Coeur d'Alene Basin
Final Interim Restoration Plan
and
Environmental Assessment

TRUSTEES:
Department of the Interior, Fish and Wildlife Service
Department of the Interior, Bureau of Land Management Department
Department of Agriculture, Forest Service
Coeur d'Alene Indian Tribe

LEGAL AUTHORITIES:

Comprehensive Environmental Response, Compensation and Liability Act of 1980 (as amended)

Natural Resource Damage Assessment, 43 Code of Federal Regulations, Part 11

National Environmental Policy Act, 42 U.S.C. §4321-4347

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CHAPTER 1

1. BACKGROUND, PURPOSE AND NEED FOR PROPOSED ACTION

1.1. Project Background

For over 100 years, the Coeur d'Alene River Basin (Basin) was one of the most productive silver, lead, and zinc mining areas in the United States, producing 7.3 million metric tons of lead and 2.9 million metric tons of zinc between 1883 and 1997 (Mitchell and Bennett 1983; Long 1998). The majority of mining and mineral processing in the Basin occurred along the South Fork of the Coeur d'Alene River and its tributaries (Mitchell and Bennett 1983). The wastes generated by these operations contain metals, including lead, zinc, cadmium, and arsenic.

For most of the 20th century, these wastes were discharged directly into the river and tributaries or were deposited on lands and migrated into ground and surface waters. Mining products and wastes containing metals were also transported by train and other vehicles that spilled and tracked metals along travel routes in the Basin. Mining-related wastes were also taken from the mine and mill properties or hauled out of the floodplain areas for use in other applications throughout the Basin, including without limitation ballast for railroad lines, materials for street and road surfacing, and concrete aggregate. As a result, mining-related waste rock, tailings, mine drainage, and contaminated floodplain deposits are continuing sources of metals contamination in the Coeur d'Alene Basin (USFWS, et al. 1991; Ridolfi 1998; and Stratus 2000). Surface and ground water continues to transport dissolved and particulate metals contamination to downstream surface waters, soils, and floodplain sediments (Beckwith et al. 1997; Ridolfi 1995; Stratus 2000; Weisel 1981). Tailings and contaminated sediments continue to be deposited in the Coeur d'Alene River channel, levees, and floodplain, as well as in lakes and wetlands adjacent to the river (Campbell et al. 1999; Box et al. 1996; Fousek 1996; Hoffmann 1995; and Rabbi 1994), and in Coeur d'Alene Lake (Woods and Beckwith 1997; Horowitz et al. 1993, 1995a, 1995b). As a result, extremely elevated metals concentrations exist in soil, sediments, and waters throughout the Basin.

In 1983, the U.S. Environmental Protection Agency (USEPA) listed the Bunker Hill Mining and Metallurgical Complex Superfund facility on the National Priorities List (NPL) in response to human health risks associated with mining-related metals contamination in the 21 square-mile area around the former Bunker Hill smelter, known as the "Box." The facility includes mining-contaminated areas in the Coeur d'Alene River corridor, adjacent floodplains, downstream water

bodies, tributaries, and fill areas, as well as the 21-square mile "Box" (USEPA 2002). See Figure 1. The USEPA defined "operable units" (OUs) for the facility. A Record of decision (ROD) was signed for the populated areas of Bunker Hill Box (OU1) in 1991 (USEPA 1991), and a ROD was signed for the non-populated areas of the Box (OU2) in 1992 (USEPA 1992). USEPA did not select actions in the RODs for OU-1 and OU-2 to address sources of mining-related contamination outside of the Bunker Hill Box, leaving broader contamination and water quality issues in the Basin to be resolved through coordination of federal, state, tribal and local regulatory controls by the Coeur d'Alene Basin Restoration Project ("CBRP"). However, CBRP ultimately was unsuccessful in its efforts to systematically address contamination in the Basin.

In 1991, the U.S. Departments of Interior and Agriculture and the Coeur d'Alene Indian Tribe ("Trustees") initiated a Natural Resource Damages Assessment (NRDA) to assess damages under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Clean Water Act [33 U.S. C. 1321] for natural resource injuries resulting from exposure to hazardous substances, particularly lead, zinc, and cadmium in the Basin. Each of the Trustees qualifies under CERCLA and its implementing regulations as a trustee of injured natural resources in the Basin [42 U.S.C. 9607(f)]. The Trustees developed the Basin NRDA consistent with the U.S. Department of Interior's non-mandatory damage assessment regulations, 43 CFR Part 11, Subpart E, as appropriate. Consistent with those regulations, the Trustees' decision to conduct a full-scale damage assessment in the Basin was based upon the 1991 "Preassessment Screen (PAS) of Natural Resource Damages in the Coeur d'Alene Watershed Environment from Mining and Related Activities Taking Place in and about the Bunker Hill Superfund Site" (USFWS et al. 1991). The Trustees subsequently prepared and released the Phase I (Injury Determination) Assessment Plan (USFWS et. al. 1993), and the Phase II (Injury Quantification and Damage Determination) Assessment Plan (USFWS et. al. 1996). The results of the injury determination and quantification studies confirmed widespread distribution of mining-related contamination throughout the Basin and resulting natural resource injuries, and were described in the Trustees' Report of Injury Assessment (Stratus 2000), which documented that:

(1) Concentrations of metals in floodplain soils of Canyon Creek, Ninemile Creek, and the South Fork Coeur d'Alene River valley are phytotoxic and caused reduced riparian vegetative cover and habitat complexity, resulting in hundreds of acres of barren and sparsely vegetated floodplain soils and sediments (Stratus 2000).

(2) Concentrations of metals in surface water (Ridolfi 1995; Ridolfi 1999) exceed chronic and acute aquatic life criteria recommended by the USEPA [63 FR 68354]. Fish and other aquatic resources have been injured as a result of exposure to elevated metals (Ellis 1940; Stratus 2000); populations of trout and other fish have been reduced or eliminated from the South Fork Coeur d'Alene River (Stratus 2000).

(3) Of the approximately 19,200 acres of floodplain habitat in the lower Basin, approximately 18,300 acres (95 percent) contain lead levels above those observed to cause negative physiological effects in waterfowl. Approximately 15,400 acres (80 percent) contain lead levels above those observed to kill waterfowl (USEPA 2002). Ingestion of lead-contaminated sediments by waterfowl has resulted in extensive mortality and other adverse physiological effects (Beyer et al. 2000; Sileo et al. 2001).

(4) Approximately 40 square miles, or 85 percent of lakebed sediments contain lead concentrations above values considered ecologically harmful (Stratus 2000).

In 1998, as the Trustees' NRDA studies were near completion, the USEPA initiated a CERCLA remedial investigation/feasibility study (RI/FS) into human and ecological risks from exposure to mining-related metals contamination in areas of the Basin located outside of the Box, identifying this area as OU-3, USEPA's RI/FS findings and conclusions were consistent with those of the Trustees concerning the widespread geographic extent and impact of mining-related metals contamination on natural resources in the Basin.

In 2002, USEPA issued an interim ROD for Basin OU-3, specifying thirty-years of remedial actions in Basin areas upstream and downstream of Coeur d'Alene Lake at an estimated cost of $359 million.[1] USEPA's cleanup plan focuses on source control and removal actions in these areas to reduce human and ecological resource exposures to mining contamination, particularly lead in soil and sediment, and dissolved zinc and cadmium and particulate lead in surface waters. USEPA's cleanup actions may include surface water treatment to remove excess arsenic, cadmium, lead, manganese and mercury, excavation and removal of contaminated soils, permanent capping of contaminated areas, and/or reducing surface metal concentrations through surface-subsurface mixing.

[1]EPA did not select remedial actions for Coeur d'Alene Lake, deferring to the Coeur d'Alene Indian Tribe and the State of Idaho to develop and implement an updated lake management plan to monitor and address metals contaminated sediments in Coeur d'Alene Lake (USEPA 2002; Ridolfi and Falter 2004)

In 2003, the U.S. District Court for the District of Idaho ruled that the Trustees established the liability of two non-settling mining company, Asarco Incorporated and Hecla Mining Corporation, Incorporated (hereafter referred to as "remaining defendants"), under CERCLA and the Clean Water Act for natural resource injuries resulting from the releases of mining-related metals contamination by those defendants into the Basin. The Court determined the scope of injuries includes[2]:

(1) surface and ground water,
(2) soils and sediments,
(3) riparian resources,
(4) fish,
(5) birds, i.e., Tundra swans (*Cygnus columbianus*) that feed in the lower Basin, and
(6) benthic macroinvertebrates and phytoplankton.

Under CERCLA, damages recovered from parties responsible for natural resource injuries are used "to restore, rehabilitate, replace, and/or acquire the equivalent of the injured resources" (hereafter collectively referred to as "restoration" or "restoration activities") [42 U.S.C. § 9607(f)(1)]; and any funds used by Federal Trustees to implement restoration activities are subject to the requirements of the National Environmental Policy Act (NEPA) [42 U.S.C.§ 4321]. Accordingly, the Trustees developed the Draft Coeur d'Alene Basin Interim Restoration Plan (DIRP) to identify restoration alternatives that partially address the resources injured due to the release of mining-related hazardous substances in the Coeur d'Alene Basin. The Trustees released the DIRP for a 30 day public comment period on June 19, 2006. The Federal Trustees used the public comments and further Trustee discussions to complete the FIRP and to conduct an Environmental Assessment (EA) on the FIRP in consultation with the Tribe. This document includes both the FIRP and the associated EA. The Trustees have reached consensus on the proposed alternatives described in the FIRP in coordination with the State of Idaho.

1.2. Project Purpose

[2] See Coeur d'Alene Tribe v. Asarco, Inc., et al., 208 F.Supp.2d 1094, 1106-1107, 1123-1124 (D. Idaho 2003).

The FIRP is being proposed prior to final resolution of the Trustees' natural resource damage claims against the remaining defendants responsible parties to take advantage of opportunities to restore injured resources using currently available funding to implement interim restoration projects. The scope of restoration activity undertaken as a result of the FIRP would depend on current and near future funds, property, and services made available through the resolution of natural resource damage claims. The proposed alternatives in the FIRP are consistent with the funds currently available from the Trustees' prior settlements with several responsible parties in the Basin (approximately $5 million dollars). Additional funds may also become available through requests for reimbursable funds that are submitted by the Federal Trustees to the ASARCO, Inc. Environmental Trust, which the company established through a judicially approved, partial settlement of certain nationwide environmental claims against it by the United States, and/or through Trustee settlements for natural resource damages with the remaining defendants.

To implement the selected restoration alternative, the Trustees may choose to establish partnerships through agreements with other parties and organizations to assume title to lands or to preserve those lands. By doing so, the Trustees do not intend to delegate trustee responsibilities or authorities to such parties or organizations.

The FIRP is not intended to quantify or to analyze the full extent of actions necessary to accomplish restoration of injured natural resources in the Basin. The Trustees would conduct the limited restoration actions proposed in this Interim Restoration Plan over the next several years. The Trustees will continue to assess opportunities to enhance the scale of the restoration projects proposed in the FIRP, as well as opportunities to conduct additional restoration projects, consistent with available funding. Consistent with the National Contingency Plan, the Trustees would implement the selected alternative in coordination with the remedial activities of USEPA and the State of Idaho in the Basin. See Subpart G of the National Oil and Hazardous Pollution Contingency Plan 40 CFR 300.600-615.

To summarize, the purpose of the Final Interim Restoration Plan (hereafter FIRP) is to identify projects agreed upon by the Trustees that: 1) would partially address natural resource injuries caused by mining activities in the Coeur d'Alene Basin and; 2) could be implemented within the next several years; and 3) would use, but not exceed, funds available to the Trustees' as described in paragraph one of this section. Through this EA and decision processes, the Trustees will select one

of the proposed interim restoration alternatives to pursue. Consistent with the National Contingency Plan, the Trustees would implement the selected alternative in coordination with the remedial activities of USEPA and the State of Idaho in the Basin. See Subpart G of the National Oil and Hazardous Pollution Contingency Plan [40 CFR 300.600-615].

1.3. Project Need

The proposed restoration projects in the FIRP are needed to:

1. Restore, rehabilitate, replace, or acquire the equivalent of injured surface and ground water, soils and sediments, riparian resources, fish, birds (Tundra swans that feed in the lower Basin), and benthic macroinvertebrates;
2. Preserve, restore, or enhance, wetlands, aquatic and riparian systems and their ecologically associated uplands;
3. Control, modify or eliminate sediment sources, noxious weeds, and erosion;
4. Conduct effectiveness monitoring and apply adaptive management to future projects;
5. Improve water quality; and
6. Acquire high priority habitat.

1.4. Restoration Planning

The Trustee's proposed FIRP identifies actions intended to aid in returning injured natural resources to baseline condition. "Baseline" means the condition or conditions that would exist absent the release of hazardous substances [43 CFR §11.14 (e)], and restoration to baseline conditions can be measured in terms of physical, chemical, or biological properties [43 CFR §11.14(11)]. The Trustees' FIRP proposes restoration projects that would go beyond the source control and hazardous substance removals contemplated under USEPA's 1991, 1992, and 2002 RODs for OU-1, OU-2, and OU-3 in the Basin (USEPA 1991, 1992, and 2002) through actions aimed at restoring, rehabilitating or replacing physical, chemical, biological, and ecological attributes of natural resources that contribute to functional ecosystems.

Under the NRDA regulation [43 CFR §11.82], natural resource trustees should consider the following factors when selecting which of the proposed restoration alternatives to pursue:

(1) technical feasibility;

(2) relationship of the expected costs of the proposed actions to expected benefits from the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources;
(3) cost-effectiveness;
(4) results of actual or planned response actions;
(5) potential for additional injury resulting from the proposed actions, including long-term and indirect impacts, to the injured resources or other resources;
(6) natural recovery period;
(7) ability of the resources to recover with or without alternative actions;
(8) potential effects of the action on human health and safety;
(9) consistency with relevant federal, state and tribal policies; and
(10) compliance with applicable Federal, State and Tribal laws.

The Trustees used these factors to help select which projects to include in alternative C, and will use these factors, as appropriate, in the process of selecting which of the alternatives in this EA to implement.

As noted above, the Trustees' proposed FIRP does not include the full extent of restoration activities that are needed to address injured natural resources in the Basin. However, interim restoration activities proposed herein are consistent with expert determination that were submitted in the Trustees' natural resource damages litigation (LeJeune et al., 2004, Stratus 2004, and Trost 2004) and evaluate a broad array of actions to partly accomplish restoration of injured natural resources in the Basin.

1.5. Public Participation

Consistent with CERCLA, the Trustees made the DIRP available for public review and comment. The notice of the public's opportunity to submit comments on the DIRP was posted on June 19, 2006 at the internet sites of U.S. Fish and Wildlife Service (http://www.fws.gov/pacific/ecoservices/envicon/nrda/restoration.html or http://www.fws.gov/easternwashington). The public comment notices were also published on that date in local newspapers, including the Spokesman Review and the Coeur d'Alene Press.

The Trustees received two public comment letters during the comment period. One commenter was interested in overall land management of the Pine Creek watershed and the possibility of increased peak flows. The other commenter had several concerns about the DIRP's responsiveness to DOI NRDA policy, and the NRDA regulations along with the specificity of the Interim Restoration Plan. This commenter also suggested that the DIRP might be premature, noting that the natural resource damages litigation brought by the United States and the Coeur d'Alene Tribe (Tribe) is still pending, and that the United States and the Tribe do not know whether there may be further recovery of natural resource damages, or the amounts of any damages which could be recovered . The commenter felt that full knowledge of the complete amount of funding was needed to prioritize spending. Responses to the public comments are presented in Appendix B.

The administrative record regarding the Interim Restoration Plan and the EA are being maintained at U.S. Fish and Wildlife Office, 911 NE 11th Avenue, Portland, Oregon, 97232.

1.6. Scope of the Action

The area affected by the FIRP defines the scope of this proposed action. Given this definition, the scope of the proposed FIRP is the Coeur d'Alene Basin. While most proposed projects would only affect a small area within a specific watershed within the Coeur d'Alene Basin, the wetland-based restoration projects could take place anywhere in the Basin there are both willing landowners and wetlands.

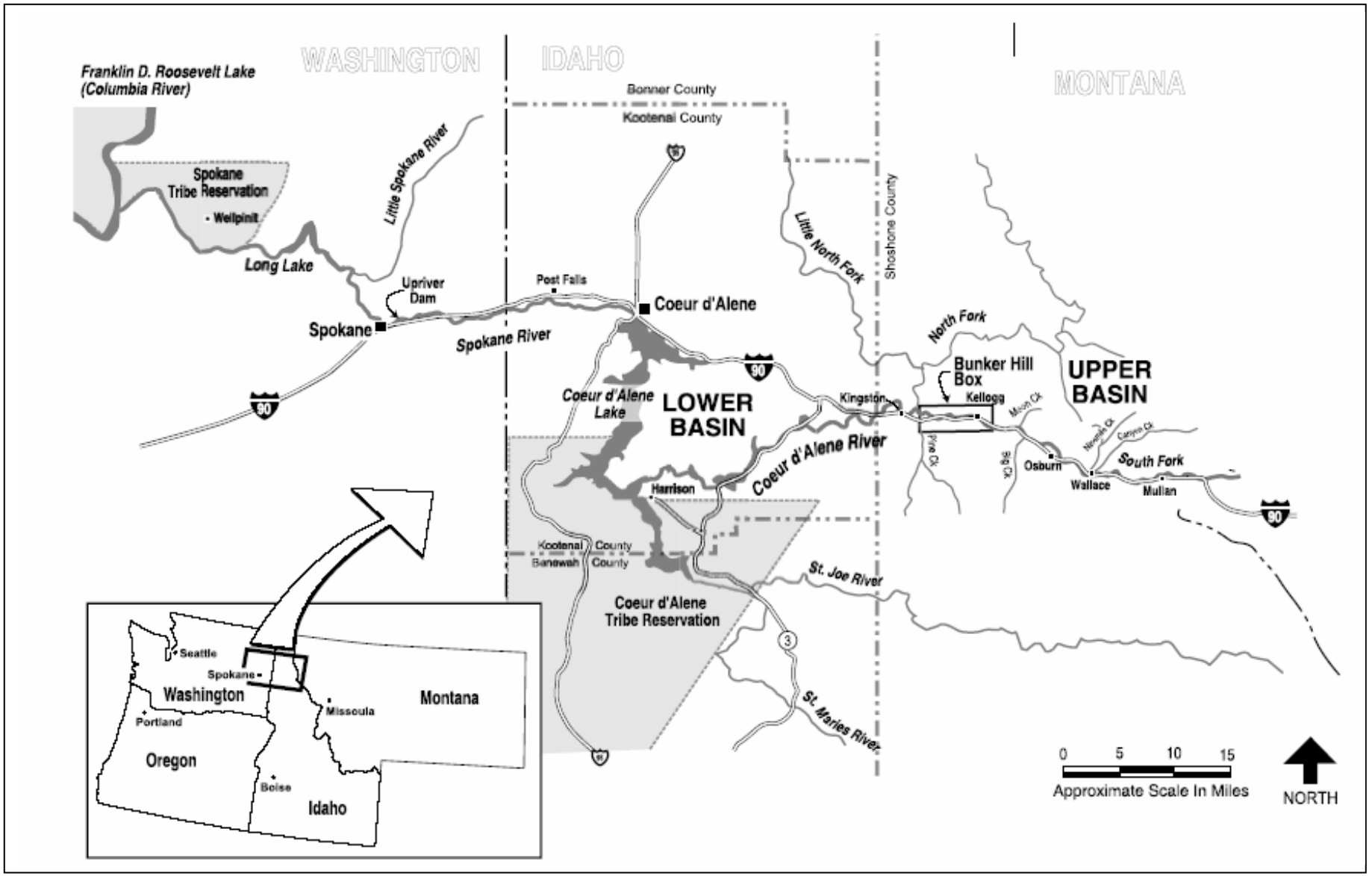
1.7. Decision to be Made

The Federal Trustees will select one of the alternatives. In selecting which alternative to pursue, the Trustees will consider the purpose and need for the action, potential impacts to the human environment, and the criteria presented in Section 1.3 above. The Federal Trustees' decision on which alternative to pursue will be made in consultation and with the concurrence of the Coeur d'Alene Tribe and with the concurrence of the State of Idaho.

The FIRP's preferred alternative (alternative C) presents general descriptions of projects, but does not present detailed site-specific project designs. The project descriptions include activity types, and when known, locations of proposed activities. Because this is a plan, a selection of the

preferred alternative would authorize the Trustees to pursue the projects in the plan, but they would not be implemented until site-specific project designs are written, needed clearances and permits are obtained, and site-specific compliance with other laws such as NEPA and ESA are completed, as appropriate. See Chapter 6 for a discussion of specific programs, plans, and regulatory authorities.

Figure 1. Coeur d'Alene Basin (from USEPA, 2002).



CHAPTER 2

2. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

2.1. Changes in the Proposed Action Between the Draft and Final Interim Restoration Plan

Four changes were made in the proposed action between the draft and the final Interim Restoration Plan. One, the proposed DIRP indicated that the Trustees intended to implement the restoration actions between 2006 and 2008. There were unexpected planning delays, and we now estimate that the projects would occur over the next several years. Two, the Trustees in the DIRP estimated that the Trustees would spend approximately $200,000 on Sherlock Creek restoration. The legal issues at the restoration site have been resolved and the project planning proceeded much more quickly than the Trustees anticipated. It is now estimates that approximately $950,000 would be allocated to this project. The Trustees will seek a substantial portion of these funds from ASARCO, Inc. Environmental Trust. Three, the DIRP included two alternatives; this EA includes three. A third alternative was added, Alternative B, Future Final Restoration Alternative, to respond to public comments, and also to broaden the range of alternatives. Four, the funds currently available to the Trustees from past settlements with responsible parties in the Coeur d'Alene Basin were updated with more accurate information as well as some additional payments to the accounts resulting in an increase in available funds from $3 million to $5 million dollars.

2.2. Alternative A: No Action – Natural Recovery

The Trustees, under the No Action-Natural Recovery alternative, would not at this time initiate specific actions to compensate the public for losses attributable to continuing injuries resulting from on-going releases of mining-related hazardous substances in the Basin. The USEPA would continue to implement the agency's Records of Decision for operable units 1, 2, and 3 (USEPA 1991, 1992, and 2002). Under alternative A, recovery of the Coeur d'Alene Basin ecosystem could take centuries following USEPA's response actions (Ridolfi and Falter 2004; and USEPA 2002). Selection of alternative A, at this time, would not preclude a different alternative selection at a later date, either after resolution of NRDA litigation with remaining defendants, or after completion of USEPA's response actions.

2.3. Alternative B: Future Final Restoration Plan

The Trustees, under the Future Final Restoration Plan (FFRP) alternative, would not initiate restoration until a final restoration plan was developed. Therefore, at this time, the Trustees would not take any specific actions to compensate the public for injuries to natural resources from past and on-going releases of mining-related hazardous substances in the Basin. The FFRP would be developed after a litigation result or a settlement was achieved with the remaining defendants found to be liable by the U.S. District Court for the District of Idaho for injuries to certain natural resources associated with the release of mining-related hazardous substances into the Coeur d'Alene Basin[3]. Although a time frame is difficult to estimate, it is feasible that litigation could be resolved or settlements could occur over the next four to five years.

Once settlements or a litigation result is achieved, the Trustees would know the full extent of the funds available for restoration. The Trustees would develop a restoration plan that included a prioritization scheme for the full amount of funding and projects available at that time. The USEPA would continue to implement the agency's Records of Decision for operable units 1, 2, and 3 (USEPA 1991, 1992, and 2002). Selection of alternative B, at this time, would not preclude a different alternative selection at a later date.

