene River, determine the efficacy of wastewater collection system infiltration and inflow (I/I) reduction projects to reduce peak plant flows, and advance the current state of knowledge with regard to the cause and effect of such efforts to reduce pollution while considering transaction costs and community coordination.	Sample and analyze influent and effluent wastewater at the treatment plant for metals levels. Analyze metals loading trends and influent flows to the plant and verify impacts from the construction portion of the project. Update the final report as warranted and present to the BEIPC.	South Fork Sewer District
Woodland Park Groundwater Quality Monitoring	Monitor water quality in this shallow alluvial groundwater system in Woodland Park area of Canyon Creek. Gain a better understanding of the metal concentrations and potential loading from groundwater to the Canyon Creek surface water system.	The work is complete and the final report will be presented to the BEIPC.	IDEQ
Meyer Creek Flood Control	Assess the condition of the Meyer Creek diversion system and propose possible alternative remedial recommendations and order of magnitude cost estimates to prevent recontamination of the Superfund remedy in the City of Osburn during a flood event.	All work complete.	IDEQ

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Upper East Fork Nine Mile Creek Water Quality Evaluation	Success Mine Passive Water Treatment – 1) Reduce plugging in the Success Mine Apatite Barrier by making design modifications to the sediment chamber and injecting air into the Apatite to break up clogging in the media; 2) Perform a tracer study to determine hydraulic flow paths and residence times; 3) Analyze Apatite to determine forms of metal precipitates and where the reactions occur; and 4) Evaluate nutrient addition in the groundwater to determine if in situ metal precipitation is a viable option. East Fork Ninemile Creek Monitoring – Conduct monitoring of the East Fork of Ninemile Creek to assess where metal loadings occur, how seasonal flows affect metal loadings, evaluate overall water chemistry, and determine forms of metal precipitates.	It is anticipated that the work of placing new media into the Pilot Scale Success Mine Reactive Barrier will be completed in 2005. With that in mind, monitoring the discharge from the barrier will continue through the summer of 2006.	INL
Metals and Nutrient Removal Pilot at Page Plant	Evaluate two emerging technologies for precipitation and/or adsorption for removal of heavy metals (lead, cadmium, zinc, and copper) and phosphorus from point source discharges in the Silver Valley, especially the Page wastewater treatment plant.	No further pilot testing is planned for this project. The summary report will be completed in 2006 and presented to the BEIPC.	South Fork Sewer District

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
East Fork Pine Creek Revegetation Pilot Project	Identify practical and cost-effective methods to accelerate natural revegetation processes. Vegetation is needed to ultimately stabilize many stream reaches within the Basin. Identify and contrast the relative “bang for the buck” of several locally applicable revegetation methods.	Spring planting will take place in late April–early May, 2006. Field measurements for site characterization, including stream flow measurements, floodplain particle size distribution and surveyed channel cross-sections continue throughout the summer of 2006. Additional planting will resume in the fall of 2006. Monitoring of plant growth and survival rates will continue throughout the growing season. Any changes to planting site conditions, including average depth to seasonal low water table, effects of floods or channel shifting will also be monitored	BLM
Inventory and Evaluation of Private Lands for Potential Restoration of Wetland Habitats	Provide a comprehensive inventory that identifies private land that may be suitable for wetland remediation and restoration projects in the Basin. This inventory would be useful for identifying agricultural and wetland habitats that could be remediated or restored as part of the ROD. Landowners will be surveyed to determine interest in wetland creation or enhancement on their respective properties. Properties identified as potential remediation/restoration projects will be assessed for their habitat quality.	Landownership, potential project location and toxicological surveys will continue through 2009 based on need and project status.	USFWS