2.4. Alternative C: Proposed Coeur d'Alene Basin Interim Restoration Plan

2.4.1. Background

CERCLA authorizes natural resource trustees to replace or acquire natural resources equivalent to those injured by hazardous substance releases, in lieu of or in addition to, direct restoration of the injured resources. Natural resources may also be rehabilitated with actions that increase the ecological integrity or viability of natural resources in the Coeur d'Alene Basin that have been determined by the court to have been injured by the release of the mine-related metals. It is the intent of the Trustees to implement restoration actions that address these injuries. Injured aquatic biota inhabiting the Coeur d'Alene Lake ecosystem may use many Coeur d'Alene Lake tributaries, including the Coeur d'Alene, and St. Joe Rivers. Alternative C, therefore, proposes projects in a number of river and creek systems whose restoration/enhancement would support the rehabilitation of the Basin's aquatic resources. The reestablishment and restoration of wetlands and their ecologically-associated uplands would begin to help replace services for impaired fish and aquatic

[3]See Coeur d'Alene Tribe v. Asarco, Inc., et al., 208 F.Supp.2d 1094, 1106-1107, 1123-1124 (D. Idaho 2003)

biota in the Coeur d'Alene Basin ecosystem, ultimately aiding in their recovery. Tundra swans that feed in the lower Coeur d'Alene Basin have been injured from hazardous substances released from mining and mineral processing in the Coeur d'Alene Basin. Alternative C includes projects that would begin to provide ecosystem services to Tundra swans through the preservation, reestablishment, restoration and/or enhancement of wetland habitat safe for use by Tundra swans. Preservation, reestablishment, restoration and/or enhancement of wetland habitat would serve as partial compensation for injury to Tundra swans. The control of sediment sources and restoration of aquatic and riparian systems would begin to help replace lost services associated with surface water, riparian resources, fish, and benthic macroinvertebrates.

2.4.2. Selection Criteria for Proposed Projects

In developing a list of proposed interim restoration projects that address injuries to natural resources within the Coeur d'Alene Basin, the Trustees considered all known related potential projects. Available damage funds, available willing landowners (where applicable), and costs of potential projects influenced project opportunities and ultimately, the selection of the proposed projects by the Trustees. Priorities for evaluating potential projects were influenced by several considerations:

(1) injured natural resources (U.S. District Court 2003);
(2) quality of restoration opportunities (areas with substantial ecological opportunities);
(3) relationship to losses (areas with restoration opportunities that address services and values similar to those lost due to the release of metals are preferred);
(4) ecological value of target habitats;
(5) cost-effectiveness (projects with lower cost per services or values are preferred);
(6) currently available damage funds with which to conduct restoration;
(7) potential for habitat quality improvement;
(8) minimal metal contamination and low propensity for recontamination are preferred; and
(9) ownership/protection opportunities.

Potential projects were further evaluated in consideration of factors described in Sections 1.4. Projects also received higher priority for their ability to utilize funds with time-sensitive limitations (i.e., ASARCO Environmental Trust Fund). Costs outlined in Stratus (2004) were followed in initial restoration planning and project selection. Under alternative C, the Trustees would continue

to seek partnerships for cost sharing on proposed projects as design and implementation proceeds. The Trustees intend to implement the restoration/enhancement projects that are proposed below as alternative C over the next several years that would serve to partially compensate for public losses associated with identified natural resources injuries in the Basin (U.S. District Court 2003).

2.5. Alternative C: Proposed Coeur d'Alene Basin Interim Restoration Plan Projects (Preferred Alternative)

Alternative C is the proposed action and preferred alternative and includes several discrete restoration projects. A summary of the alternative C proposed interim restoration projects, estimated cost, lead trustee and specific Coeur d'Alene Basin injured resource that is addressed is provided in Table 1.

The dollar amounts associated with each project are estimates and, by consensus, the Trustees may allocate more or less funding to a particular project based on factors such as cost share opportunities, the availability of funding from other sources, or future settlements with remaining defendants.

Table 1. **Alternative C proposed interim restoration projects, estimated cost, lead trustee and Coeur d'Alene Basin injured resources.**

Project	Estimated Cost	Lead Trustee	Specific Coeur d'Alene Basin Injured Resource Addressed
Pine Creek and Tributaries	$600,000	Bureau of Land Management	Surface water and aquatic biota habitat Fish and aquatic biota Federal lands natural resources
Moon Creek	$25,000	US Forest Service	Surface water and aquatic biota habitat Fish and aquatic biota Federal lands natural resources
Sherlock Creek	$950,000	US Forest Service	Surface water and aquatic biota habitat Fish and aquatic biota Federal lands natural resources
Alder Creek	$600,000	Coeur d'Alene Tribe	Fish and aquatic biota
Benewah Creek	$660,000	Coeur d'Alene Tribe	Fish and aquatic biota
Hepton Lake	$300,000	Coeur d'Alene Tribe	Surface water and aquatic biota habitat Fish and aquatic biota Tundra swans

Wetland-Based Restoration	$900,000	US Fish and Wildlife Service	Tundra swans Fish and aquatic biota

2.5.1. East Fork Moon Creek Restoration Project ($25,000)

Background

From 1998 through 2000, the U.S. Forest Service (USFS) implemented a $1.9 million removal action at the abandoned 20-acre Silver Crescent Mine and Mill Complex in the East Fork of Moon Creek. The mine and mills at the site historically processed lead, zinc, and silver ore with both an early jig mill and a later ball mill with a flotation plant. The main construction phase of the USFS removal action moved over 130,000 cubic yards of material contaminated with lead, arsenic, copper, and mercury into an on-site capped repository.

Removal action tasks accomplished include the following:

- removal of public health hazards,
- removal of contamination sources,
- tailings, waste rock, and contaminated soil relocated into an on-site capped repository,
- stream channel relocation and reconstruction,
- riparian and upland revegetation, and
- erosion control and stabilization.

Monitoring results from groundwater and surface water samples strongly indicate an increase in water quality due to a reduction in metals concentrations. All metal concentrations measured in surface waters through the site have been below human health and chronic aquatic life criteria with the exception of dissolved zinc concentrations. Dissolved zinc, measured in low flow surface water conditions, is approximately 0.2 ppm (approximately four times the federal chronic aquatic life criteria). It is anticipated that the zinc levels within Moon Creek will continue to decline as removal action benefits continue to accrue. Existing zinc levels are not prohibitive in planning fish habitat restoration because those levels exceed chronic aquatic life criteria only during low flow periods and in a localized area. Monitoring for changes in water quality would continue to occur.

With an increase in water, soil, and sediment quality and all human health concerns addressed at the site, the East Fork of Moon Creek has potential for fisheries, wildlife, and terrestrial restoration. The entire site is in winter range for big game and the East Fork of Moon Creek provides valuable

spawning and rearing habitat for westslope cutthroat trout (*Oncorhynchus clarki lewisi*) in the South Fork of the Coeur d'Alene River drainage.

During the removal action construction process, the stream channel, floodplain, and flood-prone areas were greatly altered. Over 3000 feet of the East Fork of Moon Creek's channel needed to be moved several times in order to remove tailings, waste rock, and contaminated soils. Although contaminants at the site have been addressed and the disturbed area is relatively stable, the channel and floodplain areas are still in need of restoration work in order to achieve pre-mining habitat quantity and quality. The following natural resource restoration would complement and build upon the remedial work by vegetating and stabilizing the stream channel and riparian zone within remediated areas.

Proposed Restoration Monitoring

East Fork Moon Creek restoration activities are designed to augment ongoing activities. Current funding for restoration work at the Silver Crescent Mine in the East Fork of Moon Creek is provided by the USFS, Coeur d'Alene Basin Environmental Improvement Project Commission (Basin Commission), and the Trustees. Current work is part of an existing USFS CERCLA Removal Action. This proposal would provide partial additional funding required for some of the total project monitoring and maintenance.

Currently the Trustees have committed $70,000 of restoration settlement funds toward the project to cover planning, design, administration, and oversight. Clean Water Act funds through the Basin Commission (over $300,000) would be used for the on the ground construction and vegetation work as well as to cover some monitoring costs. This Interim Restoration Plan would add funds (approximately $25,000) to the East Fork Moon Creek project monitoring program to help achieve more robust monitoring of the restoration.

Restoration/stabilization techniques already in use and proposed for future work includes:

- vegetative restoration,
- installation of wildlife habitat structures,
- installation of fish habitat structures,
- stream channel enhancement,
- installation of grade controls, and
- control of noxious weeds.

It is anticipated that at least five years of post-restoration monitoring would be conducted. Monitoring of the effectiveness and costs of various treatments would provide feedback to assess feasibility of transferring successful methods to other areas within the Coeur d'Alene River Basin.

The following components would be evaluated to quantify project accomplishments:

- fish tissue and songbird blood lead surveys to evaluate ongoing contaminant exposure (includes upstream and downstream areas);
- fish population monitoring;
- fish habitat surveys to monitor the quality and dynamics of restored fish habitat;
- permanent benchmarks set up during contract preparation for cross section/longitudinal profile monitoring; and
- stationary photo points for vegetative and riparian habitat monitoring.

The Silver Crescent Mine and Mill site would be the first sizable site in the Coeur d'Alene River Drainage to be cleaned up and restored to pre-mining conditions that support functioning wildlife and fisheries habitat. Once this project is complete, future maintenance is anticipated to be minimal. The site would be more stable, with fish and wildlife habitat improving over time. Any future maintenance needs at the site would be the responsibility of the USFS.

2.5.2. Sherlock Creek Restoration ($950,000)

Background

Sherlock Creek restoration would address impacts of a large placer mining site in a USFS roadless area. Mining began in 1970, and, the activities at the site have been, in some form, out of compliance with federal regulations, particularly [36 CFR 228 A] since 1971. Legal action was recently taken by the United States against the mine operator to stop the injury to the natural resources at the site being caused by placer mining activity. Summary judgment was granted to the United States, which includes a recent court order to allow the USFS to proceed with restoration of the site.

The site, in the upper reaches of the St. Joe River watershed, is close to the Idaho - Montana divide southwest of Superior, Montana. The disturbance at the site is approximately 20 acres with additional downstream habitat degradation. The resource extraction practices over the last 30 years have been destructive to the aquatic ecosystem of Sherlock Creek. The sources of problems at the

site includes: garbage and waste dumps, abandoned machinery and other equipment, roads, channelized streams, artificial ponds, altered topography, some soil (oil / fuel) contamination, and barren or partially revegetated ground.

Bull trout, a threatened species under the Endangered Species Act (ESA), still actively spawn below the site as well as in adjacent streams. A continuing problem in the upper reaches of the St. Joe River is low egg hatching success due to redds being smothered by fine sediments. The sediment originates in upstream areas such as the Sherlock Creek placer mine site. The Draft Bull Trout Recovery Plan identified Sherlock Creek as a priority stream for restoration (USFWS 2002).

Proposed Restoration

The restoration project would focus on rebuilding over 1 mile of stream that was channelized leading to the stream and tributary routes that lack natural stream meander patterns. Total floodplain reconstruction would be needed to create hydrological stability within this stream reach in the long term. Extensive native revegetation would also be needed to restore the barren or only partially vegetated areas.

Proposed restoration activities include:

- removal of machinery and waste from the site (several garbage / waste dumps, contaminated soil, and 14 pieces of large machinery - dozers, etc);
- recontouring of the floodplain to a more natural and functional configuration with revegetation (nearly 25,000 cubic yards of material will have to be moved and reshaped);
- reconstruction of the stream channel so that it can function as a natural stream (over 1 mile of stream channel reconstruction is needed);
- improvement of aquatic and terrestrial habitat in the stream and floodplain (in-stream habitat structures such as pools, riffles, root wads, and logs as well as revegetation throughout the site);
- maintenance of selected ponds where the biological community is re-established; and
- downstream placement of woody debris for fish habitat improvement.

2.5.3. Pine Creek Restoration Project ($600,000)

Background

The Pine Creek projects would be conducted on lands managed by the Bureau of Land Management (BLM). The Pine Creek watershed covers approximately 79 square miles in the St. Joe Mountains.

Pine Creek joins the South Fork Coeur d'Alene River at Pinehurst in Shoshone County, Idaho. Hard rock mining began in the catchment of Pine Creek near the end of the 19th century and has contributed to increased tributary bedload yield (Kondolf et al. 2000). Kondolf et al. (2000) analyzed aerial photos from 1933 through 1997 and compared the width of the unvegetated active floodplain. Increased bedload migrating to the channel, combined with removal of large cedar trees on the floodplain, resulted in channel instability, which propagated downstream over a period of decades. On many reaches of Pine Creek, active channel width has increased by over 50 percent since 1933.

Following the floods of 1996, which caused substantial damage to infrastructure and resources within the Pine Creek drainage, BLM commissioned a reconnaissance-level geomorphic investigation to identify sediment sources in the basin and to identify the feasibility of conducting a flood damage restoration (Kondolf and Matthews 1996). A follow-up field investigation and report was commissioned to develop a conceptual restoration plan balancing the need to protect existing infrastructure with the goal of accelerating the natural recovery of the stream system toward a properly functioning condition (Matthews and Kondolf 1996). That plan laid out the basis for development of this proposed Pine Creek restoration project.

Pine Creek is a priority drainage for remedial actions in the USEPA OU-3 ROD (USEPA 2002). BLM has conducted remedial and restoration activities along Pine Creek since 1996 including: metals removal actions, installation of off-channel water treatment projects, construction of temporary tailings storage areas, floodplain grading/channel realignment, armoring of road sides, and revegetation of stream banks. The proposed natural resource restoration would complement the completed activities by re-vegetating and reducing erosion on sites where contaminated materials have been removed.

Pine Creek supports a variety of fish species including sculpin (*Cottus* spp.), brook trout (*Salvelinus fontinalis*) and westslope cutthroat trout. The fish populations in Pine Creek would benefit from the proposed Pine Creek restoration which would increase channel stability and floodplain vegetation, and reduced sedimentation of the creek.

Proposed Restoration

The Pine Creek restoration actions that are part of the FIRP preferred alternative would not complete all the restoration that is needed in Pine Creek. Rather, this proposed project would provide part of the funding that would be required to complete restoration and monitoring of Pine Creek.

The premise guiding Pine Creek restoration is that sediment source control and revegetation of the floodplain would eventually restore the stability of the watershed. Approximately 13.6 stream miles of Pine Creek and its tributaries are targeted for restoration activities. Target stream reaches include all, or parts of, the following delineated stream reaches:

East Fork Pine Creek and Tributaries

- 0.8 miles of the East Fork Pine Creek below Gilbert Creek to Douglas Creek,
- 0.3 miles of Douglas Creek ,
- 0.6 miles of the East Fork Pine Creek from Douglas to Blue Eagle Creek,
- 0.5 miles of the East Fork Pine Creek from Blue Eagle to Highland Creek,
- 0.6 miles of Lower Highland Creek,
- 0.5 miles of Middle Highland Creek,
- 0.9 miles of Red Cloud Creek to Sidney Mine,
- 0.2 miles of Upper Highland Creek,
- 0.6 miles of the East Fork from Highland to Denver Creek,4
- 1.0 mile of Denver Creek from Pine Creek confluence to Little Pittsburgh mine,
- 0.9 miles of the East Fork from Denver to Nabob Creek,
- 0.5 miles of Trapper Creek,
- 0.4 miles of Nabob Creek, and
- 1.3 miles of the East Fork from Nabob Creek to the West Fork Confluence.

West Fork of Pine Creek and Tributaries

- 2.0 miles of the West Fork Pine Creek from Calusa Creek to Langlois Creek,
- 0.5 miles of the West Fork from Langlois Creek to Upstream Levee Bridge, and
- 2.0 miles of the West Fork from Upstream Levee Bridge to East Fork confluence.

Whether a particular reach of Pine Creek is recovering toward a narrower and less braided channel, or continuing to widen or aggrade, restoration efforts would be designed to allow for dynamic adjustment towards geomorphic equilibrium (also referred to as channel stability). Geomorphic

[4] Restoration work would be done near the mouth of Denver Creek where the Bureau of Land Management has completed removal actions. Work on the upper stream reaches would not be done until after completion of remedial projects.

equilibrium exists when the processes of bank erosion and channel migration occur gradually. Use of a combination of non-deformable treatments and deformable banks is one conceptual treatment that may be applied for heavily impacted stream reaches.

Restoration/stabilization techniques that are already in use or are proposed for future work includes:

- stabilizing major off-channel sediment sources (i.e., rock dumps, tailings piles; oversteepened banks, failing roads adjacent to the channel);
- installing groins, barbs, and anchor points to re-direct flow, protecting eroding banks;
- armoring banks to protect infrastructure and set a limit to excessively wide or poorly defined channel migration corridors;
- installing floodplain grade controls to help stabilize mobile floodplain deposits and allow vegetation establishment;
- revegetating the riparian floodplain;
- adding soil amendments including composting, increasing litter, soil supplements (topsoil, fertilizer, etc.) to assist revegetation;
- modifying channels to stabilize the streambank and direct flow;
- conducting instream enhancement to improve fisheries habitat using large woody debris; including engineered log jams, anchor points, and roughness trees;
- continuing presence/absence fisheries population work to establish baseline and reference information; and
- constructing off-channel spawning and rearing habitat.

Subsequent and ongoing project implementation and review, as well as additional studies and monitoring, would be included in this project. As more is learned about the Pine Creek system and its response to various restoration treatment methods, the plan would be adapted to the most efficient and effective treatments to meet the purpose and need of the FIRP. The recently published Integrated Stream Protection Guidelines, (Washington State 2003) would be used as a primary guidance tool for selecting treatments and monitoring methods where applicable within the Pine Creek drainage. The Integrated Stream Guidelines are endorsed by the State of Washington, Army Corps of Engineers Regulatory Branch, and the U.S. Fish and Wildlife Service. Monitoring of the effectiveness and costs of various treatments would provide feedback to assess feasibility of transferring successful methods to other areas within the Coeur d'Alene River Basin.

Coeur d'Alene Indian Reservation Enhancement Projects

The following proposed projects would occur on the Coeur d'Alene Indian Tribe Reservation. Potential project activities include fee title and/or land preservation agreement purchase or restrictive covenants of target areas. While the provisions of each purchase are tailored to the

particular property, the Coeur d'Alene Tribe would be vested with the power to regulate the uses and disposition of acquired property and responsible for the management of maintenance and protection measures.

Sections 2.5.4. to 2.5.6 contain Trustee target areas for aquatic habitat enhancements within Reservation boundaries. Additional specifics regarding Reservation restoration projects are included in the Coeur d'Alene Tribe Fish and Wildlife Research Monitoring and Evaluation Plan (Vitale et al. 2002a) and the Coeur d'Alene Tribe Fish and Wildlife Program Habitat Protection Plan (Vitale et al. 2002b).

Monitoring of habitat enhancement efforts within Reservation boundaries would be included in restoration projects. Monitoring would provide data for baseline characterization, risk assessment, trend assessment and activity performance evaluation. Data from simultaneous monitoring of selected control streams would provide information on the effectiveness of enhancement activities as they pertain to improvements in quality of habitat and aquatic biota community characteristics.

2.5.4. Alder Creek Restoration ($600,000)

Background

The heavily forested Alder Creek watershed encompasses 17,286 acres and contains 70.4 miles of stream habitat. The Coeur d'Alene Tribe has identified areas within the Alder Creek watershed as high priority for ecological protection.

Alder Creek flows east and north across the Coeur d'Alene Indian Reservation into the St. Maries River. Alder Creek historically supported westslope cutthroat trout, and currently supports resident cutthroat and brook trout populations (Anders et al. 2003). Alder Creek flows through pasture for approximately one mile downstream of the Alder Creek/North Fork of Alder Creek confluence. Alder Creek has downcut approximately four vertical feet into the floodplain along this reach.

Proposed Alder Creek Restoration

Successful restoration of Alder Creek would include streambed reconstruction to halt vertical downcutting . Halting the downcutting would also benefit water quality in Coeur d’Alene Lake by

reducing sediment and nutrient inputs.

Proposed restoration activities include:

- purchasing the high priority protection areas to conduct stream restoration/enhancements (142 acres);
- raising the creek bed approximately two feet along downcut stretches (1.23 miles);
- installing grade control structures;
- reshaping stream banks (2,468 linear feet);
- constructing off-channel water storage/flood areas; and
- revegetation (49 acres).

This project would accomplish a portion of these activities, beginning with acquiring high priority habitat and designing improvements.

2.5.5. Benewah Creek Restoration ($660,000)

Background

The Benewah Creek watershed covers approximately 33,800 acres and includes 136.2 miles of stream habitat. Eighty-eight percent of the watershed is forested and 11 percent is agricultural land. The Coeur d'Alene Tribe has identified areas within the Benewah Creek watershed as high priority for ecological protection.

Benewah Creek flows north and east across the Coeur d'Alene Indian Reservation and into Coeur d'Alene Lake via Benewah Lake. Benewah Creek supports a significant resident adfluvial fish population, including westslope cutthroat trout, but has been closed to fishing since 1994 (Anders et al. 2003).

Proposed Benewah Creek Restoration

Restoration of Benewah Creek would benefit Coeur d'Alene Lake adfluvial cutthroat trout populations by improving the habitat conditions.

Proposed restoration activities identified for Benewah Creek include:

- high priority habitat acquisition by the Coeur d'Alene Tribe for ecological protection and enhancement (1,531 acres);
- comprehensive stream channel habitat quality evaluation (10.7 miles);
- stream channel reconstruction to halt/repair incisions (2.88 miles);
- installing grade control structures; and
- revegetation (114 acres).

This project would accomplish a portion of these activities, beginning with acquiring high priority habitat and designing improvements.

2.5.6. Hepton Lake Restoration ($300,000)

Background

The Coeur d'Alene Tribe owns the Hepton Lake property consisting of 1,350 acres located within the Reservation at the southern end of Coeur d'Alene Lake, of which 1,187 acres are enrolled in the Wetland Reserve Program. The majority of the property is flooded pasture used by a variety of wildlife species. High waterfowl use, including use by Tundra swans, has been documented on the property. The property also provides important habitat for bald eagles (*Haliaeetus leucocephalus*).

Proposed Hepton Lake Restoration

Initial surveys and habitat assessments must be completed before major restoration activities could be conducted.

The Hepton Lake survey and assessments would include:

- property boundary survey;
- hazardous materials surveys and removal and disposal of hazardous materials as appropriate;
- cultural resources inventories;
- hydrologic assessment to determine the potential to restore a diverse assemblage of wetland communities; and
- management plan development to guide restoration, enhancement, operation and maintenance, and monitoring/evaluation activities.

Anticipated tasks associated with operations and maintenance would include:

- removal of fencing, debris and structures that pose safety hazards and diminish the property's potential to provide fish and wildlife habitat;
- installation of boundary fencing and gates at access points to minimize unauthorized access and disturbance to fish and wildlife;
- installation of public education signs at boundary points; and
- management of noxious weeds.

Enhancement/restoration activities would be guided by a site-specific management plan. These activities could be costly if engineering is involved for activities such as design of water control structures, wetland excavations and island building.

Proposed enhancement/restoration activities would include:

- obtaining necessary permits;
- installing water control structures;
- planting native wetland and riparian vegetation to restore emergent, scrub-shrub and forested wetlands; and
- recontouring the lake bed to create a variety to water depths.

2.5.7. Wetland-Based Restoration Projects ($900,000)

Background

The wetland-based restoration projects would be directed by the USFWS. Approximately 5,362 wetland acres within the Lower Coeur d'Alene Basin were determined to be used by Tundra swans as feeding habitat (Ridolfi 2004), and approximately 95 percent of the palustrine habitat in the Lower Basin contains surface lead concentrations above levels toxic to Tundra swans. Tundra swans within the Pacific Flyway population nest in western and northwestern Alaska and winter in central California, migrating along one of two routes through Idaho. The northern Idaho migration route includes the Coeur d'Alene Basin, St. Joe River Basin, and Kootenai National Wildlife Refuge. The southern route includes areas in southeastern Idaho (Pacific Flyway Council 2001, as cited in Trost 2004). Tundra swans utilizing the Coeur d'Alene Basin as a stopover point during migration are primarily exposed to lead through ingestion of lead-contaminated sediment while feeding (Beyer et al. 1998; Audet et al. 1999a). Tundra swans are exposed to concentrations of lead in sediment within the Basin sufficient to cause death (Beyer et al. 1997; Beyer et al. 2000; Sileo et al. 2001).

Tundra swan mortality has been recorded in the Basin since 1929, and continues today (Trost 2004). Estimated Tundra swan mortality due to lead poisoning unrelated to lead artifacts (e.g., hunter lead shot) from 1981-2004 averaged 150/year (Trost 2004). A population model was developed to convert estimated Tundra swan mortality to lost swan-years due to non-artifact lead poisoning within the Basin. Factors used in calculating lost swan years included (1) years lost by swans killed, based on the average life span of Tundra swans, and (2) the estimated loss of lifespan years of the first generation progeny of adult Tundra swans killed. The final estimate was that 40,000 swan-years have been lost between 1981 and 2004. Yearly Tundra swan mortalities are expected to continue, but are expected to be reduced depending on remediation and restoration activities taken within the Basin (Trost 2004).

The U.S. Fish and Wildlife Service is currently identifying areas suitable for wetland remediation and/or restoration in the Coeur d'Alene Basin. The USEPA OU-3 ROD (USEPA 2002) specified cleanup actions within the Basin that would provide 4,500 acres of safe waterfowl feeding areas. This includes clean-up of approximately 3,000 acres of contaminated palustrine and lacustrine habitat (i.e., 0-3 feet and 3-9 feet, respectively) and cleanup and conversion of 1,500 acres of agricultural lands to wetlands. Remedial actions would reduce waterfowl ingestion of sediment contaminated with lead and other metals. The restoration work that is part of this proposal is intended to supplement cleanup actions described in the ROD as well as conduct wetland restoration in other clean areas, leading to safe, functioning wetlands for Tundra swans.

Proposed Wetland-Based Restoration

Wetland reestablishment, restoration and enhancement would help replace services to Tundra swans within the Basin that have been injured from mining-related metals release. Functioning wetlands would provide areas for feeding, loafing, and roosting for Tundra swans. Restoration activities would be designed with the end goal of producing a functional wetland with characteristics similar to local, unimpaired wetland sites providing services to Tundra swans. Initial target site characteristics may range in habitat quality and include a need for habitat reestablishment or metals remediation (i.e., sediment removal). In contrast, a site may already resemble a native functioning wetland. Restoration activities therefore could range in required intensity and effort, from the initial establishment of functioning water regimes and vegetation establishment to low maintenance

vegetation species management. Wetland reestablishment efforts would be focused on areas where hydrological alterations or other modifications have destroyed or impaired former wetland habitat. This focus is more cost efficient and functionally effective than wetland creation where wetlands have not previously existed.

From a practical standpoint, it is estimated that one to two projects per year for the next three years could be completed as described above. Parcels of land are anticipated to vary in size (i.e., 20-500 acres). The Trustees are proposing to purchase land preservation agreements on properties on which restoration activities are conducted to protect restorations in perpetuity. Any proposed purchases of land/land preservation agreement deeds would be held by land management groups, such as the State of Idaho, Tribal, Federal, local governments, land trusts, or conservation non-governmental organizations after following specific procedures and standards set for each entity. Property remediation, conversion and restoration would be implemented with the full agreement and cooperation of landowners. Available settlement funds, available willing landowners and costs would influence overall preservation, reestablishment, restoration and enhancement opportunities.

Proposed enhancement/restoration activities would include:

- Legal surveys
- acquisition of wetlands or wetland land preservation agreements,
- acquisition and/or restoration of resources associated with injured wetlands,
- development of site-specific wetland restoration plans,
- restoration of wetlands acquired or with land preservation agreements,
- restoration of remediated wetlands, and
- monitoring of restoration/enhancement success.

Primary restoration strategies may include, but would not be limited to low impact techniques such as:

- closing off/filling drainage ditches,
- disrupting (or not repairing) drain tile systems,
- constructing flap gates to limit river-caused flooding,

- mechanical and chemical vegetation control, and
- reestablishing wetland plants and other native vegetation in order to reestablish historic natural characteristics.

Final selection of specific wetland areas that would be preserved, restored, or enhanced would include consideration of the ecological value of the wetland habitats, inherent improvement of water quality, ownership/protection opportunities, geographic/ecological diversity, local/regional planning, and citizens' concerns.

2.6. Alternatives Considered but Not Analyzed in Detail

2.6.1. Alternative Development

The Trustees began the planning process for the DIRP by evaluating known potential restoration projects against the aforementioned selection factors (see Sections 1.4 and 2.4.2). The Trustees then combined the restoration projects that met the criteria (e.g., Moon Creek Monitoring, Benewah Creek Restoration, Alder Creek Restoration, Pine Creek Restoration, Sherlock Creek Restoration, Hepton Lake Restoration, and Wetland-Based Restoration, Kokechik Bay) in various ways to addressed specific injured natural resources. (For a list of the injured natural resources see Section 1.1) Some of the projects that met the criteria were later dropped from further consideration, either to focus the plan more narrowly, or because the project was no longer viable. For instance, the purchase of an easement in Kokechik Bay, Alaska to help restore Tundra swan populations during the interim planning process in alternative E was dropped from consideration, because an agreement with the land owner could not be reached at this time. Potential remaining combinations of projects resulted in five action alternatives.

Ultimately, the Trustees decided that alternative C, the preferred alternative, was the only alternative which eventually met the purpose and need for the Trustees' proposed restoration during the interim planning period. alternative C was the only alternative that included the full set of the seven projects and all seven projects were needed to meet all the components of the purpose and need of the proposed action. See Sections 1.2 and 1.3 for a description of the purpose and need.

The following are the alternatives that were considered by the Trustees, but were not analyzed in detail. The alternative names are presented as they were in earlier drafts of the Interim Restoration

Plan. Please note that alternative C presented immediately below is not the same the alternative C in the FIRP.

Alternative C

Alternative C combined projects that addressed restoration for all fish and other aquatic biota (i.e., Sherlock Creek, Pine Creek, Benewah Creek, Alder Creek). This alternative did not address migratory birds such as Tundra swans, and therefore did meet the purpose and need of the Trustees' proposed action, because one of the needs of the proposed action was to address injury to Tundra swans.

Alternative D

Alternative D combined the projects on Federal land with a potential to increase recreational opportunities (i.e., Sherlock Creek, Pine Creek). The scope of projects on Federal lands did not provide for a full suite of restoration projects to meet the Trustees' needs for interim planning. This alternative was not pursued because the Trustees determined that only the full set of the seven projects would meet the purpose and need of the action during the interim period.

Alternative E

Alternative E combined projects only for Tundra swan restoration and increased wetland function within the Coeur d'Alene Basin (i.e., Hepton Lake, Wetland-Based Restoration, and Kokechik Bay). The scope of projects for Tundra swans was too narrow to meet the purpose and need for the Trustees' interim plan. This alternative was not pursued because the Trustees determined that only the full set of the seven projects would meet the purpose and need of the action during the interim period.

Alternative F

Alternative F combined the projects that would address surface water resources (i.e., alternatives C projects, Wetland-Based Restoration, and Hepton Lake). The scope of these projects was too narrow to meet the purpose and need for the Trustees' interim plan. This alternative was not

pursued because the Trustees determined that only the full set of the seven projects would meet the purpose and need of the action during the interim period.

CHAPTER 3
3. AFFECTED ENVIRONMENT

3.1. Introduction

Several previous reports have summarized the conditions of natural resources in the Coeur d'Alene Basin. The data and other information in these reports were used in the development of this environment assessment:

1. Records of Decision for OU-1, OU-2, and OU-3 in the Basin (USEPA 1991, 1992, and 2002),
2. Report of Injury Assessment (Stratus 2000),
3. Damage Calculation for Aquatic Resources: Coeur d'Alene Basin Natural Resource Damage Assessment. Draft (Lipton et. al. 2004),
4. Damage Calculation for Federal Lands: Coeur d' Alene Basin Natural Resource Damage Assessment (LeJeune et al. 2004),
5. Tundra Swan (*Cygnus columbianus*) Injury Assessment Lower Coeur d'Alene River (Trost, 2004),
6. Intermountian Province SubBasin Plan (GEI Consultants 2004),
7. Superfund and Mining Megasites – Lessons from the Coeur d'Alene River Basin. (NRC 2005), and
8. Five-year Review Report, Second Five-Year Review for the Bunker Hill Mining and Metallurgical Complex Superfund Site Operable Units 1, 2, 3, Idaho and Washington (USEPA 2005).

These reports contain detailed information about the conditions of the Basin. This Environmental Assessment will provide a summary of some of the information relevant to this proposed action. Please consult these reports for additional detailed discussions about the condition of natural resources in the Coeur d'Alene Basin.

As stated in the Section 1.1, over 100 years of mining has exerted a significant influence over the condition of the natural resources within the Coeur d'Alene Basin. Mining in Coeur d'Alene Basin

area has resulted in contamination that extends through Northern Idaho in the Coeur d'Alene River Basin, Lake Coeur d'Alene, and down the Spokane River in the State of Washington (NRC 2005). Prior to commercial mining in 1883, the area was home to a few thousand members of the Coeur d'Alene Tribe. At that time: "The [Coeur d'Alene] river was described as 'transparent as cut glass', the mountains 'clothed in evergreen forests' of white pine, grand fir, Douglas fir, and spruce; riparian areas thick 'with cottonwoods and silver beeches on both banks almost forming an arch overhead' of the deep channel; and the stream 'alive with trout and other fish' that 'could be seen by the thousands in the clear waters (Rabe and Flaherty 1974)."

Over 100 years of mining and other human development have resulted in natural resources that are no longer in a pristine condition. Even so, the Coeur d'Alene Basin forms a unique and important ecosystem within the larger Northern Idaho Ecoregion. The terrestrial, wetland, and aquatic habitats of the Basin support a wide diversity of birds, fish, and mammals, including threatened and endangered species. The condition of the ecosystem's processes and functions and the quality of its habitats are vital to the invertebrates, plants, fish, and wildlife of the area. The environmental conditions of the Basin are also important to public uses and enjoyment of these natural resources.

This proposed action encompasses the entire Coeur d'Alene Basin. While most proposed projects would only affect a small area within a specific watershed, the wetland-based restoration projects could take place anywhere that wetlands occur in the Coeur d'Alene Basin.

3.2. Site Description - Coeur d'Alene Basin

The Trustees conducted a natural resource damage assessment (NRDA) to assess damages resulting from releases of hazardous substances from mining and mineral processing operations in the Coeur d'Alene River Basin, Idaho (Stratus 2000). The introduction of this assessment provides a summary of the physical environment and the condition of natural resources in the Coeur d'Alene Basin, the Stratus (2000) report is hereby incorporated in this EA by reference; and sections of it are provided below.

3.3. Physical Characteristics

The Coeur d'Alene Basin is located in northern Idaho in Shoshone, Kootenai, and Benewah Counties, and a small portion of Latah County and encompasses approximately 3,840 square miles. The Basin consists of two principle tributaries, the Coeur d'Alene and St. Joe Rivers, which drain into Coeur d'Alene Lake, and the Spokane River, which drains from the lake. The outlet of Coeur d'Alene Lake forms the headwaters of the Spokane River, which flows 111 miles to its confluence with the Columbia River.

The Coeur d'Alene River originates near the Idaho-Montana border along the Bitterroot Mountain Range and extends westward into Lake Coeur d'Alene at Harrison, Idaho. The Coeur d'Alene River empties a drainage Basin of 1,489 square miles and has over 1,052 miles of tributary streams. Topography includes steep hillside slopes, canyons, high-gradient streams, alpine lakes, and the Coeur d'Alene River floodplain. The mainstem Coeur d'Alene River is a fine substrate, low gradient, meandering river in a broad valley. In the broad valley, 12 shallow lateral lakes and thousands of acres of wetlands are hydraulically connected to the mainstem Coeur d'Alene River. The mainstem Coeur d'Alene River flows into Coeur d'Alene Lake near Harrison. Coeur d'Alene Lake is a large natural lake fed mainly by the Coeur d'Alene River and the St. Joe River (Stratus 2000).

The South Fork of the Coeur d'Alene River originates near Independence Pass along the Idaho-Montana border and flows west for approximately 57 miles, meeting the North Fork of the Coeur d'Alene River near Enaville (forming the Coeur d'Alene River), and emptying into Lake Coeur d'Alene. The North and South Forks of the Coeur d'Alene River are rocky, high-gradient streams in narrow valleys confined by steep hillsides.

The St. Joe River originates at the Idaho/Montana border and flows west into the southern end of Coeur d'Alene Lake. The drainage area of the St. Joe is about 1,726 square miles and has over 1,189 miles of tributary streams. The largest tributary is the St. Maries River that flows north from near the boundary of Shoshone and Clearwater county to join the St. Joe River near the town of St. Maries.

Water levels in Coeur d'Alene Lake are controlled by the Post Falls dam. The dam holds the lake levels at higher elevations than would naturally occur for some portion of the year and backs up

water into the lower Coeur d'Alene, St. Joe and St. Maries Rivers. The Post Falls dam also regulates discharge from the lake, into the Spokane River during low flow periods (GEI Consultants 2004).

Peak discharge from Lake Coeur d'Alene usually occurs between April and June, although the highest discharges recorded have resulted from mid-winter rain-on-snow events. The Coeur d'Alene and St. Joe monthly discharges range from highs in April and May of 7,000 to 8,000 cubic feet per second (cfs), and lows in September, of 400 to 500 cfs.

3.4. Major Land Ownership

The land ownership pattern in the Coeur d'Alene Basin is a mix of private, federal, state, and Tribal lands. The Coeur d'Alene Indian Reservation covers approximately 293 square miles of the Basin and their aboriginal territory encompasses the entire Coeur d'Alene Basin. According to GEI Consultants (2004), based on GIS data and map produced by the Coeur d'Alene Tribe in 2000, the major land manager in the Basin is the USFS (1,988 square miles). Other land managers with substantial interests in the Basin include the State of Idaho (183 square miles), Coeur d'Alene Tribe (24 square miles), Bureau of Land Management (134 square miles), Capital Forest Group and Potlatch Corporation (GEI Consultants 2004).

3.5. Land Use

The main historical and current types of land use in the assessment area are agricultural, recreational, mining, logging, and industrial/residential. Silver was discovered in the Coeur d'Alene Valley in the 1880's. The first mill in the Basin, associated with the Bunker Hill mine, began operations in 1886 (USEPA 2001). Since then, "Silver Valley" has produced more silver than anywhere else in recorded history. The amount of mine tailings discharged into the Coeur d'Alene River, its tributaries and floodplain ranges from 54.5 to more than 70 million tons. A football field filled with this quantity of material would be over 4 miles high (USEPA 2001).

Farming or agriculture, including cropland, pastures, and meadows for grazing livestock, is the current dominant land use. Forests in the area are utilized for recreation and logging. The vast

majority of Shoshone County's population lives in the Coeur d'Alene River valley, through which Interstate 90 passes east to west (Stratus 2000).

Land use along the lower Coeur d'Alene River, its floodplain, and the lateral lakes area is predominantly agricultural, residential, and recreational. The discontinued Union Pacific (UP) railroad track runs through the floodplain, and associated berming has modified water flow and connectivity between several of the lakes and the river. Agricultural use is largely hay and pasture (Stratus 2000).

The floodplain of the South Fork Coeur d'Alene River from Wallace to Pinehurst is characterized by urban and industrial land uses. These include a UP discontinued railroad track, a state highway, the interstate, and the towns of Osburn, Kellogg, Smelterville, and Pinehurst and several other small communities. The river has been channelized along much of this reach by the railroad and roads (Stratus 2000).

In the headwater and tributary areas, predominant land uses include mining, mineral processing, forestry, and urban and residential land use. The towns of Mullan and Wallace, a UP discontinued railroad track, a state highway, and Interstate 90 parallel border the South Fork Coeur d'Alene River. In the narrow tributary canyons, small communities, dispersed residences, and roads border the streams (Stratus 2000).

3.6. **Terrestrial and Wetland Communities** (Stratus 2000[5])

In the high-gradient, headwater, V-shaped canyons, and in the medium gradient, U-shaped canyons, terrestrial communities include riparian and upland communities. Where local gradient allows, wetland communities may also occur (or may have been present in the past). Riparian communities in the narrow V-shaped canyons are dominated by thinleaf alder (*Alnus incana*), snowberry (*Symphoricarpos albus*), bush honeysuckle (*Lonicera involucrata*), and goldenrod (*Solidago* spp.) in the shrub layer, and wild ginger (*Asarum caudatum*), aster (*Aster modestus*), lady fern (*Athyrium filix-femina*), redtop bentgrass (*Agrostis stolonifera*), violet (*Viola glabella*), bluebell (*Mertensia paniculata*), fescues (*Festuca* spp.), and oxeye daisy (*Chrysanthemum leucanthemum*) in the

[5] Reference citations at the in a section title indicates that the text was taken nearly verbatim from the indicted reference.

herbaceous layer (Table 2). Black cottonwood (*Populus trichocarpa*) and conifers such as grand fir (*Abies grandis*), white pine (*Pinus monticola*), and, in higher elevations, western hemlock (*Tsuga heterophylla*) may also be present in the riparian zone.

In U-shaped, open riparian reference areas where the stream meanders more, willow (*Salix* spp.) communities develop on point bars. Black cottonwood, Rocky Mountain maple (*Acer glabrum*), grand fir, western hemlock, and western red cedar (*Thuja plicata*) are typical canopy layer dominants (Table 2). Historically, the valley flats along the South Fork Coeur d'Alene River were dominated by western red cedar stands. Dominant shrub species in reference areas include willows, thinleaf alder, cascara (*Rhamnus purshiana*), ninebark (*Physocarpus malvaceous*), serviceberry (*Amelanchier alnifolia*), snowberry, red-osier dogwood (*Cornus stolonifera*), and mockorange (*Philadelphus lewisii*). Typical herbaceous layer dominants include mosses, bluebell, lady fern, redtop bentgrass, reed canarygrass (*Phalaris arundinacea*), sedges (*Carex* spp.), marsh cinquefoil (*Potentilla palustris*), and Solomon-seal (*Smilacina stellata*).

Table 2. Typical Dominant Vegetation species in Coeur d'Alene River Reference Riparian Communities					
Narrow V-Shaped Canyons			**Open U-Shaped Canyons**		
Herbaceous layer:	wild ginger	*Asarum caudatum*	Herbaceous layer:	bluebell	*Mertensia paniculata*
	aster	*Aster modestus*		lady fern	*Athrium filfix-femina*
	lady fern	*Athyrium filix-femina*		redtop bentgrass	*Agrostis stolonifera*
	red top bentgrass	*Agrostis stolonifera*		reed canarygrass	*Phalaris arundinacea*
	violet	*Viola glabella*		sedges	*Carex spp.*
	bluebell	*Mertensia paniculata*		marsh cinquefoil	*Potentilla palustris*
	fescues	*Festuca* spp.		Solomon-seal	*Smilacina stellata*
	oxeye daisy	*Chrysanthemum leucanthemum*		moss spp.	
Shrub layer:	thinleaf alder	*Alnus incana*	Shrub layer:	willows	*Salix* spp.
	snowberry	*Symphoricarpos albus*		thinleaf alder	*Alnus incana*
	bush honeysuckle	*Lonicera involucrata*		cascara	*Rhamnus purshiana*
	goldenrod	*Solidago* spp.		ninebark	*Physocarpus malvaceous*
				serviceberry	*Amelanchier alnifolia*
				snowberry	*Symphoricarpos albus*
				redosier dogwood	*Cornus stolonifera*
				mockorange	*Philadelphus lewisii*
Tree layer:	black cottonwood	*Populus trichocarpa*	Tree layer:	black cottonwood	*Populus trichocarpa*
	grand fir	*Abies grandis*		grand fir	*Abies grandis*
	white pine	*Pinus monicola*		western hemlock	*Tsuga heterophylla*
	western hemlock	*Tsuga heterophylla*		western red cedar	*Thuja plicata*
				Rocky Mountain maple	*Acer glabrum*

The structure and composition of upland plant communities are strongly influenced by the length of the growing season, moisture availability, and the seasonal distribution of moisture. Gross physical factors that control moisture availability and growing season length include elevation, slope, and aspect. High points near the headwaters of the South Fork Coeur d'Alene River (upstream of Mullan) and in the upstream reaches of Canyon and Ninemile Creeks range from approximately 5,000 to 6,600 ft. between Wallace and Kellogg, high points adjacent to the riparian corridor are generally within the 3,000 to 4,500 ft. elevation range, and between Kellogg and Cataldo, are between 2,000 to 3,500 ft. South facing slopes are typically warmer and drier and support more xeric shrubland and grassland communities. North facing slopes tend to be heavily forested with conifers. Valley bottoms generally stay cooler than slopes with a southerly or westerly aspect, partially a result of diurnal temperature fluctuation and cold air flow down-valley. Additional orographic effects may produce cold-air pockets that result in localized vegetation response.

Table 3. Typical Dominant Upland Vegetation Species in the Coeur d'Alene River Basin

North, east facing slopes	western hemlock	*Tsuga heterophylla*
	western red cedar	*Thuja plicata*
	western white pine	*Pinus monticola*
	western larch	*Larix occidentalis*
	lodgepole pine	*Pinus contorta*
South, west facing slopes	Douglas fir	*Pseudotsuga menziesii*
	grand fir	*Abies grandis*
	ponderosa pine	*Pinus ponderosa*
Dry south facing slopes	redtop bentgrass	*Agrostis stolonifera*
	bluebunch wheatgrass	*Agropyron spicatum*
	pinegrass	*Calamagrostis rubescens*
	tufted hairgrass	*Deschampsia cespitosa*
	ceanothus	*Ceanothus velutinus*
	huckleberry	*Vaccinium membranaceum*
	serviceberry	*Amelanchier alnifolia*
	chokecherry	*Prunus virginiana*
	mountain ash	*Sorbus* spp.
	ninebark	*Physocarpus malvaceous*
	snowberry	*Symphoricarpos albus*
	wild rose	*Rosa* spp.

Upland forest communities characteristic of north and east facing slopes are often dominated by western hemlock and western red cedar, along with western white pine, western larch (*Larix occidentalis*), and lodgepole pine (*Pinus contorta*) (Table 3). On south and west facing slopes, Douglas fir (*Pseudotsuga menziesii*), grand fir, and Ponderosa pine (*Pinus ponderosa*) are typical dominants. On the dry south facing slopes, grasses such as redtop bentgrass, bluebunch wheatgrass (*Agropyron spicatum*), pinegrass (*Calamagrostis rubescens*), and tufted hairgrass (*Deschampsia cespitosa*) and the shrub species ceanothus (*Ceanothus velutinus*), huckleberry (*Vaccinium membranaceum*), serviceberry, chokecherry (*Prunus virginiana*), mountain ash (*Sorbus* spp.), ninebark, snowberry, and wild rose (*Rosa* spp.), among others, are common.

Along the lower Coeur d'Alene River and lateral lakes, and the bays of Coeur d'Alene Lake, community types include riparian, palustrine, and lacustrine communities. These community types are differentiated by the predominant vegetation species and, particularly, the moisture tolerance of the dominant vegetation species. Riparian communities are typically dominated by black cottonwoods and willows in the overstory, and Douglas spiraea (*Spiraea douglasii*), willows, and red-osier dogwood in the shrub layer. The herbaceous layer may be quite diverse, with no single species dominant, although typical species include redtop bentgrass, reed canarygrass, and sedges.

Palustrine and lacustrine communities are the dominant communities of the lateral lake wetlands. Palustrine wetlands are dominated by emergent wetland vegetation. Dominant species include sedges, rushes (*Juncus* spp.), horsetail (*Equisetum arvense*), cattail (*Typha latifolia*), wild rice (*Zizia aquatica*), common reeds (*Phragmites australis*), bulrushes (*Scirpus microcarpus*), and water potatoes (*Sagittaria latifolia*). Lacustrine vegetation is characterized by submergent and floating vegetation, including duckweed, potamogeton, and algae.

The riverine community also provides habitat for terrestrial wildlife such as moose (*Alces alces*), elk (*Cervus elaphus*), white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus nemionus*), beaver (*Castor cananensis*), bats (Chiroptera), frogs (Anura), dippers (*Cinclus* spp.). Agricultural communities, predominantly pastureland and hayfields, also provide habitat for migratory birds such as bobolink (*Dolichonyx oryzivorus*) during the summer and waterfowl when fields are flooded in the spring.