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Monitoring Fish Responses to Bank Stabilization in the Coeur d'Alene River	Assess the short- and long-term effects of bank stabilization treatments on fish community structure in the lower Coeur d'Alene River. Provide recommendations for bank stabilization project designs with the least adverse impacts and most positive benefits to overall fish community structure. Provide recommendations on what project-specific monitoring that would be required for individual bank stabilization projects.	Sampling will continue in the spring and summer of 2006 and spring of 2007 at the same sites as in 2005.	USFWS, U of I
Sediment Transport Model	Develop a set of tools that can be used by resource managers for evaluating proposed projects designed to minimize the transport of metal contaminated sediments in the Lower CDA River. Objectives include the utilization of existing data and collection of additional data to develop and calibrate computer models of the river between Cataldo and CDA Lake. These models would be capable of simulating the hydraulic and sediment transport characteristics of the river over a wide range of streamflow and lake elevation conditions. The models would be used to test proposed projects prior to implementation with the goal of improving their design and avoiding unanticipated and costly mistakes.	A one-dimensional (1D) sediment model will be calibrated. Various flow and sediment transport scenarios will be run for the final report. Data necessary for multi-dimensional bed-shear stress model will be collected. A multi-dimensional (multi-D) model will be developed of a single 1500 m reach near Dudley. Multi-D model will be calibrated and various flow and lake level scenarios will be run for final the report. Model development, calibration, and results of both 1D and multi-D models will be summarized in a final report to be published in 2006.	USGS

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Lake Response Simulation Model	Provide the entities responsible for management of Coeur d'Alene Lake with a sophisticated computer modeling system with which to simulate the lake's long-term responses to a wide range of remediation strategies to be implemented under the ROD and the Lake Management Plan.	Continue to assemble and/or update data bases which relate to lake bathymetry, inflow/outflow hydrology, inflow/outflow constituent loads and concentrations, meteorological forces, and limnological variables throughout water column. Continue and complete bioassay experiments to define zinc toxicity equations for lake phytoplankton. Continue and complete development of benthic flux equations for metals and nutrients. Complete development of 3-D hydrodynamic model, ELCOM, early in 2006. Link CAEDYM (aquatic ecology model) to ELCOM in early 2006. Using calibration data sets derived from limnological sampling program, test linked ELCOM-CAEDYM's ability to simulate interaction of physical, chemical, and biological processes. Incorporate new computer code to assess sensitivity of models to augmented modules related to phytoplankton toxicity and benthic flux. Use linked ELCOM-CAEDYM to assess transient conditions such as snowmelt runoff, convective circulation, and late summer stratification. Using those results, program linked DYRESM-CAEDYM to simulate long-term limnological conditions. Project completed at end of 2006.	USGS

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
North Fork Coeur d'Alene River Hydrologic and Sediment Study	Characterize and determine the existing hydrologic and in-stream conditions within the North Fork Coeur d'Alene River sub-basin stream system, and attempt to determine the impact of past and current management actions on the observed stream function and ecological conditions. In turn, the above scientific assessment would lead to specific identification of restoration projects, BMPs, and land use policy changes aimed to restore proper hydrologic functions and the impaired cold water aquatic life beneficial use (i.e., salmonid populations).	Conduct in-office work to perform an initial watershed assessment of existing conditions, and possible causes of the observed biological impairment in sub-basin streams. This analysis will identify priority areas for field examination of significant sediment sources, and channel stability condition as it relates to possible hydrological modification from a long history of land use activities. Prepare final document, <i>Summary of Known Existing Information and Improvement Projects</i> . Conduct on-the-ground surveys and inventories of sediment sources which could be the focus and target of a TMDL Implementation Plan, and conduct in-channel surveys for evidence of impairment by hydrologic modification. Complete watershed assessment using survey information collected during the 2006 field season. Produce a final report.	IDEQ

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Mica Bay Nutrient Reduction Project	Demonstrate for training and education purposes a means of reducing nutrient and sediment contamination to Coeur d'Alene Lake in accordance with the implementation of the Lake Management Plan. Project will also accomplish some TMDL implementation goals for the recovery of beneficial uses in Mica Creek.	If the preliminary plan is approved by landowners and the BEIPC, a final design would be completed. Permit applications will be submitted to the regulatory agencies. Easement language would be finalized by fall of 2006. Depending on progress with landowners and permitting, construction work could commence in the fall of 2006 at the earliest.	IDEQ
Lower Lakes Aquatic Vegetation Survey	Develop baseline data on submersed aquatic plant species distribution and biomass in Benewah, Chatcolet and Round Lakes. Estimate nutrient (primarily phosphorus) release from the existing plant beds into the water column of these lakes and, subsequently into Coeur d'Alene Lake. Inspect these lakes for the presence of invasive, noxious aquatic species.	Prepare project completion report and present it to BEIPC.	CDA Tribe
Canyon Creek Groundwater Metal Source Characterization	Determine how, in practical terms, zinc and other metals are distributed between different physical and chemical states in the Canyon Creek alluvium. This information will be used to help understand how natural processes can affect the movement of contaminant metals through Canyon Creek and how engineered processes can impact contaminant metal mobility or sequestration.	Complete studies and prepare final report and present it to the BEIPC.	INL