Each of these vegetation community types is inhabited by mammalian and avian populations, and to a lesser extent, amphibian and reptilian populations. The wildlife inhabitants are an integral part of the riparian, wetland, and upland communities. Wildlife may use several vegetation community types, and habitat use may extend into the aquatic environment. Wildlife species typical of each of the community types are described in more detail below. In addition to the visible flora and fauna, associated with each of these communities is the below-ground community of macro- and microinvertebrates and fungi that are essential to decomposition, nutrient cycling, and soil formation.

3.7. **Aquatic Communities** (Stratus, 2000)

Aquatic communities include high-gradient cold water, mid-gradient cold water, low-gradient cool and cold water, and warm, cool, and cold water lake communities. High-gradient cold water communities are characterized by native cutthroat (*Oncorhynchus clarki*) and bull trout (*Salvelinus confluentus*), sculpin, possibly mountain whitefish (*Prosopium williamsoni*), and introduced rainbow (*Oncorhynchus mykiss*) and brook trout. Benthic macroinvertebrate communities include craneflies (Tipulidae), stoneflies (Plecoptera), mayflies (Ephemeroptera), and caddisflies (Tricoptera). Periphyton and some zooplankton are also present.

Mid-gradient reaches support the fish species listed above, plus, suckers (Catostomidae), northern pikeminnow (*Ptychocheilus oregonensis*), dace (Cyprinidae), and introduced salmon. Brown trout (*Salmo trutta*) are present in the Spokane River. Benthic invertebrate communities include the taxa identified above. Periphyton and zooplankton are also present.

Low-gradient communities include native cutthroat trout, bull trout, and mountain whitefish, and introduced rainbow trout, brook trout, kokanee salmon (*Oncorhynchus nerka*), and chinook salmon (*Oncorhynchus tshawytscha*). The lateral lakes also support warm water fish, including largemouth bass (*Micropterus salmoides*), northern pike (*Esox lucius*), yellow perch (*Perca flavescens*), black crappie (*Pomoxis nigromaculatus*) , brown bullhead (*Ameiurus nebulosus*), and pumpkinseed (*Lepomis gibbosus*).

In Coeur d'Alene Lake, both cold and warm water species are present. Native species include cutthroat trout, bull trout, mountain whitefish, and northern pikeminnow,. Introduced cold water

species include chinook and kokanee salmon. Warm and cool water introduced species include largemouth bass, northern pike, black crappie, yellow perch, bluegill (*Lepomis macrochirus*), brown bullhead, pumpkinseed, tench (*Tinca tinca*), and smallmouth bass (*Micropterus dolomieui*).

3.8. On-going Mining-Related Hazardous Substances Effects to Natural Resources

3.8.1. **Hazardous Substances Sources** (Stratus 2000)

Sources that have released or continue to release hazardous substances to the Coeur d'Alene River Basin include mining and mineral processing operations; waste rock, tailings dumps, and adits at mine and mill sites; floodplains, and river and lake beds and banks containing tailings and mixed tailings and alluvium; and eroding hillsides historically contaminated by smelter emissions. Source materials include waste rock, mill tailings, mixed tailings and alluvium, concentrates, mine drainage waters, smelter emissions, and flue dust. Hazardous substances released are the metals and metalloids in mining waste. Types of releases include historical disposal of tailings to creeks, rivers, and floodplains; historical smelter emissions; and ongoing releases of hazardous substances from waste rock and tailings deposits and sites where tailings have come to be located throughout the Coeur d'Alene River Basin.

The following summarizes the findings regarding hazardous substances sources in the Coeur d'Alene Basin (Stratus 2000):

- Hazardous substances, including cadmium, lead, zinc, and other hazardous metals and metalloids have been and continue to be released as a result of mining and mineral processing operations in the Coeur d'Alene River Basin. Releases of hazardous substances to the Coeur d'Alene River Basin began in the 1880s and continue to the present. Releases will continue for the foreseeable future absent large-scale remediation or restoration.
- Waste rock, mill tailings, and drainage from underground mine workings are the primary sources of hazardous substances in the Coeur d'Alene River Basin. Historically, smelter emissions that were transported by air pathways were a primary source of hazardous substances to the hillsides surrounding the Bunker Hill smelter. The predominant secondary sources of hazardous substances are bed, bank, and floodplain sediments and upland soils of

the Coeur d'Alene River Basin that have been contaminated by releases from the primary sources.

- The many releases of hazardous substances from mines and mineral processing facilities to hillsides, floodplains, and streams of the Basin, and subsequent transport of wastes from source areas via natural and human pathways, have resulted in the inextricable commingling of hazardous substances from numerous sources, with subsequent distribution of hazardous substances throughout the Coeur d'Alene River Basin.

3.8.2. Hazardous Substances Pathways

The following paragraphs discuss the pathways by which natural resources of the Coeur d'Alene River Basin are exposed to hazardous substances released from mining and mineral processing operations. The pathway determinations presented are based on data collected by the Trustees and by other researchers in the Basin.

Stratus (2000) summarized the findings regarding hazardous substances pathways in the Coeur d'Alene Basin:

- Surface water serves as a critical transport and exposure pathway of dissolved and particulate hazardous substances to soil, aquatic, and terrestrial biological resources and downstream surface water resources. Surface waters of the Coeur d'Alene River Basin downstream of mining and mineral processing facilities have been and continue to be exposed to elevated concentrations of hazardous substances, including cadmium, lead, and zinc. Because of natural downstream transport mechanisms, surface waters throughout much of the Coeur d'Alene River Basin — including the South Fork Coeur d'Alene River, the Coeur d'Alene River, Coeur d'Alene Lake, and Canyon, Ninemile, Moon, and Pine creeks and other tributaries to the South Fork Coeur d'Alene River — are exposed to elevated concentrations of hazardous substances.
- Sediment in the water column and in the beds and banks of Coeur d'Alene River Basin drainages downstream of mining and mineral processing facilities has been and continues to be a transport and exposure pathway. Bed and bank sediments throughout the Basin contain elevated concentrations of hazardous substances, including cadmium, lead, and zinc. Contaminated sediments are an ongoing pathway for downstream movement of hazardous

substances through natural processes. Contaminated streambed sediment exposes fish, periphyton, and aquatic invertebrates to hazardous substances. Contaminated sediment re-deposited on floodplains and on vegetation surfaces is an important cause of exposure of wildlife and vegetation to hazardous substances.

- Floodplain soils have been and continue to be a transport and exposure pathway. Floodplain soils and wetland sediments have become contaminated with hazardous substances in direct discharge of wastes to the floodplain, and through deposition of contaminated sediments in natural hydrological processes. Floodplain soils are contaminated with hazardous substances such as cadmium, lead, and zinc in riparian areas downstream of mining and mineral processing facilities, including riparian areas of the South Fork Coeur d'Alene River, the Coeur d'Alene River, and Canyon, Ninemile, Moon, and Pine creeks. Contaminated floodplain soils serve as an ongoing transport pathway to downstream resources through mobilization by surface waters. Floodplain soils contaminated with hazardous substances serve as a pathway by which vegetation and soil biota are exposed to hazardous substances. Wildlife are exposed to hazardous substances through direct ingestion of soil and sediment and ingestion of soil and sediment adhering to vegetation.
- Although data are not available throughout the Coeur d'Alene River Basin, available information illustrates that groundwater in certain locations is a pathway by which hazardous substances are leached from contaminated floodplain deposits and transported to downgradient surface waters. In addition, surface waters containing hazardous substances are in contact with shallow groundwater aquifers in floodplains. Surface waters containing hazardous substances also serve as a pathway to shallow groundwater.
- Biological resources serve as contaminant exposure pathways through dietary exposure. Contaminated periphyton, aquatic invertebrates, and fish are exposure routes of hazardous substances to higher trophic level consumers. Aquatic vegetation containing or coated with elevated concentrations of lead exposes waterfowl through their diets. Wildlife also are exposed to hazardous substances through consumption of contaminated prey.

3.8.3. Surface water conditions

Surface water resources addressed include the South Fork Coeur d'Alene River, certain tributaries to the South Fork Coeur d'Alene River, the lower Coeur d'Alene River, the lateral lakes, and Coeur d'Alene Lake.

Stratus (2000) summarized the findings regarding surface water conditions in the Coeur d'Alene Basin:

- Sufficient concentrations of hazardous substances exist in pathway resources now, and have in the past, to expose surface water resources to hazardous substances.
- Sufficient concentrations of hazardous substances exist in surface water resources now, and have existed in the past, to exceed federal, state, and tribal water quality criteria developed for protection of aquatic life. Therefore, surface water resources are injured.
- Exceedences of water quality criteria have been documented from the upper reaches of the South Fork Coeur d'Alene River and its tributaries to the mainstem Coeur d'Alene River, including the lateral lakes, and in Coeur d'Alene Lake. Surface water is injured in the South Fork Coeur d'Alene River from downstream of Daisy Gulch to the confluence with the North Fork Coeur d'Alene River. Canyon Creek, Ninemile Creek, and Pine Creek are also injured from locations in each stream adjacent to the uppermost mine or mill site to the confluence of each tributary with the South Fork Coeur d'Alene River. Surface waters of the lower Coeur d'Alene River from the North Fork Coeur d'Alene River confluence to Coeur d'Alene Lake are injured. Surface waters of the lateral lakes and Coeur d'Alene Lake are also injured. In addition, the following tributaries of the South Fork Coeur d'Alene River, Canyon Creek, and Pine Creek are injured from the location of the uppermost mine or mill site to the mouth: Grouse Gulch, Moon Creek, Milo Creek, Deadwood Gulch/Bunker Creek, Government Gulch, Gorge Gulch, Highland Creek, Denver Creek, and Nabob Creek.
- Concentrations of hazardous substances in surface water resources downstream of releases are sufficiently elevated that surface water serves as a pathway of injury to downstream surface waters.
- Concentrations of hazardous substances in surface water resources are sufficient to cause injury to aquatic biological resources, and to serve as a pathway to injury to wildlife and aquatic biological resources.

3.8.4. Sediment Conditions

Sediments are organic and inorganic particles in an aquatic or wetland environment, and include suspended materials in the water column, and bed, bank, and floodplain deposits. Sediments carried in the water column are suspended sediments. Sediment resources are defined by DOI NRDA regulations both as geologic resources [43 CFR §11.14 (s)] and as a component of surface water resources [43 CFR § 11.14 (pp)]. However, because sediments represent a distinct component of the ecosystem, data on sediments are discussed separately from surface water. Stratus (2000) summarized the findings regarding sediment conditions in the Coeur d'Alene Basin:

- Metals in streambeds, banks, and floodplains are remobilized through natural hydrologic processes such as scouring, erosion, and resuspension during high water events.
- Sediments of the Coeur d'Alene River Basin at and downstream of mining and mineral processing facilities contain substantially elevated concentrations of hazardous substances, including cadmium, lead, and zinc. Sediment contamination is pervasive in the beds, banks, and floodplains of the Basin.
- Concentrations of hazardous substances in Coeur d'Alene River Basin sediments exceed thresholds associated with adverse effects for benthic invertebrates. As concentrations of hazardous substances in these sediments increase, concentrations of hazardous substances in biofilm (attached algae, bacteria, and associated fine detrital material that adheres to substrates in surface waters and is a food source for higher trophic level consumers), benthic invertebrates, and fish in the Basin increase. Sites with the highest concentrations of metals in water, sediment, biofilm, and benthic invertebrates were also the sites where fish populations were reduced, mortality was observed, and tissues contained elevated concentrations of metals.
- Coeur d'Alene River Basin sediments containing elevated concentrations of lead and other hazardous substances are ingested by migratory waterfowl. Ingestion of contaminated sediments causes death, physiological malfunction, and physiological deformation of wildlife resources. Sufficient concentrations of hazardous substances are present in sediments to cause injury to biological resources, and therefore sediments are injured.

3.8.5. Wildlife Conditions

Stratus (2000) summarized the findings regarding the wildlife resource conditions in the Coeur d'Alene Basin that have resulted from exposure to hazardous metals released from mining and mineral processing facilities:

- Sufficient concentrations of hazardous substances exist in pathway resources to expose wildlife resources. The sources of hazardous substance exposure to wildlife are releases of lead and other metals from mining and mineral processing activities. Hazardous substances are transported from the South Fork Coeur d'Alene River Basin in surface water, soil, and sediment to the lower Coeur d'Alene River Basin.
- Hazardous substances in sediments are accumulated in plants, invertebrates, fish, mammals, and birds that are consumed by other species of birds and mammals in the Coeur d'Alene River Basin. Food chain exposure is an important pathway for lead and other metals in the Coeur d'Alene River Basin. Hazardous substance concentrations in pathway resources are sufficient to expose wildlife via ingestion of contaminated sediment and forage and prey items.
- The results of field investigations and controlled laboratory experiments demonstrate that death, physiological malfunctions, and physical deformation injuries to wildlife of the Coeur d'Alene River Basin have occurred and continue to occur as a result of exposure to lead in Coeur d'Alene River Basin sediments. Adverse effects that have been caused by lead exposure and have been observed in migratory birds in the field include death; physiological malfunctions, including changes in parameters related to impaired blood formation and impaired growth; and physical deformations, including gross and histopathological lesions.
- Laboratory studies demonstrated a dose-response relationship between the magnitude of exposure to Coeur d'Alene River Basin sediment and physiological malfunctions such as biochemical changes in waterfowl. The injury assessment studies demonstrated a causal relationship between increasing sediment ingestion and adverse changes in parameters related to blood formation in multiple species of waterfowl.
- Ingestion of lead-contaminated sediments is the pathway and cause of the injuries to migratory birds in the Basin. Injury studies were designed to explicitly assess whether the observed deaths and sublethal injuries were caused by other agents, including lead artifacts (e.g., shot/sinkers), disease (e.g., aspergillosis, avian cholera), or other factors (e.g., trauma). Detailed evaluation of field observations and diagnostic histological studies demonstrated that the cause of the injuries was exposure to lead-contaminated sediments. Therefore,

injuries to migratory birds are caused by hazardous substances, particularly lead, released from mining and mineral processing facilities.

3.8.6. Fisheries Conditions

The assessment of injury to fish resources of the Coeur d'Alene River Basin was focused on the South Fork Coeur d'Alene River, the Coeur d'Alene River, and tributaries to the South Fork Coeur d'Alene and Coeur d'Alene rivers. Fish resources have been injured in the South Fork Coeur d'Alene River, Canyon Creek, and Ninemile Creek, as well as other stream/river reaches affected by releases of hazardous substances from mining and mineral processing operations.

Stratus (2000) summarized the findings regarding fisheries resource conditions in the Coeur d'Alene Basin:

- Sufficient concentrations of hazardous substances, particularly cadmium and zinc, exist in pathway resources now, and have existed in the past, to expose and injure fish of the Coeur d'Alene River Basin. Concentrations of hazardous substances in surface water (including suspended and bed sediments), biofilm (attached algae and associated detritus), and aquatic invertebrates are elevated and are pathways of metals exposure and injury to fish.
- Fish resources of the Coeur d'Alene River Basin are injured as a result of exposure to hazardous metals, particularly cadmium and zinc, which are highly toxic to fish. Fish resources have been injured in the South Fork Coeur d'Alene River, Canyon Creek, Ninemile Creek, and the mainstem Coeur d'Alene River, as well as other stream and river reaches affected by releases of hazardous substances from mining and mineral processing operations.
- Injured fish resources include resident, fluvial, and adfluvial species of the South Fork Coeur d'Alene River, the lower Coeur d'Alene River, and Coeur d'Alene Lake.
- Concentrations of cadmium and zinc in surface water of the South Fork Coeur d'Alene River, Canyon Creek, and Ninemile Creek exceed chronic and acute water quality criteria for the protection of aquatic life and are sufficient to cause acute mortality to trout.
- Laboratory and field studies demonstrated that salmonids avoid water containing zinc at concentrations that occur in the South Fork Coeur d'Alene River, Canyon Creek, Ninemile

Creek, and the lower Coeur d'Alene River as far downstream as Harrison, and Coeur d'Alene Lake.

3.8.7. Benthic Macroinvertebrate Conditions

Benthic macroinvertebrates are invertebrates that live on stream or lake bottoms. Benthic macroinvertebrate resources have been injured in the South Fork Coeur d'Alene River, Canyon Creek, and Ninemile Creek, as well as other stream and river reaches affected by releases of hazardous substances from mining and mineral processing operations.

Stratus (2000) summarized the findings regarding benthic macroinvertebrate conditions in the Coeur d'Alene Basin:

- Benthic macroinvertebrates in the South Fork Coeur d'Alene, the Coeur d'Alene River, Coeur d'Alene Lake, Canyon Creek, and Ninemile Creek, as well as other tributary reaches, are exposed to elevated concentrations of cadmium, lead, and zinc in surface water, sediment, and biofilm.
- The metal concentrations to which benthic macroinvertebrates of the South Fork Coeur d'Alene, the Coeur d'Alene River, Coeur d'Alene Lake, Canyon Creek, and Ninemile Creek are exposed are well above concentrations shown to cause toxicity.
- Toxicity tests using water and sediment demonstrate that water and sediment collected from the Coeur d'Alene River Basin downstream of mining activity are toxic to invertebrates under controlled laboratory conditions.
- Benthic macroinvertebrate communities in the South Fork Coeur d'Alene, Canyon Creek, Ninemile Creek, and other stream/river reaches are adversely affected by metals. Specifically, metal-sensitive species are largely absent from the invertebrate communities of these waterways downstream of mining activity. Historical data also demonstrate that the invertebrate communities in the mainstem Coeur d'Alene River and Coeur d'Alene Lake have been adversely affected in the past. Recent data on the communities in these areas are not available to confirm that the effects are continuing, but hazardous substance concentrations in surface water and sediment of the Coeur d'Alene River and Lake remain elevated. In addition, chironomid mouthpart deformities resulting from metals exposure may be ongoing in the South Fork and mainstem Coeur d'Alene rivers.

- The adverse effects on the invertebrate community have been occurring since at least the 1930s. Reductions in metals concentrations over time have resulted in an improvement in the benthic macroinvertebrate community, but the communities of the South Fork Coeur d'Alene River, Canyon Creek, and Ninemile Creek remain adversely affected.

3.8.8. Riparian Resource Conditions

Riparian resources of the Coeur d'Alene River Basin have been injured by releases of hazardous substances from mining and mineral processing operations. Stratus (2000) summarized the findings regarding riparian resource conditions in the Coeur d'Alene Basin:

- Sufficient concentrations of cadmium, lead, and zinc exist in pathway resources to transport hazardous substances to floodplains of the Coeur d'Alene River Basin.
- Concentrations of hazardous substances, particularly cadmium, lead, and zinc, in exposed floodplain soils of Canyon Creek, Ninemile Creek, and the South Fork Coeur d'Alene River are significantly greater than concentrations in reference area soils. Concentrations of hazardous substances in lower Coeur d'Alene River Basin sediments are also substantially elevated relative to the reference soils.
- Floodplain soils of Canyon Creek, Ninemile Creek, and the South Fork Coeur d'Alene River are phytotoxic (i.e., cause toxicity to plants) relative to control soils. Plant growth performance in field-collected assessment soils was measured under controlled laboratory conditions. Plant growth in contaminated soils was reduced relative to control soils, and plant growth was significantly negatively correlated with concentrations of hazardous substances in the soils.
- Concentrations of hazardous substances in floodplain soils of assessment reaches exceed phytotoxic thresholds identified in the scientific literature, and the observed reductions in plant growth are consistent with the phytotoxic effects of zinc and other heavy metals reported in the scientific literature.

3.9. Threatened, Endangered, and Candidate Species

USEPA (2001) completed an Ecological Risk Assessment that assessed the risks that mining-related hazardous substances posed to the natural resources of the Basins in a Remedial

Investigation/Feasibility Study. The analysis phase of the Ecological Risk Assessments links the problem formulation[6] with the risk characterization[7] and consists of the technical evaluation of ecological and chemical data to determine the potential for ecological exposure and adverse effects. The analysis consists of two components: (1) exposure characterization and (2) ecological effects characterization. These two components are used to evaluate the relationships between receptors, potential exposures, and potential effects. The results of these evaluations provide the information necessary to estimate potential risks to the representative species, under conditions defined for the Coeur d'Alene Basin (USEPA 2001).

More than 80 species of fish, plants, and wildlife were evaluated; included in this analysis was information relevant to the existing conditions of species considered "of special concern" (USEPA 2001). Species were considered "of special concern" based on their occurrence in Kootenai, Shoshone or Benewah counties and classifications of Idaho State threatened or endangered status, of cultural significance, or of priority management. Examples of these species include barred owl (*Strix varia*), black tern (*Chlidonias niger*), ferruginous hawk (*Buteo regalis*), California myotis (*Myotis californicus*), fisher (*Martes pennanti*), wolverine (*Gulo gulo luscus*), Coeur d'Alene salamander (*Plethondon idahoensis*), northern leopard frog (*Rana pipiens*), California floater (*Anodanta californiensis*), bank monkeyflower (*Mimulus clivicola*) and clustered lady's slipper (*Cypripedium fasciculatum*) (USEPA 2001).

The report found that high concentrations of metals are pervasive in soil, sediment, and surface water in the Basin, and these metals pose substantial risks to plant and animals that inhabit the Basin. Greatest risks were generally observed among species that either had the greatest direct or indirect exposures to soil or sediment (e.g., shrews) or that consume terrestrial or aquatic invertebrates (e.g., shrews and bats). Higher trophic-level consumers (i.e., mink, raccoon, etc.) displayed comparatively lower levels of risk. More detailed information on the existing condition

[6]Problem formation is ecological conceptual site model that describes the contaminant sources and transport mechanisms, evaluates potential exposure pathways and routes, and identifies the representative species that would be used to assess potential ecological risk to those and other similar species.

[7]The Risk Characterization evaluates the evidence linking exposures to chemicals of potential environmental concern with their potential ecological effects among the representative species identified for the Basin.

of these natural resources is provided in USEPA (2001) in Section 7.2 (pages 7-17 to 7-113) this information is hereby incorporated in this EA by reference.

Several species known or expected to occur in the vicinity of the Coeur d'Alene Basin are federally-listed as threatened or endangered. Discussions regarding life histories of these species are provided below. In discussions between USFWS (Larry Salata, USFWS Chief of Consultation, pers. com. 2006) and the Trustees, it was determined by consensus that Endangered Species Act, Section 7 consultation would be completed, as appropriate, on individual projects rather than on the FIRP if alternative C or the preferred alternative is selected. Once project designs are more precisely known, Section 7 consultation would be more meaningfully conducted.

Bald Eagle

Bald Eagles are large fish-eating raptors and have been a federally-listed species since 1967. Their current status is listed as threatened under the ESA. A dramatic recovery of eagle populations led to the July 8, 1999, U.S. Fish and Wildlife Service proposal to remove the species from the federal list of endangered or threatened wildlife.

On-going Effects to Bald Eagles

Stratus (2000) evaluated lead exposure and effects of lead exposure on bald eagles in the Coeur d'Alene River Basin, blood samples were collected from young bald eagles and hematological parameters (blood ALAD activity, hemoglobin and hematocrit levels) and growth were measured. Blood samples and growth data were collected from eagles in nests in the Coeur d'Alene River Basin and at McArthur Lake Wildlife Management Area (Audet et al. 1999b). Food chain exposure was evaluated by measuring lead concentrations in eagle prey items, including muskrats (*Ondatra zibethicus*), brown bullheads, and other fish species collected from the Coeur d'Alene and St. Joe river Basins, and by measuring lead concentrations in lead-poisoned waterfowl (without ingested lead shot) from the Coeur d'Alene River Basin (Audet 1997; Audet et al. 1999b). Blood lead levels were higher in Coeur d'Alene River Basin eaglets (0.03 to 0.18 ppm) than in reference eaglets (0.01 to 0.02 ppm) (Audet et al. 1999b). Blood protoporphyrin and hemoglobin were similar in Coeur d'Alene River Basin and reference area eaglets. ALAD was inhibited by 35 to 65% in Coeur

d'Alene River Basin eaglets. The average weight of Coeur d'Alene eaglets was lower than the average weight of reference area eaglets of similar age. For both blood and growth measurements, sample sizes were small, so statistical analyses were not provided.

Prey items of eagles in the Coeur d'Alene River Basin were contaminated with lead. For example, lead concentrations were significantly greater in brown bullheads from the Coeur d'Alene River Basin (range 3.8 to 122 ppm) than in brown bullheads from the St. Joe River Basin (range <0.1 to 2.9 ppm) ($p < 0.0001$). Lead concentrations in tissues of lead poisoned waterfowl prey items from the Coeur d'Alene area were elevated and ranged from 1.64 to 38.0 ppm in liver and from <0.09 to 0.76 ppm in muscle (Audet 1997).

Dead eagle carcasses from northern Idaho and eastern Washington were necropsied to determine causes of death. Lead poisoning without the presence of ingested lead shot was the most common diagnosis of dead bald eagles collected in northern Idaho/eastern Washington. Of the 13 carcasses documented, 10 were suitable for necropsy. Six of the 10 carcasses necropsied, including 2 of the 4 carcasses collected from the Spokane River Basin (which includes the Coeur d'Alene River Basin), were lead-poisoned without ingested lead shot (Audet et al. 1999b). Given the multiple lines of evidence regarding eagle exposure to metals of concern, ongoing negative physiological effects, including potential death, are expected to occur.

Gray Wolf

The gray wolf (*Canis lupus*) is a large canid occupying forested areas. The gray wolf was extirpated from the western U.S. by the 1930s (USFWS et al. 2004) and was federally-listed as endangered in 1967. Northern populations have recovered from local extirpation to include a number of breeding pairs and packs. Under the Endangered Species Act, USFWS proposed to establish a distinct population segment (DPS) of the gray wolf in the Northern Rocky Mountains (NRM) of the United States, including Idaho. USFWS also proposed removing the gray wolf in the NRM DPS from the List of Endangered and Threatened Wildlife pending the approval of state management plans [72 FR 6106]. While no established packs are known in the Coeur d'Alene Basin, individual gray wolves have been reported (Steve Netto, Idaho Department of Fish and Game, Boise, pers. com.).

On-going Effects to Gray Wolves

Due to their scarcity in the Basin, lead exposure and effects of lead exposure on gray wolves in the Coeur d'Alene River Basin was not evaluated by Stratus (2000). USEPA (2002) evaluated the nature and extent to which mining-related hazardous substances present risks to ecological receptors within the Coeur d'Alene Basin based on the weight-of-evidence analyses. The estimated exposure to gray wolf did not exceed the lowest observable adverse effects level or the effective dose (20 percent response) for any chemical of potential ecological concern in any area if the Basin. No risks to gray wolf were identified (USEPA 2001). However, subsequent monitoring results reported by USFWS (2005b) demonstrated elevated uptake of metals of concern in several large mammals (i.e., elk, deer, moose, coyote) using the South Fork Coeur d'Alene River corridor. While conclusions regarding the risk assessment for gray wolves were considered strong (USEPA 2001), ongoing risks may constitute an uncertainty.

Canada Lynx

The Canada lynx (*Lynx canadensis*), the only lynx in North America, is a rare forest-dwelling cat of northern latitudes. The lynx was federally-listed as threatened in 2000. It feeds primarily on snowshoe hare (*Lepus americanus*), but also will prey on small mammals and birds. Canada lynx require extensive coniferous forests with downed trees and windfalls that provide cover for den sites, escape, and protection from severe weather. Lynx were historically distributed throughout northern Idaho, occurring in 8 of the 10 northern and north-central counties. Current Idaho population sizes and distribution are unknown [65 FR 58]. The natural resources division of the Coeur d'Alene Tribe is currently investigating lynx presence in the Basin. Although study results are not yet available, preliminary data indicates lynx presence in the Basin (Alfred Nomee, pers. com. 2007).

On-going Effects to Canada Lynx

Due to Canada lynx scarcity in the Basin, lead exposure and effects of lead exposure on Canada lynx in the Coeur d'Alene River Basin was not evaluated. However, USEPA (2002) evaluated the

nature and extent to which mining-related hazardous substances present risks to ecological receptors within the Coeur d'Alene Basin based on the weight-of-evidence analyses. The estimated exposure did not exceed the lowest observable adverse effects level or the effective dose (20 percent response) for any chemical of potential ecological concern in any area. No risks to Canada lynx were identified in any area of the Basin (USEPA 2001).

Bull Trout

The bull trout is a member of the Salmonidae family native to western North America. Adults are dark in appearance with light spots, are 12-27 inches long, and can weigh up to 22 pounds. Bull trout range throughout the Columbia and Snake River Basins, extending into streams in Idaho, Montana, Oregon, and Canada. Bull trout currently occupy approximately 45% of watersheds in their historical range. Adults migrate upstream to spawn from August to October. Eggs begin to hatch in March and April. The USFWS listed bull trout in the coterminous United States as threatened in 1999 [Federal Register 64:210; 1999]; and their critical habitat was designated most recently in 2005 [Federal Register 70:185, 2005]. A previous listing rule [Federal Register 63:111; 1998] listed 71 subpopulation in the upper Columbia River, only one of these was identified within the Spokane River Basin.

The Draft Bull Trout Recovery Plan (USFWS, 2002) reports that in the Coeur d'Alene Lake Basin recovery unit, bull trout are currently found primarily in the upper portion of the St. Joe River subbasin (PBTTAT, 1998; USFWS, 1998), which contains spawning and rearing habitats. Migratory bull trout also use the St. Joe River and Coeur d'Alene Lake for foraging, migrating, and overwintering habitat. Bull trout have not been observed in many of the streams in recent years, and spawning and rearing appear to be concentrated in relatively few tributaries of the St. Joe River subbasin. According to the 1998 rule, bull trout were thought to be extirpated from 12 streams in the Coeur d'Alene River Basin and approximately 25 streams in the St. Joe River Basin. The current distribution is substantially less than historical distributions. In USFWS (2002), the recovery team reported that they considered the population of bull trout within the Coeur d'Alene Recovery Unit to be seriously imperiled. The Coeur d'Alene Lake Basin, including parts of Shoshone, Kootenai, and Benewah Counties, was identified as a core recovery area. In addition, the

Draft Bull Trout Recovery Plan lists Sherlock Creek among those streams that are a priority for restoration (USFWS 2002).

On-going Effects to Bull trout

According to Stratus (2000), comparison of water quality data with toxicological effects thresholds indicates that fish are injured by metals in the Coeur d'Alene River Basin. One way to estimate toxicological thresholds is to use toxicological data relating exposures of site-relevant species to water quality conditions that are representative of the site. Data relevant to such an analysis was collected in studies performed by EVS (1996c, 1997b) using water collected from the Little North Fork of the South Fork Coeur d'Alene River, and in the studies performed by Hansen et al. (1999a) in which bull trout were exposed to zinc and cadmium in laboratory waters formulated to represent various water quality conditions that occur in the Coeur d'Alene River Basin. The toxicity thresholds were derived following the convention used by the U.S. EPA of calculating effects thresholds as a value equal to one-half the LC50 value (G. Chapman, Paladin Water Quality Consulting, pers. com. December 1997; as cited in Stratus 2000). Effects thresholds varied depending on hardness and pH. Threshold values for cadmium therefore ranged from 0.225 to 1.255 µg/L; effects thresholds for zinc ranged from 18.6 to 207 µg/L.

Surface water quality data were compared with these adverse effects thresholds. Water chemistry median and maximum values for three reaches in the South Fork Coeur d'Alene River, lower Canyon Creek, lower Ninemile Creek, two reaches in lower Pine Creek, three reaches in the mainstem Coeur d'Alene River, and Coeur d'Alene Lake were used in the comparison. The data presented provide clear indication that metal concentrations exceeded lethality thresholds in the South Fork Coeur d'Alene River downstream of Canyon Creek, in Canyon, Ninemile, and Pine Creek, the lower Coeur d'Alene River, and Coeur d'Alene Lake (Stratus 2000).

Spalding's Catchfly

Spalding's catchfly (*Silene spaldingii*) is a member of the pink or carnation family (Caryophyllaceae). This plant is a long-lived perennial herb with four to seven pairs of lance-shaped leaves and a spirally arranged inflorescence consisting of small greenish-white flowers.

Plants are approximately 20 to 60 centimeters in height and reproduction is accomplished by seed only. Fruits mature from August until September and one stem may have both flowers and mature fruit capsules at the same time. Within the United States, Spalding's catchfly is know to occur in three counties of Idaho (Idaho, Lewis and Nez Perce), four counties in Montana (Flathead, Lake, Lincoln, Sanders), one county in Oregon (Wallowa) and five counties in Washington (Adams, Asotin, Lincoln, Spokane, and Whitman). The USFWS listed the Spalding's catchfly as threatened in 2001 [Federal Register 66: 196; 2001], and no critical habitat has been designated. The distribution and habitat of Spalding's catchfly are primarily found in open, mesic (moist) grassland communities, but is also occasionally found with sagebrush-steepe communities as well as pine forests. Plants are generally located in swales or on north or east facing slopes where soil moisture is relatively higher. The grassland communities where the plant occurs are dominated by one or both of the bunchgrass species, Idaho fescue (*Festuca idahoensis*) and bluebunch wheatgrass. Spalding's catchfly occurs at elevations between 420 to 1,555 meters, usually in deep, productive loess soils. The range of plant includes five physiographic regions, the region closest to the FIRP action area is the Palouse Grassland in west-central and southeastern Washington, encompassed by portions of Spokane County, Washington, the extreme southwest corner of Kootenai County, Idaho, and western Benewah County, Idaho. (USFWS 2005a). At this time, however, none of these counties has known populations of Spalding's catchfly. Therefore, none of the counties within the FIRP action area currently have populations of Spalding's catchfly.

On-going Effects to Spalding's Catchfly

Because this plant is not generally found within the contaminated portions of the Coeur d'Alene Basin, the effects of mining-related hazardous substances to Spalding's catchfly populations were not specifically evaluated.

Water Howellia

Water howellia (*Howellia aquatilis*) is a monotypic genus in the bellflower family (Campanulaceae). This plant is an aquatic annual that grows 4 to 24 inches in height and has extensively branched, submerged or floating stems with narrow leaves 0.4 to 2 inches in length. Water howellia historically occurred over a large portion of the Pacific Northwest region of the United States, but today is found only in specific habitats (Shelly and Moseley 1988, Gamon 1992). The water howellia was federally listed as a threatened species under the Endangered Species Act in 1994 [Federal Register 94: 17134; 1994] and no critical habitat has been designated. Only 97 small populations of this plant were known to exist when the proposed rule to list the species was published [Federal Register 58, 19795;1993]. It has been reported in one county in California (Medocino), three counties in Oregon (Clackamas, Marion, and Multnomah), four counties in Washington (Mason, Thurston, Clark, and Spokane), two counties in Idaho (Kootenai and Latah), and two counties in Montana (Lake and Missoula) (Jokerst 1980; Shelly and Moseley 1988; and Gamon 1992). Subsequent inventories in the State of Washington located 28 new sites in Spokane County, expanding the number of known populations to 107 (Shelly and Gamon 1996). In Montana, the plant has been found in only 13.5 percent of the 437 acres of potential habitat that has been surveyed since 1987 (Roe and Shelley 1992). Water howellia appears to be extirpated from California and Oregon and from Mason and Thurston Counties in Washington, and Kootenai County in Idaho (Jokerst 1980; Shelly and Moseley 1988; and Gamon 1992).

Nearly all of the remaining populations of water howellia are clustered in two main population centers. One population center is near Spokane, Washington, near the Turnbull National Wildlife Refuge, and consists of 46 individual populations in Spokane County and Latah Counties, Idaho. The other population center is located in the Swan River drainage where 59 individual populations are found.

Water howellia grows in firm consolidated clay and organic sediments that occur in wetlands associated with ephemeral glacial pothole ponds and former river oxbows (Shelly and Moseley 1988, and Lesica 1992). The microhabitat for the plant includes shallow water, and the edges of deep ponds that are partially surrounded by deciduous trees (Shelly and Moseley 1988, Gamon 1992). Water howellia produces two types of flowers, one is submerged in water and is small and

inconspicuous, and the other is an emergent white flower 0.08 to 0.11 inches in length. The plant is primarily self-pollinating, and each fruit contains up to 5 large (0.08 to 1.6 inches) brown seeds (Shelly and Moseley 1988). Reproduction is entirely from seed, and germination only occurs when ponds dry out and the seeds are exposed to air (Lesica 1990, 1992).

On-going Effects to Water Howellia

Because this plant is not generally found within the contaminated portions of the Coeur d'Alene Basin, the effects of mining-related hazardous substances to water howellia populations were not specifically evaluated.

3.9.1. Candidate Species

Yellow-billed cuckoo

The yellow-billed cuckoo (*Coccyzus americanus)* is a medium-sized bird of about 30 cm long and approximately 60 grams. Plumage is grayish-brown above and white below, with red primary flight feathers. The tail feathers are boldly patterned with black and white below. The legs are short and bluish-gray, and adults have a narrow, yellow eye ring. The species has a slightly down-curved bill which is blue-black with yellow on the base of the lower mandible.

Available data suggests that the yellow-billed cuckoo's range and population have declined substantially across much of the western United States. The species was listed as a state endangered in California in 1987, and either thought to be extirpated or extremely rare in Colorado and Idaho. Breeding ranges formerly included most of North America from southern Canada to the Greater Antilles and northern Mexico. Species' distribution in the western United States has recently contracted. The northern limit of known breeding range in the western interior United States is southern Idaho. The last confirmed breeding records in Washington and Oregon were in the 1930s and 1940s, respectively. Specific migration or wintering patterns are not well determined [Federal Register 66, 38611-38626, 2001].

Western yellow-billed cuckoos breed in large blocks of riparian habitats (particularly woodlands with cottonwoods and willows), while eastern yellow-billed cuckoos breed in a wider range of habitats, including deciduous woodlands and parks (Ehrlich et al. 1988). Dense understory foliage appears to be an important factor in nest site selection. Cottonwood trees also appear to be an important foraging habitat (Laymon et al. 1993). Clutch size is usually two or three eggs. Young fledge within 17 days of eggs being laid (Hughes 1999).

This species is considered a rare and local summer resident in southwest Idaho. The most recent record for Idaho was from the South Fork of the Snake River in 1992 (Stephens and Sturts 1997). Numerous sightings have been recorded in the southwestern part of Idaho since the mid 1970s. The available information is inadequate to judge population or distributional trends, and the Idaho breeding population is likely limited to a few breeding pairs, at most.

As far back as 1887, debate has occurred regarding separating the yellow-billed cuckoo into eastern and western subspecies. The FWS was petitioned in 1998 that the yellow-billed cuckoo be listed as threatened or endangered in the western United States and that critical habitat be designated. As announced in the Federal Register (66, 38611; 2001), the petitioned action was found to be warranted but precluded by higher priority listing actions. The species is a candidate for listing under the Endangered Species Act.

On-going Effects to Yellow-Billed Cuckoo

This species is considered a rare and local summer resident in southwest Idaho. The most recent record for Idaho was from the South Fork of the Snake River in 1992. Because this species is not found within the contaminated portions of the Coeur d'Alene Basin, the effects of mining-related hazardous substances to yellow-billed cuckoo populations were not specifically evaluated.

Slender Moonwort

Slender moonwort (*Botrychium lineare*) is a small perennial fern that occurs in 9 populations in Colorado, Oregon, Montana, and Washington. Historic populations were also previously known from, Idaho, California, Utah and Canada. However, these additional historic populations have not

been documented for at least 20 years and may be extirpated (Wagner and Wagner 1994). A new population site in Idaho (Boundary County) was tentatively identified in 2001.

Slender moonwort is a habitat generalist often found in disturbed habitats along roadsides. Specific habitat descriptions therefore tend to be problematic. Identifiable threats include road maintenance and herbicide spraying, recreation, timber harvest, trampling and development. Slender moonwort is considered a USFS regionally sensitive species in Colorado, Oregon, Washington, and California, but not Idaho or Montana. FWS concludes that the overall magnitude of threats to this species throughout its range is moderate and the overall immediacy of threats is nonimminent. This species, however, carries threatened and endangered candidate status.

On-going Effects to Slender Moonwort

Slender moonwort is not generally found within the contaminated portions of the Coeur d'Alene Basin; therefore, the effects of mining-related hazardous substances to slender moonwort populations were not specifically evaluated.

3.10. Cultural Resources

Information in this section was provided by the Coeur d'Alene Tribe, specifically, their website http://www.cdatribe-nsn.gov and from conversations with Tribal cultural and natural resources staff.

The Coeur d'Alene Basin is within the nearly 5,000,000 aboriginal acres of the Coeur d'Alene Indian Tribe. Their ancestral homeland extended throughout what is now northern Idaho, eastern Washington, and western Montana. The Coeur d'Alene River Basin was home to one of the band of the Coeur d'Alene from time immemorial. In their own language, they are called Schitsu'umsh meaning "those who are found here." The Coeur d'Alene's established Indian villages along the Coeur d'Alene, St. Joe, Clark Fork and Spokane Rivers, and on the shores of Coeur d'Alene Lake, Lake Pend Orielle and Hayden Lake.

The first Europeans to encounter the Coeur d'Alene were French trappers and traders in the late 18th or early 19th century. Euro-American miners and settlers established themselves the area in the

1840's. The name Coeur d'Alene was given to the Tribe in the late 1800s or early 1900s by French traders and trapper. In French it meant "heart of the awl" referring to the sharpness of the trading skills exhibited by the tribal members in their dealing with European traders. The Coeur d'Alenes also traded with neighboring tribes and participated in indigenous trade networks spanning the area from the pacific coast into the plains.

The record of human occupation within the Coeur d'Alene Basin exists in many forms, including archeological sites, historic buildings, and structures which may or may not be visible on the modern landscape. In addition to the Mission of the Sacred Heart in Cataldo, Idaho, other examples of cultural resources include surface and subsurface tribal artifacts and the town of Wallace, Idaho, in which every building is on the National Register of Historic Places.

The Coeur d'Alene Tribe values all the natural resources within their territory and numerous species are of cultural significance. Examples include cutthroat trout, mountain whitefish, muskrat, beaver, deer, water potato, huckleberries (G*aylussacia spp*.), and camas (*Camassia spp*.) (Jill Wagner and Quanah Matheson, pers. com. 2007). Cultural events were associated with hunting, fishing, and harvesting of plants from the river and associated floodplain. For example, water potato day is celebrated each October, demonstrating that traditional resources remain important and utilized. On Water Potato Day, water potatoes are dug and shared, and cultural information is taught. People from surrounding communities and students from area schools are invited and many attend (in 2006 something over 400 school kids attended).

The Coeur d'Alene Tribe currently has sovereign authority on a reservation covering 345,000 acres, spanning the western edge of the northern Rocky Mountains to the Palouse, and encompassing the southern end of Coeur d'Alene Lake. The Coeur d'Alene Indian Tribe has a current enrollment of 1,922 who practice many traditional cultural activities. Families with ties to the Coeur d'Alene River Basin continue to identify with the region and to utilize resources in the Basin. The Mission of the Sacred Heart in Cataldo, Idaho is the oldest building in Idaho and already on the National Register of Historic Places. The annual pilgrimage to the Mission is attended by members of all bands as well as other people. The location of the Mission in this area increased the area's use by other bands of Coeur d'Alenes and implicated the area in many political events during the early history of Indian-White relations in Coeur d'Alene Territory. It is important to note here that

epidemics were generally centered around missions and trading posts. Epidemics lead to people living and dying in unexpected places. Specific location information is primarily held by the Tribe, in confidence, and is not appropriately included in detail in this public document.

3.11. Issues Not Analyzed in Detail

3.11.1. Impacts on Socioeconomic Conditions

The Trustee examined the projects and determined that none had the potential for substantially affecting the socioeconomic status of the Coeur d'Alene Basin. The limited funding associated with the preferred alternative would not be large enough to affect the economy of the Basin. The preferred alternative includes three proposed projects (one of the projects would include multiple properties) that could include title fee or conservation easement purchase of high priority restoration areas. Such purchases could result in the conversion of agricultural lands to wetlands or to lands used primarily to support fish and wildlife species. The tax base of the area would not be substantially affected by the proposed action. These purchases would not be large enough in scope to effect the socioeconomic status of the area thus this impact topic was dropped from further analysis.

3.11.2. Impact on Minority and Low Income Persons or Populations

On February 11, 1994, President Clinton issued the Executive Order (EO) on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (E0 12898). The order requires Federal agencies to make environmental justice part of their mission and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies, and activities on minority and low-income persons and populations. All of the activities within the FIRP were evaluated for their impact on the human environment and compliance with EO 12898 to ensure environmental justice. The proposed activities under the preferred alternative would not pose significant risks to human health or their environment. While there are some low-income and minority people living in the Coeur d'Alene Basin (http://quickfacts.consus.gov/16/16079.html) none of the activities under the preferred alternative

would result in any adverse or disproportionate environmental impacts to minority or low income persons or populations.

CHAPTER 4
4. ENVIRONMENTAL CONSEQUENCES

This section describes direct, indirect, and cumulative environmental consequences of the proposed action and no action to the human environment. Those remedial actions, which have already been planned or are being undertaken as part of other activities (i.e., USEPA Superfund activities) would be analyzed in the cumulative effects analysis.

4.1. Criteria for Significance

This evaluation assesses whether the proposed activities would have any individual or collectively significant effects on the human environment within the Coeur d'Alene River Basin. Significance is determined by considering intensity and context [40 C.F.R 1508.27]. Intense effects are those that cause impacts to public health; to unique characteristics of the area; to cultural resources or endangered species; are precedent setting; controversial; unique or uncertain; or are those that violate environmental protection laws. In general, context is viewed in relation to sensitivity of the environment. Sensitive environments are those that have little past disturbance, and have intact ecological functions and processes; or are environments that have resources that can easily be impacted by disturbance leading to disruption of ecological functions and processes.

The following natural resources will form the basis for the analysis: surface water quality, soils and sediments, riparian resources, fish, birds (Tundra swans), and benthic macroinvertebrates. These are the natural resources that were determined by the District Court of Idaho to be injured by mining-related hazardous substances and the restoration projects were chosen because they addressed one or more of these natural resources; [See Coeur d'Alene Tribe v. Asarco, Inc., et al., 208 F.Supp.2d 1094, 1106-1107, 1123-1124 (D. Idaho 2003)]. Wildlife resources and special status species will also be evaluated as they are important components of the ecosystem. A summary of environmental consequences associated with the alternatives is presented in Table 4.

The descriptions of the activities in the FIRP are general and effects will be estimated based on information available at this time. If the preferred alternative is selected, then prior to implementation of the projects in the FIRP they would undergo more detailed site-specific NEPA and ESA assessments, and other assessments needed to comply with other statutes and regulations (e.g., Clean Water Act, 404 permits, Natural Historic Preservation Act, section 106)), as appropriate.

4.2. Alternative A: No Action Alternative

Under this alternative, the Trustee would not complete "restoration activities" over the next several years. The public would not be compensated, at this time, for any injuries to natural resources or any interim losses of natural resources caused by the release of mining-related hazardous substances into the Basin environment. Past environmental degradation due to activities not directly related to metals releases (e.g., logging, road building, agriculture) would not be addressed by the Trustees under the No Action alternative.

4.2.1. Effects to Water quality, Sediment and Soils

Under the No Action alternative restoration would occur only through natural recovery. When Stratus (2000), evaluated natural recovery of selected resources there was no indication of improvement in the conditions of the Basin. According to Stratus (2000) none of the existing surface water data indicate declining hazardous substance concentrations with time during the past two decades. There was no evidence that maximum, minimum, or mean zinc concentrations have declined: almost all of the concentrations measured in the South Fork Coeur d'Alene River downstream of Canyon Creek, and all of the concentrations measured at the mouths of Canyon and Ninemile creeks, exceeded acute zinc aquatic water quality criteria at all times that samples were collected over the last 30 years. Although patterns of recovery may be obscured by variability in flow and climate, the data overall did not indicate that water quality was improving.