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Plummer Wastewater Treatment Plant Pilot	Construct a pilot scale demonstration of a cascading wetland treatment for use in the City of Plummer waste water treatment plant upgrade.	Construction began in 2005 and will be completed in early 2006. Monitoring and testing will be completed on a monthly basis from September, 2005 through September, 2006. Prepare final report.	City of Plummer
Plummer Creek Watershed Nutrient Load Assessment, Modeling, and Management Plan Development	Characterize nutrient concentrations and transport through the Plummer Creek watershed and into Chatcolet Lake. Develop a Watershed Nutrient Management Plan which will include appropriate and specific point nutrient source control efforts for the Plummer Creek watershed.	Field water quality and constituent concentration data will be collected at key points, including potential pollutant sources in the Plummer Creek watershed.	CDA Tribe
Pinehurst Flood Impact Study	Develop stream channel and drainage infrastructure techniques to control and mitigate water pollution and protect property from recontamination and flood impacts.	Prepare design report for Little Pine Creek Pilot Project. After report approval from the TLG, Little Pine Creek improvements will be designed and presented in a bid package. Discussion of Division Street improvements will occur with the TLG and City of Pinehurst. A design package will be prepared that includes stream improvements and Division Street storm drainage improvements. A construction project will be implemented in 2006.	IDEQ

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Silver Crescent Mine and Mill Complex Habitat Restoration	Study the feasibility and economics of watershed restoration in areas where the original stream type has been severely altered by mining and environmental cleanup activities.	Construction contract award late in 2005 or early 2006 with implementation start planned for 2006. Stream channel construction with wildlife and fish habitat structure installation will encompass the bulk of the construction phase at the site in 2006.	USDA-Forest Service
Canyon Creek Treatability Study	Develop an alkaline precipitation design as a low cost method of achieving a substantial improvement toward ROD goals, and determine if the proposed water treatment technology is implementable in the So. Fork CDA River.	Develop a conceptual design for construction of an alkaline precipitation treatment pilot plant study. The conceptual design will include a literature search into the technology; an evaluation of implementation and effectiveness issues associated with this technology; and a design for a pilot scale test facility and program.	IDEQ
South Fork Sewer District Toxicity Reduction	Identify sources of toxicity in Basin community wastewater treatment plant effluent to develop options for removal of toxicants; perform bench testing to verify removals; and develop capital and O&M cost projections.	Baseline toxicity testing (whole effluent toxicity) – January 2006, June 2006, and October 2006. Review of potential sources of toxicity at the Page WWTP – April/May 2006. Step-wise toxicity identification evaluation (TIE) – June through August, 2006. Toxicity control evaluation (TCE) – November 2006 through May 2007.	South Fork Sewer District

<b>Proposed Activity</b>	<b>Scope</b>	<b>CY 2006 Objective</b>	<b>Lead Agency</b>
Assessment of the Economics and Effectiveness of Alluvium Sorting as Mine Waste Removal Strategy at the Project Implementation Level	Establish, at a removal project level, the costs of a simple screening of removed contaminated alluvium, and assess the beneficial value of the removal strategy by assessing the change in the metals content of the three-quarter inch minus fraction of the bed load sediment downstream.	Prichard Creek will be monitored to establish if bank full discharge occurs either during a winter storm event or spring runoff. Bank full discharge is sufficient to mobilize the stream bed, displacing sediments accumulated. If at least one bank full discharge occurs, stream bed load sediment will be re-sampled for its metals content for comparison to pre-tailings removals content. The project has allotted four seasons (2006-2009) to attain at least two bank full discharge events and assess the effectiveness of the project in removal of contaminated sediments from Prichard Creek.	IDEQ
Coeur d'Alene Lake Management Plan Implementation	Conduct an extensive evaluation of all activities within one mile of the Lake shore to evaluate what BMPs are in place, how effective they are, what BMPs are required but not in place, and to establish specific BMP audit procedures.	Conduct and complete a survey and effectiveness audit. Estimate programmatic costs for nutrient management activities.	IDEQ, CDA Tribe