There had been no consistent sampling of sediments over time at designated locations as there had been for surface water. In general, however, sediment data collected in the 1990s from the lower Basin were consistent with data collected previously (1970s and 1980s). There was no indication

that sediment concentrations of cadmium, lead, and zinc in sediments were decreasing (Stratus 2000).

4.2.2. Effects to Riparian Resources, Wildlife, Fisheries, and Benthic Macroinvertebrates

Throughout the Coeur d'Alene River Basin, the release of mining-related hazardous substances such as cadmium, lead, and zinc, have caused injuries to natural resources. Animal deaths by lead poisoning from the ingestion of contaminated soils and sediment are expected to continue (USEPA 2002). Existing concentrations of mining-related metals in the Basin, ongoing releases, and ongoing transport and exposure pathways limit natural recovery of the injured resources.

Recovery of fish, benthic macroinvertebrates, wildlife, and riparian resources is dependent on recovery of suitable habitat quality, which requires recovery of surface water, sediment, and floodplain soil resources. Once surface water, sediment, and floodplain soil resources have recovered to a condition that will support biological resources, recovery of the Coeur d'Alene River Basin ecosystem will be constrained by the rate of natural physical and biological recovery (e.g., vegetation reestablishment and physical habitat rebuilding by natural hydrologic, geologic, and biological processes) (Stratus 2000).

Stratus (2000) further reports, for wildlife resources of the lower Basin, recovery will occur rapidly once sediments are nontoxic, since physical modifications resulting from sediment injuries are not negatively affecting habitat use. When surface water and sediment conditions improve, benthic macroinvertebrates and fish from upstream clean reaches and clean tributaries will colonize recovered areas naturally and rapidly. Recovery time for fish also will include time required for natural reestablishment of physical features of habitats that were degraded as a result of the injuries, such as overhanging banks, vegetative overhang, and pools created by woody debris and roots. Natural recovery of the aquatic physical habitat of the upper Basin will depend strongly on recovery of riparian resources (Stratus 2000).

Natural recovery time for riparian resources will depend on time required for floodplain soils to become diluted to nonphytotoxic levels, followed by primary vegetation succession, organic soil

development, and development of vertically and horizontally diverse vegetation communities. Natural recovery of riparian resources includes development of vegetation that will overhang the stream, modulate stream temperatures, and provide security cover for fish. It includes recovery of riparian vegetation to the point where the vegetation provides habitat structure (e.g., large woody debris; bank stabilization) and a source of energy (i.e., detritus) to the aquatic ecosystem. It also includes reestablishment of diverse early and late successional vegetation and the expected range of terrestrial habitat features (e.g., mature tree boles for tree-cavity nesting birds) (Stratus).

Natural resources injured by the release of metals into the environment would not be restored, rehabilitated, replaced or the equivalent acquired in the next several years , if the No Action alternative were chosen. The public would not be compensated for the interim losses of wildlife resources at this time. Wildlife species dependent on water and wetland habitats would continue to be injured by mining-related hazardous substances and lack of clean feeding areas. The listed, proposed or candidate species determined to be at risk of injury due to hazardous substances would continue to be injured under the no action alternative.

Throughout the Coeur d'Alene River Basin, the hazardous substances cadmium, lead, and zinc are the cause of the injuries. Existing concentrations of cadmium, lead, and zinc in the Basin, ongoing releases of these hazardous substances from sources, and ongoing transport and exposure pathways limit natural recovery of the injured resources. There will be little recovery unless releases from sources are eliminated, and transport and exposure pathways are eliminated. Surface water and sediment data showed no evidence of either elimination of sources or pathways over the last 20 to 30 years. Therefore, it is reasonable to expect that natural recovery of the Coeur d'Alene River Basin ecosystem would take hundreds of years (Stratus 2000).

Furthermore, according to USEPA (2002) animal deaths by lead poisoning from the ingestion of contaminated soils and sediment are expected to continue. This conclusion was based on the fact that in 1997 the number of waterfowl carcasses found represented the largest documented die-off in the Coeur d'Alene River Basin since 1953. This and other wildlife data collected over the past 20 years are supportive of the fact that lead concentrations in soil and sediment in the Coeur d'Alene Basin still occur at toxic levels.

4.2.3. Threaten, Endangered and Candidate Species

Bald Eagle

Stratus (2000) evaluated lead exposure, and effects of lead exposure, on bald eagles in the Coeur d'Alene River Basin, and found evidence that they are being adversely affected by mining-related hazardous substances. According to Stratus (2000), recovery of fish, benthic macroinvertebrates, wildlife, and riparian resources is dependent on recovery of suitable habitat quality, which requires recovery of surface water, sediment, and floodplain soil resources. Because water quality data and sediment data did not indicate that toxic substances were declining (Stratus 2000), the no action alternative is likely to result in continued harmful affects to bald eagles.

Gray Wolf

USEPA (2002) evaluated the nature and extent to which mining-related hazardous substances present risks to ecological receptors within the Coeur d'Alene Basin based on the weight-of-evidence analyses. No risks to gray wolf were identified (USEPA 2001). Therefore, the no action alternative will have neither positive nor negative effects on gray wolf.

Canada Lynx

USEPA (2002) evaluated the nature and extent to which mining-related hazardous substances present risks to ecological receptors within the Coeur d'Alene Basin based on the weight-of-evidence analyses. The estimated exposure did not exceed the lowest observable adverse effects level or the effective dose (20 percent response) for any chemical of potential ecological concern in any area. No risks to Canada lynx were identified in any area of the Basin (USEPA 2001). Therefore, the no action alternative would have neither positive nor negative effects on Canada lynx.

Bull Trout

According to Stratus (2000), a comparison of water quality data with toxicological effects thresholds indicates that fish are injured by metals in the Coeur d'Alene River Basin (Stratus 2000). Because water quality data did not indicate that toxic substances were declining (Stratus 2000), the no action alternative is likely to result in continued harmful effects to bull trout. In addition, the public would not be compensated for the injury or the interim losses of this fishery resource, at this time, if the no action alternative were implemented.

Spalding's Catchfly

Spalding's catchfly is not generally found within the contaminated portions of the Coeur d'Alene Basin, therefore the no action alternative would neither positively nor negatively impact Spalding's catchfly populations.

Water Howellia

Water howellia is not generally found within the contaminated portions of the Coeur d'Alene Basin; therefore the no action alternative would neither positively nor negatively impact water howellia populations.

4.2.3.1. Candidate Species

Yellow-billed Cuckoo

Yellow-billed cuckoo is not generally found within the contaminated portions of the Coeur d'Alene Basin, and therefore, the no action alternative would neither positively nor negatively impact yellow-billed cuckoo populations.

Slender Moonwort

Slender moonwort is not generally found within the contaminated portions of the Coeur d'Alene Basin, and therefore the no action alternative would neither positively nor negatively impact slender moonwort populations.

4.2.4. Cultural Resources

If the No Action alternative were selected, then the resources that the Court determined to be injured would not be partly addressed by restoration activities by the Trustees over the next several years. To the Tribe, restoration is necessary to support their cultural resources (Alfred Nomee pers. com. 2007); therefore, the no action alternative would not meet the Tribe's goals for restoring their cultural resources. The Tribe values all the natural resources in the Basin, including those found to be injured by the courts; and considers many natural resource in the Basin to be culturally important, for example: cutthroat trout, mountain whitefish , muskrat , beaver, deer, water potato, huckleberries, and camas (Jill Wagner, pers. com. 2007). Many of these cultural resources play prominent roles in ceremonies and creation stories. Many kinds of restoration activities that would partly address injured resources would also indirectly benefit or effect culturally significant resources. The No Action alternative would provide no direct or indirect benefits to injured or culturally significant resources.

4.2.5. Cumulative Effects

Since the Trustees will not undertake any activities under the No Actions alternative there will be no cumulative effects.

4.2.6. Project Costs and Opportunities

The No Action alternative includes no projects so there would be no costs or implementation opportunities.

4.3. Alternative B: Future Final Restoration Plan Alternative

Under this alternative, the Trustees would defer restoration until the pending litigation is resolved, or settlements are reached with the remaining defendants. This deferral would likely be a minimum of four to five years. The Trustees would defer the restoration, rehabilitation, replacement or acquisition of the equivalent of habitat, or the services provided by any habitat for four to five years. Even though the Trustees outlined the types and amount of restoration that would be needed to

respond to the mining-related injuries in the Basin (LeJeune et al., 2004, Stratus 2004, and Trost 2004), the Trustees do not know the total amount of funding that would be available as the result of resolving the current litigation; therefore, it is not possible, at this time, to identify the final set of specific restoration projects that would be a part of a FFRP. Because the Trustees can not define a set of projects for the FFRP, the assessment of the effects of alternative B will be those general effects of deferring restoration for four to five years. The Trustees do no know at this time the effects of implementing a FFRP.

4.3.1. Effects to Water quality, Sediment and Soils

Under alternative B, restoration would not begin for four to five years, and near term recovery of surface water quality and sediment and soils would occur through natural recovery. The results of natural recovery of surface water quality, sediments and soils were analyzed in Sections 4.2 1. above. Delaying restoration would result in continued degraded surface water quality (e.g., turbidity, high stream temperatures) and sedimentation in Basin streams where there are current opportunities to improve these conditions. It would also delay replacing lost services and injured resources The effect of the delay on surface water quality, sediment, and soils would be minor given the relatively short period of time (four to five years) involved. There are benefits of improving these important physical habitat features sooner rather than later. Higher quality habitats support better growth and survival of the associated biological resources. Under improved conditions, both the physical and biological resources are better able to provide their associated services[8]. Over the intervening period of four to five years, interim losses of services provided by injured natural resources would continue to accrue, and the public would not be partly compensated for these lost services for an additional four to five years.

4.3.2. Effects to Riparian Resources, Wildlife, Fisheries, and Benthic Macroinvertebrates

Under alternative B, restoration would not begin for four to five years and near-term recovery of riparian resources, wildlife, fish, and benthic macroinvertebrates would occur through natural recovery. The results of natural recovery of these resources were analyzed in Sections 4.2.2. above.

Recovery of fish, benthic macroinvertebrates, wildlife, and riparian resources is dependent on recovery of suitable habitat quality, which requires recovery of surface water, sediment, and floodplain soil resources. Delaying restoration of these physical natural resources will result in also delaying improvements in the aforementioned biological resources. Over the intervening period of four to five years, interim losses of services provided by injured natural resources would continue to accrue, and the public would not be partly compensated for these lost services for an additional four to five years. The effect of the delay on riparian resources, wildlife, fish, and benthic macroinvertebrates would be minor given the relatively short period of time (four to five years) involved.

4.3.3. Threaten, Endangered and Candidate Species

Bald Eagle

Stratus (2000) evaluated lead exposure, and effects of lead exposure, on bald eagles in the Coeur d'Alene River Basin, and found evidence that they are being adversely affected by mining-related hazardous substances. According to Stratus (2000), recovery of fish, benthic macroinvertebrates, wildlife, and riparian resources is dependent on recovery of suitable habitat quality, which requires recovery of surface water, sediment, and floodplain soil resources. Because water quality data and sediment data did not indicate that toxic substances were declining (Stratus 2000), alternative B would have the same effects to bald eagles as the No Action alternative over the next four to five years. The Trustees' actions now or in the future would not be directed at restoration of bald eagles, since they were not found to be injured by the U. S. District Court, District Court of Idaho. However, restoration actions that improve resources such as fisheries or water quality may have indirect beneficial effects on bald eagles. Delaying restoration would delay these indirect beneficial effects to bald eagles. The delay in providing these beneficial effects is likely to result in only minor effects to bald eagles given the relatively short period of time (four to five years) involved.

Gray Wolf

[8] For a full description of these services see Stratus (2000) on page 1-26 and Chapter 10.

USEPA (2002) evaluated the nature and extent to which mining-related hazardous substances present risks to ecological receptors within the Coeur d'Alene Basin based on the weight-of-evidence analyses. No risks to gray wolf were identified (USEPA 2001). Therefore, alternative B would neither positively nor negatively affect gray wolf.

Canada Lynx

USEPA (2002) evaluated the nature and extent to which mining-related hazardous substances present risks to ecological receptors within the Coeur d'Alene Basin based on the weight-of-evidence analyses. The estimated exposure did not exceed the lowest observable adverse effects level or the effective dose (20 percent response) for any chemical of potential ecological concern in any area. No risks to Canada lynx were identified in any area of the Basin (USEPA 2001). Therefore, alternative B would have neither positive nor negative effects on Canada lynx.

Bull Trout

According to Stratus (2000), a comparison of water quality data with toxicological effects thresholds indicates that fish are injured by metals in the Coeur d'Alene River Basin (Stratus 2000). Since water quality data and sediment data did not indicate that toxic substances were declining (Stratus 2000), alternative B would have the same effects to bull trout as the No Action alternative over the next four to five years. In addition, the public would not be compensated for the injury or the interim losses of this fishery resource, at this time, if alternative B were implemented. Delaying restoration would delay these beneficial effects to fisheries. The delay in providing these beneficial effects is likely to result in only minor effects to bull trout given the relatively short period of time (four to five years) involved.

Spalding's Catchfly

Spalding's catchfly is not generally found within the contaminated portions of the Coeur d'Alene Basin, therefore alternative B would neither positively nor negatively impact Spalding's catchfly populations.

Water Howellia

Water howellia is not generally found within the contaminated portions of the Coeur d'Alene Basin; therefore alternative B would neither positively nor negatively impact water howellia populations.

4.3.3.1. Candidate Species

Yellow-billed Cuckoo

Yellow-billed cuckoo is not generally found within the contaminated portions of the Coeur d'Alene Basin, and therefore, alternative B would neither positively nor negatively impact yellow-billed cuckoo populations.

Slender Moonwort

Slender moonwort is not generally found within the contaminated portions of the Coeur d'Alene Basin, and therefore alternative B would neither positively nor negatively impact slender moonwort populations.

4.3.4. Cultural Resources

If alternative B were selected, then injured resources would not begin to have active restoration within the next four to five years . To the Tribe, restoration is necessary to support their injured resources (Alfred Nomee pers. com. 2007), and alternative B would not meet the Tribe's goals for restoration for the next four to five years. The Tribe values all the natural resources in the Basin, including those found to be injured by the Courts, and considers many resources in the Basin to be culturally important including, for example: cutthroat trout, mountain whitefish, muskrat, beaver, deer, water potato, huckleberries, and camas (Jill Wagner, pers. com. 2007). Many of these cultural resources play prominent roles in ceremonies and creation stories. Restoration of injured resources could also indirectly benefit or effect culturally important natural resources. In the near-term, alternative B would not restore habitats that support culturally important species and would not partly address the Tribe's injured resources. The delay in providing these beneficial effects is likely

to result in only minor effects to cultural resources given the relatively short period of time (four to five years) involved.

4.3.5. Cumulative Impacts

Cumulative effects are defined as those effects that result from the incremental impacts of the proposed action when added to other past, present, and future activities that are reasonably certain to occur within the project area. The Trustees must determine whether impacts of the alternatives, when taken together with other actions, would result in a significant environmental impact.

There have been and continue to be negative impacts from past and current activities in proposed project areas; including impacts caused by mining, forestry, ranching and development. These activities have altered function for habitats and those species utilizing the proposed project areas (GEI consultants 2004; Stratus, 2000; USEPA, 2001). Impacts range from simple habitat modification to severe degradation of habitat function as described in the Section 3 of this EA.

To address mining-related hazardous substances, remedial activities are occurring in the Coeur d'Alene Basin consistent with USEPA's RODs (USEPA 1991, 1992, and 2002). In 1983, the U.S. Environmental Protection Agency (USEPA) listed the Bunker Hill Mining and Metallurgical Complex Superfund facility on the National Priorities List (NPL) in response to human health risks associated with mining-related metals contamination in the 21 square-mile area around the former Bunker Hill smelter, known as the "Box." The facility includes mining-contaminated areas in the Coeur d'Alene River corridor, adjacent floodplains, downstream water bodies, tributaries, and fill areas, as well as the 21-square mile "Box" (USEPA 2002). A ROD was signed for the populated areas of Bunker Hill Box (OU1) in 1991 (USEPA 1991), and a ROD was signed for the non-populated areas of the Box (OU2) in 1992 (USEPA 1992). In 2002, USEPA issued an interim ROD for Basin OU-3, specifying thirty-years of remedial actions in Basin areas upstream and downstream of Coeur d'Alene Lake at an estimated cost of $359 million.[9]

[9] EPA did not select remedial actions for Coeur d'Alene Lake, deferring to the Coeur d'Alene Indian Tribe and the State of Idaho to develop and implement an updated lake management plan to monitor and address metals contaminated sediments in Coeur d'Alene Lake (USEPA 2002; Ridolfi and Falter 2004).

USEPA's cleanup plan focuses on source control and removal actions in these areas to reduce human and ecological resource exposures to mining contamination, particularly lead in soil and sediment, and dissolved zinc and cadmium, and particulate lead in surface waters. USEPA's cleanup actions may include surface water treatment to remove excess arsenic, cadmium, lead, manganese, and mercury; excavation and removal of contaminated soils, permanent capping of contaminated areas; and/or reducing surface metal concentrations through surface-subsurface mixing.

Ongoing remedial activities undertaken by EPA and other agencies to reduce the amount of mining-related hazardous substances available for uptake and transport in the Basin such as the implementation of USEPA's RODs (USEPA 1991, 1992, and 2002) would positively impact the natural resources in the Coeur d'Alene Basin. The USEPA reported their 1995 to 2004 accomplishments in the Basin in two reports (USEPA 2000; USEPA 2005). These accomplishments have been substantial, though a significant amount of work remains at this complex site to meet the goals stated in EPA's RODs. The EPA's remedial work began in areas with the greatest concern for human health exposure from mine waste; and the OU3 ecological remedial actions have not yet been implemented (USEPA 2005). Under alternative B, restoration actions would be delayed for four to five years, so the cumulative effects during that period would be similar to the No Action alternative, namely there would be no cumulative effects. Once actions begin to be implemented under a FFRP, they would add to the beneficial effects produced by the implementation of the RODs. The Trustees can not evaluate the specific additive effects at this time, because the extent of the restoration actions under a FFRP are currently unknown. Such an evaluation would be possible once there is a settlement or litigation result from the pending litigation with the remaining defendants. The Trustee would then complete restoration consistent with the available funding.

The adverse environmental effects of implementing actions identified by EPA RODs (USEPA 1991, 1992 and 2002) are those associated with on-going exposure of the Basins resources to mining-related hazardous substances. Alternative B would have no "significant" additive influence on levels of mining-related hazardous substances in the Basin at this time.

4.3.6. Project Costs and Opportunities

It is not possible to put forth a set of projects for alternative B at this time, because the Trustees do not know how much funding may become available as a result of settlements or the resolution of litigation with the remaining defendants. However, it is clear that simply due to inflation, a four- to five-year delay would increase restoration costs for projects within the preferred alternative or any other proposed projects. For example, if restoration projects costing $1 million dollars were undertaken in 2007; these same projects would costs approximately $ 1,125,500 dollars if undertaken in 2011 (assuming a three percent annually compounded inflation rate). This suggests that restoration proposed to be done now, and over the next few years, would cost less than projects that began in four to five years and then extended and additional four or five years beyond that time.

Delaying restoration would mean the loss of certain current funding and coordination opportunities. For the next few years, the Federal Trustees can request funds on a reimbursable basis from the ASARCO Environmental Trust Fund for projects that restore injured natural resources in the Coeur d'Alene Basin. Delaying four to five years would mean the loss of this substantial opportunity to bring additional funds to the Basin for NRDA-related restoration. Current opportunities to coordinate restoration with USEPA's remedial actions and current cost share opportunities would be lost.

4.4. Alternative C: Proposed Action

The preferred alternative will be evaluated by analyzing the effects of the projects that comprise the proposed action. A summary of environmental consequences is presented in Table 4.

4.4.1. East Fork Moon Creek Monitoring

Nature of the Effects: The effects of the East Fork Moon Creek Monitoring project would be those associated with data collection. For a more complete project description see Section 2.5.1. East Fork Moon Creek is the site of a removal action at an abandoned mine and mill site and monitoring is intended to ensure that surface water quality is improving. This project would contribute to on-going monitoring of the results of the mine and mill site restoration. The activities, either directly or indirectly, would not increase the exposure of humans or any natural resource to hazardous

substances. Surface water quality has been monitored in the past and would continue to be monitored. Any changes in water quality, such as increase in suspended sediments associated with fish or fish habitat sampling, or establishing or collecting cross-sectional/longitudinal profile data would be negligible. Monitoring is intended to ensure that soils and sediments are stabilizing. Soils and sediment would not be directly monitored, but habitat and cross-section monitoring may indicate if sediment conditions within the Creek are improving.

Monitoring is intended to ensure that riparian resources are improving and riparian vegetation would be directly monitored. No significant adverse effects to riparian resources are anticipated. Monitoring is intended to ensure that fisheries in the East Fork of Moon Creek are improving. Fish tissue (for contaminant levels) and fish populations would be monitored. Blood lead levels in songbirds would be monitored. Disturbance to fish and wildlife populations due to sampling would be minimal and would be guided by Idaho Department of Fish and Game collection permits. Monitoring is intended to ensure that habitat quality is sufficient to support benthic macroinvertebrates. Macroinvertebrates would not be directly sampled, but monitoring related to stream channel stability would indicate benthic macroinvertebrate habitat quality. Benthic macroinvertebrates may be impacted by trampling during sampling; sampling efforts would focus on a small segment of stream affected so populations would not be significantly impacted. While the resources listed would not improve directly as a result of monitoring, indirect improvements could result if monitoring results indicates that further actions are needed and this information leads to further restoration or helps to design effective restoration elsewhere in the Basin.

Extent of the Effects: The extent of the monitoring would be similar to the extent of the restoration project, though would extend to adjacent up- and downstream reaches. The restored section is 20 acres and 3300 ft of East Fork Moon Creek; the total area monitored would be a small portion of the stream and watershed. Individual fish, wildlife or benthic invertebrates may be impacted by sampling, though the numbers of these individuals impacted would be small in comparison to typical local populations.

Duration of the Effects: Sampling would occur over a 5-year period; collection permits would ensure that collections do not interfere to the degree practicable with sensitive life stages of fish or

wildlife, and that numbers collected do not affect the population as a whole. The sampling itself would of short-duration (for example, a few weeks at one time over a few months).

Site Sensitivity: The project site is not a sensitive location. Over 130,000 cubic yards of material contaminated with lead, arsenic, copper and mercury were moved from this site to an on-site capped repository. The natural resources at the site have already been severely impacted by minerals activities.

Conclusion: East Fork Moon Creek monitoring activities would cause negligible impacts to the human resources of the area. There would be no direct improvements to the resources as a result of monitoring, but there may be indirect beneficial effects if monitoring results are used to correct problems at the site; or are used to suggest improved restoration techniques elsewhere in the Basin. The direct, indirect, adverse and beneficial effects would not be "significant" because they would not affect public health; they would not produce impacts to unique characteristics of the area; and the effects would not be precedent setting, controversial, unique, or uncertain.

4.4.2. Sherlock Creek Restoration

Nature of the Effects: The effects of the Sherlock Creek Restoration Project would be those associated with stream channel and floodplain reconstruction, as well as revegetation of the site. For a more complete project description see Section 2.5.2. The activities would not, either directly or indirectly, increase the exposure of humans or natural resources to hazardous substances. The project would promote increased water quality in Sherlock Creek. The project would also address stream instability caused by channel straightening and would reconstruct a functioning floodplain. These activities would promote functional wetland soils and decrease instream fine sediments in the long-term. Stabilizing the stream and reconstructing the floodplain would improve riparian resources impacted by past activities. Disturbance of the stream channel and riparian zone during restoration activities could lead to increased suspended sediment in the short-term. Such increases are expected to be minor and would comply with applicable water quality standards. Disturbed riparian area vegetation would be replanted as part of the restoration.

The stream and floodplain improvements would indirectly support local fisheries by improving the quality of their habitat. The restoration of the floodplain would support the growth and survival of riparian-dependent, forest-associated wildlife by improving their habitat. Disturbance to fish and wildlife populations from construction equipment operating in or near stream channels would be minimized by complying with in-channel work windows. These activities would promote increased benthic macroinvertebrate production by improving the quality of their habitat. Benthic macroinvertebrates may be impacted by trampling during construction activities, though the impacts to the populations would be minimal due to the limited stream section involved.

Extent of the Effects: Sherlock Creek is estimated to include of 19 total miles of stream habitat. The section that would be restored is 20 acres of riparian habitat and one mile of Sherlock Creek; this is a small portion of the total stream miles. Individual fish, wildlife, or benthic macroinvertebrates may be impacted by restoration activities, , though the numbers of these individuals impacted would be small in comparison to typical local populations.

Duration of the Effects: Construction would occur over a 2-year period; instream construction would be limited by instream work windows to ensure that construction activities do not interfere with sensitive life stages of fish or wildlife. Increased suspended sediment due to disturbance of the stream channel would be of short duration with the ultimate goal of a long-term reduction in suspended sediment. Short duration means: during the construction activities, for a few days after construction, and possibly during the first few seasonal high flow events following construction.

Site Sensitivity: Because this site is already severely disturbed, construction actions would not add significantly to these degraded conditions. In the broader context, Sherlock Creek is within a roadless area and bull trout are known to spawn below this site. Restoration of this site will alleviate a local disturbance in a broader watershed area that is generally intact. These restoration actions would result in more natural stream and riparian conditions which would benefit fish and other riparian-dependent species.

Conclusion: Sherlock Creek Restoration activities (e.g., stream channel construction or revegetation) activities are expected to cause only minor negative effects to the natural resources of the area considering their nature, extent, and duration; and considering the sensitivity of the site.

There would be direct improvements in some of the resources (water quality, sediment, riparian resources); and indirect improvement in others (fish and benthic macroinvertebrates); these improvements would contribute to replacement of the resources injured and the associated services lost due to mining in the Coeur d'Alene Basin. The direct, indirect, adverse and beneficial effects would not be "significant" because they would not affect public health; they would not produce impacts to unique characteristics of the area; and the effects would not be precedent setting, controversial, unique, or uncertain.

4.4.3. Pine Creek Restoration

Nature of the Effects: The effects of the Pine Creek Restoration project would be those associated with several stream channel, riparian zone, and off-channel sediment source control activities. For a more complete project description see Section 2.5.3. These activities are intended to complement other completed activities by revegetating and reducing erosion on sites where contaminated materials have been removed. Therefore, there would be no significant increase in the exposure of humans or natural resources to hazardous substances. The project would address some aspects of water quality in Pine Creek (i.e., suspended sediment and water temperature). The project activities would contribute to addressing stream instability due to increased bedload caused by watershed and riparian zone disturbance, and riparian zone harvesting. Increased stream width due to aggradation of stream bed sediments would be partly addressed by this project. Restoration activities may cause short-term disturbance of the stream channel and riparian zone leading to increased suspended sediment. Such increases would comply with applicable water quality standards. Revegetation and stabilizing the stream channel would improve degraded riparian resources. Disturbed riparian area vegetation would be rehabilitated as part of the restoration.

The increased stream channel stability and improved riparian conditions would promote the health of local fisheries. Riparian-dependent wildlife would be improved by this restoration project by improving their habitat quality. Disturbance to fish and wildlife populations from construction equipment operating in or near stream channels would be minimized by complying with established in-channel work windows. Because the project would contribute to stream channel stability and riparian function, it would improve benthic macroinvertebrate habitat quality.

Extent of the Effects: Pine Creek is estimated to include 165 total miles of stream habitat and has a watershed area of 50,560 acres. Restoration within the Pine Creek watershed would encompass various discrete reaches of stream within an overall stream length of approximately 13.6 stream miles. The activities would encompass a small portion of the stream channel. The types of water quality impacts from restoration activities would include disturbance of the stream channel leading to increased suspended sediment. Such increases would be limited by applicable water quality standards. Individual fish, wildlife or benthic macroinvertebrates may be impacted by restoration activities, though the numbers of these individuals would be small in comparison to typical local populations.

Duration of the Effects: Construction would occur over a two to three year period; instream construction would be limited by established instream work windows to ensure that construction activities do not interfere with sensitive life stages of fish or wildlife. Increased suspended sediment due to disturbance of the stream channel would be of short duration with the ultimate goal of a long-term reduction in suspended sediment. Short duration means: during the construction activities, for a few days after construction, and possibly during the first few seasonal high flow events following construction.

Site Sensitivity: According to Kondolf and Matthews (1996) channel instabliltiy in the East and West Forks of Pine Creek was the result of decreased bank and floodplain stability due to the loss of the floodplain forest, increased sediment load, and a number of large flow events in the last fifty years. Based on aerial photo interpretation, many stream reaches of Pine Creek have a 50 percent increase in stream channel width. Exceedance of federal water quality standards have been observed in East Fork and mainstem Pine Creek from the Constitution Upper Mill to the mouth. Concentrations of hazardous substances in surface water of Pine creek downstream of mine and mill sites are sufficient to cause acute mortality to trout (Stratus 2000). Trout and other aquatic species exist in stream channels in West Fork Pine Creek and above mine sites in East Fork and mainstem Pine Creek.

Conclusion: Pine Creek Restoration activities (e.g., stabilizing off-channel sediment sources, installing barbs, and anchor points to re-direct flow, armoring stream banks, revegetating riparian zones) are expected to cause only minor negative effects to the natural resources of the area

considering their nature, extent, and duration; and considering the sensitivity of the site.. There would be direct improvement in some natural resources (i.e., water quality, sediments, riparian resources) and indirect improvements in others (i.e., fish and benthic macroinvertebrates); these improvements contribute to replacement of the resources injured and the associated services lost due to mining in the Coeur d'Alene Basin. The direct, indirect, adverse and beneficial effects would not be "significant" because they would not affect public health; they would not produce impacts to unique characteristics of the area; and the effects would not be precedent setting, controversial, unique, or uncertain.

4.4.4. Alder Creek Restoration

Nature of the Effects: The effects of the Alder Creek Restoration project would be those associated with stream channel reconstruction to halt incisions, installing stream grade control structures, reshaping banks, construction of off-channel water storage/flood areas, as well as revegetation. For a more complete project description see Section 2.5.4. The activities would not, either directly or indirectly, increase the exposure of natural resources to hazardous substances. The project would promote increased water quality in Alder Creek (i.e., reduced suspended sediment) over the long-term. The project would contribute to addressing stream instability which has caused the stream to become incised within its channel. Increased mobilization of bed sediments due to downcutting would be reduced by this project. Disturbance of the stream channel and riparian zone during restoration activities could lead to increased suspended sediment in the short-term. Such increases are expected to be minor and would comply with applicable water quality standards. Revegetation and stabilizing the stream channel would promote increased quality of riparian resources. Disturbed riparian area vegetation would be rehabilitated as part of the restoration.

Increased stream channel stability and improvement in riparian conditions would promote local fisheries by improving their habitat. The restoration of the stream channel and riparian zone would support the growth and survival of riparian-dependent, forest-associated wildlife by improving their habitat. Disturbance to fish and wildlife populations from construction equipment operating in or near stream channels would be minimized by complying with established inchannel work windows. The project would contribute to improving stream stability and riparian function. These activities would support benthic macroinvertebrate production by improving the quality of their habitat.

Benthic macroinvertebrates may be impacted by trampling during construction activities, though the impacts to the populations would not be small due to the limited stream sections involved.

Extent of the Effects: Alder Creek is estimated to include approximately 70 total miles of stream habitat and the watershed area is 17,286 acres. The project would include purchase of approximately 142 acres of high priority habitat, restoration of approximately one stream mile, reshaping 2, 468 linear feet of streambank and revegetation of approximately 49 acres. This is a small portion of the total stream miles. Individual fish, wildlife or benthic macroinvertebrates may be impacted by restoration activities, though the numbers of these individuals would be small in comparison to typical local populations.

Duration of the Effects: Construction in Alder Creek would occur over a two to three year period; instream construction would be limited by established instream work windows to ensure that construction activities do not interfere with sensitive life stages of fish or wildlife. Increased suspended sediment due to disturbance of the stream channel would be of short duration with the ultimate goal of a long-term reduction in suspended sediment. Short duration means: during the construction activities, for a few days after construction and possibly during the first few seasonal high flow event following construction.

Site Sensitivity: Alder Creek has been impacted by human activities such as livestock grazing and timber harvest. Cutthroat trout densities are low to moderate according to Vitale et al. (2002, unpublished report) and these projects are intended to address local microhabitat issues to improve populations within the larger watershed area.

Conclusion: The Alder Creek Restoration activities (e.g., channel reconstruction, installation of stream grade control structures, construction of off-channel water storage/flood areas, or revegetation) are expected to cause only minor negative effects to the natural resources of the area considering their nature, extent, and duration; and considering the sensitivity of the site. There would be direct improvements in some of the resources (water quality, sediments, riparian resources) and indirect improvements in others (fish, benthic macroinvertebrates); these improvements would contribute to replacement of the resources injured and the associated services lost due to mining in the Coeur d'Alene Basin. The direct, indirect, adverse and beneficial effects

would not be “significant” because they would not affect public health; they would not produce impacts to unique characteristics of the area; and the effects would not be precedent setting, controversial, unique, or uncertain.

4.4.5. Benewah Creek Restoration

Nature of the Effects: The effects of the Benewah Creek Restoration project would be those associated with stream channel surveys, stream channel reconstruction to halt incisions, installing stream grade control structures, as well as revegetation. For a more complete project description see Section 2.5.5. The activities would not, either directly or indirectly, increase the exposure of humans or natural resources to hazardous substances. The project would promote increased water quality in Benewah Creek (i.e., reduced suspended sediment). The project would address stream instability which has caused the stream to become incised within its channel. Mobilization of bed sediments due to downcutting would be decreased by this project in the long-term. The construction activities could cause short-term disturbance of the stream channel and riparian zone leading to increased suspended sediment. Such increases would comply with applicable water quality standards. Revegetation and stabilizing the stream channel would improve riparian resource conditions. Disturbed riparian area vegetation would be rehabilitated as part of the restoration.

Increased stream channel stability and improvement in riparian conditions would promote local fisheries by increasing the quality of their habitat. The restoration of the riparian areas would support the growth and survival of riparian-dependent, forest-associated wildlife by improving their habitat. Disturbance to fish and wildlife populations from construction equipment operating in or near stream channels would be minimized by complying with established inchannel work windows. The project would contribute to stream stability and riparian function. These activities would promote improved benthic macroinvertebrate production by increasing the quality of their habitat. Benthic macroinvertebrates may be impacted by trampling during construction or survey activities, though impacts to populations would be minimal due to the limited stream sections involved.

Extent of the Effects: Benewah Creek is estimated to include approximately 135 total miles of stream habitat and the watershed area is estimated to be 33,789 acres. The project includes purchase of 1, 531 acres of high priority restoration areas, reconstruction of approximately 2.9 miles

of stream and revegetation of 114 acres. Surveys would be done on approximately 10.7 miles of stream. These activities would encompass a small portion of the total stream miles. Individual fish, wildlife or benthic macroinvertebrates may be impacted by restoration activities, though the numbers of these individuals would be small in comparison to typical local populations.

Duration of the Effects: Construction within the Benewah Creek Restoration project would occur over a two to three year period; instream construction would be limited by established instream work windows to ensure that construction activities do not interfere with sensitive life stages of fish or wildlife. Increased suspended sediment due to disturbance of the stream channel would be of short duration with the ultimate goal of a long-term reduction in suspended sediment. Short duration means: during the construction activities, for a few days after construction, and possibly during the first few seasonal high flow events following construction. Stream survey of habitat quality would be of short-duration (for example, each section being affected for a few days over a few months).

Site Sensitivity: Benewah Creek has been impacted by human activities such as livestock grazing and timber harvest. Cutthroat trough densities are moderate to high according to Vitale et al. (2002, unpublished report). Some higher quality areas within Benewah Creek were identified and this restoration project is intended to begin to improve fish populations by building on the higher quality areas within the watershed.

Conclusion: Benewah Creek Restoration activities (e.g., stream channel surveys, stream channel reconstruction, installing stream grade control structures, or revegetation) are expected to cause only minor impacts to the natural resources in the area considering their nature, extent, duration; and considering the sensitivity of the site. There would be direct improvements in some of the resources (water quality, sediment, and riparian resources) and indirect improvements in others (fish and benthic macroinvertebrates); these improvements would contribute to replacement of the resources injured and the associated services lost due to mining in the Coeur d'Alene Basin. The direct, indirect, adverse and beneficial effects would not be "significant" because they would not affect public health; they would not produce impacts to unique characteristics of the area; and the effects would not be precedent setting, controversial, unique, or uncertain.

4.4.6. Hepton Lake Restoration

Nature of the Effects: The effects of the Hepton Lake Restoration project would be those associated with installing water control structures, controlling noxious weeds and creation of a diverse assemblage of wetland plants, and fence removal and construction. See Section 2.5.6 for a more complete project description. Creating clean functioning wetlands, would contribute to improved surface water quality, soils and sediments. The project is intended to bring about a diverse assemblage of wetland plants, creating a functional wetland community. Riparian resources would directly be improved by these restoration activities within the project area. Enhancement of the wetlands may improve the area for fisheries, though this aspect of the project is yet to be determined and would depend on ultimate design of the hydrology of the wetland. Any adverse impacts to natural resources due to the application of chemicals to control noxious weeds would be minimized by using personnel that are certified herbicide chemical applicators, by following all label instructions, by using the minimum amount of chemical to treat the problem, and by spot treating areas where spraying might lead to the chemical entering stream channels. The wetland habitat within Hepton Lake is being restored to improve habitat conditions for Tundra swans. Other riparian-dependent wildlife would also benefit from this restoration project.

Extent of the Effects: Restoration of Hepton Lake would encompass approximately 1,350 acres out of an estimated area of 19,200 acres of floodplain habitat in the lower Coeur d'Alene Basin. Individual fish, wildlife, plants or benthic macroinvertebrates may be impacted by restoration activities, though the numbers of these individuals would be insignificant in the context of the total local populations.

Duration of the Effects: Wetland creation would occur over a three to four year period . Noxious weed control would occur periodically on an on-going basis as needed. The long-term effects of this wetland enhancement project would be beneficial to the wetland-associated resources in the area.

Site Sensitivity: Hepton Lake is not a sensitive area as it is a flooded agricultural field. The area does not have high levels of hazardous mining-related materials, so it is an important wetland area in the lower Basin for providing clean feeding habitat for waterfowl.

Conclusion: Hepton Lake restoration activities (e.g., installing water control structures, controlling noxious weeds, removing and building fences, and revegetation) are expected to cause only minor negative impacts to the natural resources in the area considering their nature, extent, duration; and considering the sensitivity of the site. There would be direct improvements in some of the resources (riparian resources), and indirect improvement in others (Tundra swans, and possibly fish and benthic macroinvertebrates); these improvements would contribute to replacement of the resources injured and the associated services lost due to mining in the Coeur d'Alene Basin. The direct, indirect, adverse and beneficial effects would not be "significant" because they would not affect public health; they would not produce impacts to unique characteristics of the area; and the effects would not be precedent setting, controversial, unique, or uncertain.

4.4.7. Wetland-Based Restoration Projects

Nature of the Effects: The goal of Wetland-Based Restoration projects conducted in the Basin would be the reduction of Tundra swan year losses due to reduced lead-related mortality. Proposed activities include the acquisition and/or restoration of resources associated with injured wetlands, restoring wetland structure, function, and services to Tundra swans. For a more complete project description see Section 2.5.7. Preservation would be obtained through fee title or land conservation agreement purchase. Wetland reestablishment efforts would be focused on areas where hydrological alterations or other modifications have destroyed or impaired former wetland habitat. Primary strategies may include, but not be limited to, low impact techniques such as: closing off/filling drainage ditches, disrupting (or not repairing) drain tile systems, constructing flap gates to limit river-caused flooding, and reestablishing wetland plants and other native vegetation in order to reestablish historic natural characteristics.

The effects of the Wetland-based Restoration projects would be those associated with installing and operating water control structures, controlling noxious weeds and creation of a diverse assemblage of wetland plants. Contributions to improvement in surface water quality would occur through creation of clean functioning wetlands. Wetlands would be created or enhanced where lead levels are below those known to effect waterfowl (530 ppm).

Water control structures would avoid adverse effects to fisheries through screening or other means as recommended by appropriate entities. Construction of water control structures would result in minor effects to streams as established instream work windows would be used and applicable water quality standards would be met. Any adverse impacts to natural resources due to the application of chemicals to control noxious weeds would be minimized by using personnel that are certified herbicide chemical applicators, by following all label instructions, by using the minimum amount of chemical to treat the problem, and by spot treating areas where spraying might lead to the chemical entering stream channels.

Extent of the Effects: Wetland-Based Restoration projects could affect an estimated 1,500 to 3,000 acres (based on the estimated acres in Section 2.5.7.). Individual fish, wildlife, plants or benthic macroinvertebrates may be impacted by restoration activities, though the numbers of these individuals would be insignificant in the context of the total local populations. The beneficial and adverse impacts are limited to the scope of the project area, which is estimated to be between 10 to 30 percent of the 19,200 acres of floodplain habitat in the lower Coeur d'Alene Basin.

Duration of the Effects: Any particular wetland that would be restored would be completed over a two to three year period. Noxious weed control would occur periodically on an on-going basis as needed. The long-term effects of the restoration projects would be beneficial.

Site Sensitivity: Because the locations are not precisely known, it is not possible to evaluate whether sensitive areas would be affected. This would be evaluated on a case-by-case basis and if sensitive locations are chosen, appropriate levels of NEPA, and other assessments such as CWA section 404 permit requirements would be completed.

Conclusion: Wetland-Based Restoration activities are expected to cause only minor negative effects to the natural resources in the area considering their nature, extent and duration; site sensitivity will have to be determined on a case-by-case basis. There would be direct improvements in some of the resources (riparian resources), and indirect improvement in others (Tundra swans, and possibly fish and benthic macroinvertebrates); these improvements would contribute to replacement of the resources injured and the associated services lost due to mining in the Coeur d'Alene Basin. The direct, indirect, adverse and beneficial effects would not be "significant" because they would not

affect public health; they would not produce impacts to unique characteristics of the area; and the effects would not be precedent setting, controversial, unique, or uncertain.

4.4.8. Threatened, Endangered and Candidate Species

Bald Eagle

Bald eagles would benefit at least indirectly from interim proposed actions, though not significantly. Improvement of the habitat quality in clean wetland areas, and improvements in fish populations would improve habitat and food sources for bald eagles.

Gray Wolf

The gray wolf would be neither negatively nor positively affected by any of interim proposed actions. Gray wolves use and require older, mature forests as habitat. This habitat type is not a part of the Trustees' restoration strategy. Furthermore, no gray wolves are known to occupy a territory within the Coeur d'Alene Basin.

Canada Lynx

The Canada lynx would be neither negatively nor positively affected by any of the interim proposed actions in the preferred alternative. Canada lynx utilize and require older, mature forests as habitat. This habitat type is not being restored or affected by the interim proposed action.

Bull Trout

Bull trout and their habitat would benefit from some of the interim proposed actions. Sherlock Creek restoration would implement restoration in a stream identified as a priority restoration area by the Draft Bull Trout Recovery Plan (USFWS 2002). The Sherlock Creek project would reduce the amount of instream fine sediment available for transport to downstream spawning areas. Due to the limited extent of the restoration, the reductions in sediment would not be minor. Collectively, the stream and riparian interim restoration projects would improve bull trout spawning, rearing,

migration, and overwintering habitat. The direct and indirect impacts from the proposed interim restoration plan would be beneficial though, they would not be "significant", because they would not affect public health; they would not produce impacts to unique characteristics of the area; and the effects would not be precedent setting, controversial, unique, or uncertain. Any activities conducted in areas that could affect bull trout would comply with instream and disturbance windows specified for bull trout.

Areas targeted for wetland restoration/enhancement activities would be physically separated from the Coeur d'Alene River because of potential recontamination through flooding and deposition of contaminated river sediment. These activities themselves, therefore, would have no direct effect on bull trout.

Spalding's Catchfly

Spalding's catchfly is not generally found within the project areas therefore, the preferred alternative would neither positively nor negatively impact Spalding's catchfly populations.

Water Howellia

Water howellia is not generally found within the project areas therefore, the preferred alternative would neither positively nor negatively impact water howellia populations.

4.4.8.1. Candidate Species

Yellow-billed Cuckoo

Yellow-billed cuckoo is not generally found within the contaminated portions of the Coeur d'Alene Basin therefore, the preferred alternative would neither positively nor negatively impact yellow-billed cuckoo populations.

Slender Moonwort

Slender moonwort is not generally found within the contaminated portions of the Coeur d'Alene Basin therefore, the preferred alternative would neither positively nor negatively impact slender moonwort populations.

4.4.9. Cultural Resources

Prior to implementing any of the proposed activities, consultation with State and Tribal historic preservation offices would be conducted if the preferred alternative is selected. All project sites would comply the Archaeological Resource Protection Act [16 U.S.C. §§ 470, et seq.], Section 106 of the National Historic Preservation Act as described in [36 CFR 800], and the Native American Graves Protection and Repatriation Action, 1990 (applicable to Federal lands) to protect any archaeological or cultural resources that might be on the sites. These actions would ensure the preservation of any archeological, cultural, and historic resources that have appreciable cultural value to the Coeur d'Alene Indian Tribe or the public.

To the Tribe, restoration is necessary to support the cultural resources of the Tribe (Alfred Nomee pers. com. 2007). Restoration of surface water, wetlands, riparian habitat and other injured resources would also improve habitat that supports other Tribal trust resources that have cultural and religious importance for the tribe; including for example: cutthroat trout, mountain whitefish , muskrat beaver, deer, water potato, huckleberries, and camas (Jill Wagner and Quanah Matheson, pers.com. 2007). Many of these cultural resources play prominent roles in ceremonies and creation stories.

4.4.10. Cumulative Impacts

Cumulative effects are defined as those effects that result from the incremental impacts of the proposed action when added to other past, present, and future activities that are reasonably certain to occur within the project area. The Trustees must determine whether impacts of the proposed action, when taken together with other actions, would result in a significant environmental impact.

There have been and continue to be negative impacts from past and current activities in proposed project areas; including impacts caused by mining, forestry, ranching and development. These

activities have altered function for habitats and those species utilizing the proposed project areas (GEI consultants 2004; Stratus, 2000; USEPA, 2001). Impacts range from simple habitat modification to severe degradation of habitat function as described in the Section 3.

To address mining-related hazardous substances, remedial activities are occurring in the Coeur d'Alene Basin consistent with USEPA's RODs (USEPA 1991, 1992, and 2002). In 1983, the U.S. Environmental Protection Agency (USEPA) listed the Bunker Hill Mining and Metallurgical Complex Superfund facility on the National Priorities List (NPL) in response to human health risks associated with mining-related metals contamination in the 21 square-mile area around the former Bunker Hill smelter, known as the "Box." The facility includes mining-contaminated areas in the Coeur d'Alene River corridor, adjacent floodplains, downstream water bodies, tributaries, and fill areas, as well as the 21-square mile "Box" (USEPA 2002). A ROD was signed for the populated areas of Bunker Hill Box (OU1) in 1991 (USEPA 1991), and a ROD was signed for the non-populated areas of the Box (OU2) in 1992 (USEPA 1992). In 2002, USEPA issued an interim ROD for Basin OU-3, specifying thirty-years of remedial actions in Basin areas upstream and downstream of Coeur d'Alene Lake at an estimated cost of $359 million.[10]

USEPA's cleanup plan focuses on source control and removal actions in these areas to reduce human and ecological resource exposures to mining contamination, particularly lead in soil and sediment, and dissolved zinc and cadmium, and particulate lead in surface waters. USEPA's cleanup actions may include surface water treatment to remove excess arsenic, cadmium, lead, manganese, and mercury; excavation and removal of contaminated soils, permanent capping of contaminated areas; and/or reducing surface metal concentrations through surface-subsurface mixing.

Ongoing remedial activities undertaken by EPA and other agencies to reduce the amount of mining-related hazardous substances available for uptake and transport in the Basin such as the implementation of USEPA's RODs (USEPA 1991, 1992, and 2002) would positively impact the

[10] EPA did not select remedial actions for Coeur d'Alene Lake, deferring to the Coeur d'Alene Indian Tribe and the State of Idaho to develop and implement an updated lake management plan to monitor and address metals contaminated sediments in Coeur d'Alene Lake (USEPA 2002; Ridolfi and Falter 2004).

natural resources in the Coeur d'Alene Basin. The USEPA reported their 1995 to 2004 accomplishments in the Basin in two reports (USEPA 2000; USEPA 2005). These accomplishments have been substantial, though a significant amount of work remains at this complex site to meet the goals stated in EPA's RODs. The EPA's remedial work began in areas with the greatest concern for human health exposure from mine waste; and the OU3 ecological remedial actions have not yet been implemented (USEPA 2005). The Trustee's interim restoration activities would add to the beneficial effects produced by the implementation of the RODs, though the effects of these contributions would not be "significant" at this time. The interim plan includes a limited amount of restoration, a future comprehensive restoration effort undertaken by the Trustee would likely have a high level of beneficial effects. Such restoration would be possible if the Trustees obtain substantial settlements for natural resource damages with the remaining defendants found to be liable for certain natural resource injuries in the Basin.

The adverse environmental effects of implementing actions identified by EPA RODs (USEPA 1991, 1992 and 2002) are those associated with on-going exposure of the Basins resources to mining-related hazardous substances. The proposed action would have no "significant" additive influence on levels of mining-related hazardous substances in the Basin.

4.4.11. Project Costs and Opportunities

The approximate costs of the proposed projects in alternative C, are provided in Table 1. The dollar amounts associated with each project are estimates and, by consensus, the Trustees may allocate more or less funding to a particular project based on factors such as cost share opportunities, the availability of funding from other sources, or future settlements with remaining defendants. The estimated cumulative total costs for all the projects in alternative C would be approximately $4 million. The Trustees did not plan to spend the entire amount available ($5M) from previous settlements, at this time, so that the Trustees could maintain some spending flexibility and the ability to take advantage of future cost-sharing opportunities that may become available as a result of resolving the pending litigation.

Implementation of the proposed projects in alternative C would result in a cost advantage for the Trustees for three reasons. First, for the next few years, the Federal Trustees can request funds on a

reimbursable basis from the ASARCO Environmental Trust Fund for project that restore injured natural resources in the Coeur d'Alene Basin. This is a substantial opportunity to bring additional funds to the Basin for NRDA-related restoration. Second, the proposed projects would take advantage of current opportunities to coordinate restoration with USEPA's remedial actions. Such coordination would lower overall restoration costs. For example, cost would be lower for reestablishing native vegetation communities before noxious weeds become established and need treating; or erosion lowers soil productivity and fertilization is required. Third, the proposed projects would take advantage of current cost share opportunities, thereby lowering the amount of funds the Trustees would need to spend to accomplish restoration.

Table 4: Summary of Environmental Consequences by Alternative

Attributes	No Action Alternative	Future Final Restoration Plan Alternative	Preferred alternative
Surface Water Quality	Significant existing surface water quality injury and lost services would continue for sometime (on the order of 100's of years) with no partial public compensation for the injury or lost services.	The near-term effects would be similar to the No Action alternative. The effect of delaying restoration on surface water quality would be expected to be minor given the short time period of the delay, and so, would not be "significant".	There may be short-term adverse effects and long-term beneficial effects to water quality due to restoration projects, though neither effect would be "significant".
Sediment and Soil	Significant existing sediment and soils injury and lost services would continue for sometime (on the order of 100's of years) with no partial public compensation for the injury or lost services.	The near-term effects would be similar to the No Action alternative. The effect of delaying restoration on sediment and soil would be expected to be minor given the short time period of the delay, and so, would not be "significant".	There may be short-term increases with long-term reductions in instream fine sediment due to restoration projects, though neither effect would be "significant". Non-significant reductions in contaminated soil and sediments could occur due to the Wetland-Based Restoration projects.
Riparian Resources	Significant existing riparian resource injury and lost services would continue for sometime (on the order of 100's of years) with no partial public compensation for the injury or lost services.	The near-term effects would be similar to the No Action alternative. The effect of delaying restoration on riparian resources would be expected to be minor given the short time period of the delay, and so, would not be "significant".	There may be short-term adverse and long-term beneficial effects to riparian resources due to restoration projects though neither effect would be "significant".
Fish	Significant existing fish injury and lost services would continue for sometime (on the order of 100's of years) with no partial public compensation for the injury or lost services.	The near-term effects would be similar to the No Action alternative. The effect of delaying restoration on fishes would be expected to be minor given the short time period of the delay, and so, would not be "significant".	There may be short-term adverse and long-term beneficial effects to fish and their habitat, due to restoration projects though neither effect would be "significant".
Wildlife (Birds)	Significant existing tundra swan injury and lost services would continue for sometime (on the order of 100's of years). Other species of wildlife would also not be restored. The public would not be partly compensated for this injured resource, the lost services it provides.	The near-term effects would be similar to the No Action alternative. The effect of delaying restoration on tundra swans and other wildlife would be expected to be minor given the short time period of the delay, and so, would not be "significant".	There may be short-term adverse and long-term beneficial effects to wildlife and their habitat due to restoration projects, though neither effect would be significant. Reduce dermal and food chain exposure of wildlife to mining-related hazardous substances through reductions in soils and sediments, though reduction would not be "significant".
Benthic Macro-invertebrates	Significant existing benthic macroinvertebrate injury and lost services would continue for sometime (on the order of 100's of years).	The near-term effects would be similar to the No Action alternative. The effect of delaying restoration on benthic macroinvertebrates would be expected to be minor given the short time period of the delay, and so, would not be "significant".	There may be short-term adverse and long-term beneficial effects to benthic macroinvertebrates due to restoration projects, though neither effect would be "significant".

Listed, proposed, candidate species	The effects to sensitive species currently on-going as a result of exposure to mining-related hazardous substances would not be ameliorated by restoration actions.	The effects to sensitive species currently on-going as a result of exposure to mining-related hazardous substances would not be ameliorated by restoration actions for the next for to five years. The effect of delaying restoration on sensitive species would be expected to be minor given the short time period of the delay, and so, would not be "significant".	Improvements to some species of concern and their habitats due to restoration projects, but none would be "significant". Restoration projects do not directly address habitat for some of the listed species (e.g., Canada lynx, gray wolf). Restoration projects are predicted to affect and benefit only one ESA listed species (bull trout).
Cultural Resources	Continuing injury to cultural and culturally significant natural resources and associated interim losses would not be compensated at this time.	The near-term effects would be similar to the No Action alternative. The effect of delaying restoration on cultural resources would be expected to be minor given the short time period of the delay, and so, would not be "significant".	Cultural resources would be benefited by the proposed action, but not "significantly". Any adverse effect to cultural resources would be avoided or appropriately managed through compliance with all applicable laws and regulations applying to cultural resources (see main text for details).
Cumulative impacts	Because the Trustee would take no actions under the No Action alternative, there would be no cumulative effects.	Because the Trustees would take no actions under the alternative B, for four to five years, there would be no cumulative effects during this period. The effect of delaying restoration is expected to be minor due to the short period of the delay, and so would not add "significantly" to any cumulative effects.	The adverse environmental effects of implementing the RODs actions identified by EPA (USEPA 1991, 1992 and 2002) are those associated with ongoing exposure of the Basins resources to mining-related hazardous substances. The proposed action would have no "significant" additive influence on levels of mining-related hazardous substances in the Basin.
Costs and Opportunities	The No Action alternative would have no costs or opportunities because the Trustees would not carry out any activities.	A delay in restoration would increase project cost simply due to inflation. Substantial opportunities would be lost associated with: 1) time-sensitive funding (i.e., ASARCO Environmental Trust funds), 2) current USEPA's remedial actions, and 3) current cost share opportunities. A delay might increase restoration coordination opportunities with remaining defendants.	Implementation of the proposed projects in alternative C would likely lower costs and take advantage of: 1) current additional substantial funding (i.e., ASARCO Environmental Trust and cost share);2) current coordination opportunities with USEPA's remedial actions, and 3) current cost share opportunties.

CHAPTER 5

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CHAPTER 6

6. COORDINATION WITH OTHER PROGRAMS AND REGULATORY AUTHORITIES

Endangered Species Act (ESA), 16 USC 1531 et seq., 50 CFR Parts 17, 402. The ESA and implementing regulations make it unlawful to "harass, harm, pursue, hunt, shoot, wound, kill,trap, capture, or collect" any federally designated threatened or endangered species. The ESA and implementing regulations are applicable to activities in the preferred alternative of the proposed action that could affect federally designated threatened or endangered species that may be present within the Coeur d'Alene Basin. Such species may include bull trout, bald eagle, Canada lynx, gray wolf, Spalding's catchfly, and water howellia. Consistent with ESA Section 7, if any federally designated threatened or endangered species are identified in the vicinity of proposed activities, the Trustees would consult on a project-specific basis with the U.S. Fish and Wildlife Service to ensure that the activities are conducted in a manner to avoid adverse modification of any critical habitat and jeopardy to the continued existence of such species.

Idaho Water Quality Standards and Wastewater Treatment Requirements, IDAPA 58.01.02. Turbidity standards for protection of aquatic life (cold water biota) would be applicable to streams that would possibly be affected by the activities in the preferred alternative of proposed action. Variances can be granted for individual pollutants if the standard is unattainable, based on the criteria in the rule (Section 260). Short-term exemptions allow exceedances of the water quality standards under certain circumstances that are identified in the regulation (e.g., dredge and fill activities) (Section 080). Where Idaho water quality standards (WQS)are applicable or relevant and appropriate to the preferred alternative, the activities must not cause exceedances of WQS. Before the proposed actions are implemented, site-specific project designs would include provision to ensure Idaho WQS are met.

Idaho Stream Channel Alteration regulations, IDAPA 37.03.07. These regulations are applicable to any alteration of stream channels. "Alteration" means to change the natural shape of a stream channel, including by removing or placing any material or structures with potential to affect the flow within the channel. The substantive requirements of these regulations are applicable to elements of the proposed action, such as streambank stabilization, or channel reconstruction with potential to affect the flow in Coeur d'Alene Basin streams. Substantive requirements include standards for placement of rock riprap and for construction of cofferdams and temporary stream crossings. Before the proposed actions are implemented site-specific project designs would include provision to ensure they comply with Idaho Stream Channel Alteration regulations.

Clean Water Act, Section 404—Dredge or Fill Requirements, 33 USC§1344, 33 CFR Parts 320-330; 40 CFR Part 230. These requirements are applicable to work in or near navigable waters. They establish requirements that limit the discharge of dredged or fill material into navigable waters and associated wetlands. Before the proposed actions are implemented site-specific planning would include obtaining any need permits under Clean Water Act, section 404.

Native American Graves Protection and Repatriation Act (NAGPRA), 25 USC§3001 et seq. 43 CFR Part 10. NAGPRA and implementing regulations are intended to protect Native American graves from desecration through the removal and trafficking of human remains and cultural items, including funerary and sacred objects. To protect Native American burials and cultural items, the regulations require that if such items are inadvertently discovered during excavation, the excavation

must cease and the affiliated tribes must be notified and consulted. This program is applicable to ground-disturbing activities such as riparian planting or bank stabilization activities requiring digging into the stream banks. Prior to implementing any of the proposed activities under the preferred alternative, consultation with State and Tribal historic preservation offices would be conducted. All project activities would comply with the NAGPRA.

American Indian Religious Freedom Act, 42 USC§1996 et seq. This statute is applicable to soil excavation in areas of the Coeur d'Alene Basin. It protects religious, ceremonial, and burial sites and the free practice of religions by Native American groups. If sacred sites are discovered in the course of soil disturbances, work would be stopped and the Coeur d'Alene and/or Spokane Tribes would be contacted. The statute has no implementing regulations; following the NAGPRA process should meet with the intent of the law.

National Historic Preservation Act (NHPA), 16 USC§470f, 36 CFR Parts 60, 63, and 800. The NHPA and implementing regulations require agencies to consider the possible effects on historic sites or structures of actions proposed for federal funding or approval. Historic sites or structures are those included on or eligible for the National Register of Historic Places, generally older than 50 years. If an agency finds a potential adverse effect on historic sites or structures, such agency must evaluate alternatives to "avoid, minimize, or mitigate" the impact, in consultation with the State Historic Preservation Office (SHPO). The NHPA and implementing regulations may be applicable to selected proposed action activities that include soil excavation which could disturb historical sites or structures. In consultation with the SHPO, unavoidable impacts on historic sites or structures may be mitigated through such means as taking photographs and collecting historical records. Prior to implementing any of the proposed activities under the preferred alternative, consultation with State and Tribal historic preservation offices would be conducted. All project activities would comply with the NHPA.

Archaeological Resources Protection Act (ARPA), 16 USC§470aa et seq., 43 CFR Part 7. ARPA and implementing regulations prohibit the unauthorized disturbance of archaeological resources on public and Indian lands. Archaeological resources are "any material remains of past human life and activities which are of archaeological interest," including pottery, baskets, tools, and human skeletal remains. The unauthorized removal of archaeological resources from public or Indian lands is prohibited without a permit, and any archaeological investigations at a site must be conducted by a professional archaeologist. ARPA and implementing regulations are applicable for the conduct of any selected proposed action activity that may result in ground disturbance. Prior to implementing any of the proposed activities under the preferred alternative, consultation with State and Tribal historic preservation offices would be conducted. All project activities would comply with the ARPA.

Migratory Bird Treaty Act (MBTA), 16 USC 703 et seq. The MBTA makes it unlawful to "hunt, take, capture, kill" or take various other actions adversely affecting a broad range of migratory birds, including Tundra swans, hawks, falcons, or songbirds without prior approval by the USFWS (See 50 CFR 10.13 for the list of birds protected under the MBTA.) Under the MBTA, permits may be issued for take (e.g., for research) or killing of migratory birds (e.g., hunting licenses). The mortality of migratory birds due to ingestion of contaminated sediment is not a permitted take under the MBTA. The MBTA and its implementing regulations are relevant and appropriate for protecting migratory bird species identified within the Coeur d'Alene Basin. The Coeur d'Alene Basin is located within the Pacific migratory flyway and provides important habitat for migratory

waterfowl. The selected proposed action activities would be carried out in a manner that avoids the taking or killing of protected migratory bird species, including individual birds or their nests or eggs.

Idaho Classification and Protection of Wildlife regulations, IDAPA 13.01.06. These regulations are relevant and appropriate to proposed action activities that could affect wildlife species protected by the State of Idaho, including species listed by state regulation as endangered, threatened, species of special concern, and protected nongame species. Before the proposed actions are implemented site-specific project designs would include provision to ensure they comply with Idaho Classification and Protection of Wildlife regulations, as appropriate.

State of Idaho Code for the protection of graves, sacred sites and either in law or practice caves and rock shelters. http://www3.state.id.us/idstat/TOC/idstTOC.html and Title 27 Cemeteries and Crematoriums, Chapter 5: Protection of Graves for graves and cairns for state and private lands. Prior to implementing any of the proposed activities under the preferred alternative, consultation with State and Tribal historic preservation offices would be conducted. All project activities would comply with the this State of Idaho Code.

Protection of Wetlands, Executive Order 11990; 40 CFR 6.302(a); 40 CFR Part 6, Appendix A. This executive order and associated regulations apply to remedial activities in wetlands. They require federal agencies to avoid adversely impacting wetlands, to minimize wetland destruction, and to preserve the value of wetlands. Before the proposed actions are implemented site-specific project designs would include provision to ensure they comply with EO 11990, as appropriate.

Protection of Floodplains, Executive Order 11988, 40 CFR 6.302(b) and Appendix A. This executive order and implementing regulations are applicable to the remedial actions within the floodplain of the Coeur d'Alene River and its tributaries. Federal agencies are required to evaluate the potential effects of actions that take place in floodplains and to avoid adverse impacts. Before the proposed actions are implemented, site-specific project designs would include provision to ensure they comply with EO 11988, as appropriate.

Idaho Lakes Protection Act regulations, IDAPA 20.03.04. These regulations are applicable to remedial work within the beds or waters of navigable lakes of the State of Idaho. They require that the protection of property, navigation, fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, and water quality be given due consideration. Before the proposed actions are implemented, site-specific project designs would include provision to ensure they comply with Idaho Lakes Protection Act regulations, as appropriate.

CHAPTER 7

7. LITERATURE CITED

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Appendix A

LIST OF ACRONYMS AND ABBREVIATIONS

AO	Authorized Official
ARAR	Applicable or Relevant and Appropriate Requirements
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DIRP	Draft Interim Restoration Plan
EA	Environmental Assessment
EIS	Environmental Impact Statement
FIRP	Final Interim Restoration Plan
NEPA	National Environmental Policy Act
NRDA	National Resource Damage Assessment
NWR	National Wildlife Refuge
ROD	Record of Decision
Trustees	Coeur d'Alene Basin Natural Resource Trustees
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

Appendix B

RESPONSE TO COMMENTS ON THE DRAFT COUER D'ALENE INTERIM RESTORATION PLAN

This appendix presents comments that were received on the public comment draft of the Coeur d'Alene interim restoration plan (IRP) and provides the Trustees' responses to the comments. The Trustees received two public comment letters on the IRP: one from HellerEhrman, LLP, representing Hecla Mining Company [hereafter referred to as HMC] and one from the Kootenai Environmental Alliance (KEA).

HMC general comments and the trustees' response.

Comment 1: "The IRP is premature in two respects. First, the ecological remediation set forth in the Environmental Protection Agency (EPA) Record of Decision (ROD) of September 2002 is still in the planning stages. ... Until the ROD is implemented and monitored to measure success, it will not be possible to determine the "residual injury" and thus where restoration actions, if any, will be necessary. Second, natural resource damages litigation brought by the United States and the Coeur d'Alene Tribe (Tribe) is still pending. … the United States and the Tribe do not know whether there may be further recovery of natural resource damages, or the amounts of any damages which may be recovered . Thus, neither the United States nor the Tribe knows how to prioritize spending."

Response: The necessity of the restoration actions in the IRP is clear. First, lost services and injuries to several natural resources in the Coeur d'Alene Basin began prior to 1980 and have continued then after to the present. In Coeur d'Alene Tribe v. Asarco the United States District Court, District Court of Idaho found that "based on all the evidence submitted that injury has and continues to occur after the passage of CERCLA to the following resources … [w]ater…[s]oils and sediments … [r]iparian resources … [f]ish … [w]ildlife … [t]undra swans." [US v. Asarco Inc. et al., 2003; Coeur d'Alene Tribe v. Asarco Inc., et al. 2002]. In addition, the 2002 EPA ROD for OU3 states that the interim remedy is not intended to fully address contamination within the Basin; and the activities in the 2002 ROD are to be implemented over 30 years. Lost services related to natural resource will continue during the next 30 years. The Trustees know that injury has occurred, will continue to occur, and will not be fully addressed by EPA's 2002 ROD. Second, Trustees have had funds from Coeur d'Alene Basin settlements since 1995. The Trustees know which resources are a priority to restore because this information is outlined in the expert reports for Tundra swans (*Cygnus columbianus*) (Trost 2004), surface water, aquatic resource (Stratus 2004), and federal lands (Lejeune et. al., 2004). Performing some restoration actions now would reduce the amount of ongoing injury and services lost, and would begin to compensate the public for decades old natural resource injuries and lost services. However, not withstanding the above discussion, the Trustees decided to add an alternative to the Environment Assessment to assess the merits of delaying taking any actions until the pending litigation is resolved.

Comment 2: "… the IRP is deficient in numerous ways and is inconsistent with CERCLA, sections of the natural resource damage regulations and Interior's own 2004 restoration memorandum. As a result the analysis supporting the draft IRP is faulty and the IRP does not provide for meaningful public comment.

CERCLA § 111(i), 42 U.S.C. § 9611(i) provides in part:

> [F]unds may not be used under this chapter for the restoration, rehabilitation, or replacement or acquisition of the equivalent of any natural resources until a plan for the use of such funds for such purposes has been developed and adopted by affected Federal agencies … and by the governing body of any Indian tribe having sustained damages to natural resources … after adequate public notice and opportunity for hearing and consideration of all public comments."

Response: The IRP was prepared and released for public comment in compliance with CERCLA § 111(i), 42 U.S.C. § 9611, and its development was guided by the NRDA regulations, and the DOI's "Policies and Operating Principles for Natural Resource Restoration Activities. Compliance with the regulation and guidance is in no way mandatory.

Comment 3: "43 CFR §11.93 (a) requires that a restoration plan for the expenditure of natural resource damages be based upon the Restoration and Compensation Determination Plan described in 43 CFR §11.81. In the Coeur d'Alene Basin, no RCDP was ever prepared and this requirement remains unmet."

Response: The Coeur d'Alene Assessment Plan was finalized in 1993, prior to the 1994 publication of the regulations requiring a RCDP be developed [59 FR 14283, Mar. 25,1994]. Moreover compliance with the regulation is in no way mandatory. 43 CFR 11.10. The Trustees' expert reports (LeJeune et al., 2004, Stratus 2004, and Trost 2004) outline the types and amounts of restoration that are needed. The IRP satisfies the public comment and participation process.

Comment 4: "43 CFR §11.93 further states that the restoration plan shall be prepared in accordance with the guidance set forth in 43 CFR §11.81. This latter requires that the plan "list a reasonable number of possible alternatives for restoration, rehabilitation, replacement, and/or acquisition of equivalent resources." … The Coeur d'Alene Basin IRP does not present a "reasonable number of possible alternatives."

Response: The Final Coeur d'Alene Basin Interim Restoration Plan now includes three alternatives: 1) the No Action – Natural Recovery; 2) Future Final Restoration Plan; and 3) Proposed Coeur d'Alene Basin Interim Restoration Plan. The Trustees have funds from natural resource damage settlements with parties potentially responsible for natural resource injuries in the Coeur d'Alene Basin. All sums recovered in compensation for natural resource injuries must be used to restore, rehabilitate, replace, or acquire the equivalent of the injured natural resources. 42 U.S.C. 9607(f)(1). Some projects (e.g., easement purchase of Tundra swan habitat in Kokechik Bay, Alaska or an area of Prichard Creek, Idaho) that were originally considered were later dropped either in response to interagency comments or because more information about the project's feasibility became known. The Trustees prepared several drafts of the IRP that combined various projects as alternatives, however, it was the consensus of the Trustees that only the full set of projects met the interim natural resource restoration needs and were consistent with the requirement to use the funds to restore, rehabilitate, replace, or acquire the equivalent of the injured natural resources. The preferred alternative describes a number of projects that restore, rehabilitate, replace, and/or acquire the equivalent of injured resources. The Trustees sought public input on the projects including which projects to proceed with or which other projects not described in the preferred alternative should be included in the final selected alternative.

Comment 5: "The trustees have never prepared a detailed analysis of the natural recovery option and the IRP is also lacking in this regard."

Response: As discussed in the IRP section 2.1, a number of documents in the Coeur d'Alene Basin Administrative Record assess natural recovery following USEPA response actions, for example: Ridolfi and Falter (2004), Stratus Consulting (2000), and USEPA (2002). In addition, the no action alternative would not be consistent with use of all sums recovered in compensation for natural resource injuries to restore, rehabilitate, replace, or acquire the equivalent of the injured natural resources. 42 U.S.C. 9607(f)(1).

Comment 6: "Interior's May 7, 2004 memorandum concerning restoration activities provides "the restoration plan should clearly identify, and explain to the public, the relationship between each restoration alternative considered and the resource injury or services losses that the action would address." The IRP is deficient in that it contains no description or analysis of the link between the seven proposed projects and the resource injuries or service losses that the project would address."

Response: Table 1 in the IRP lists proposed projects and specific Coeur d'Alene Basin injured resources addressed by each project. In addition, various expert reports link the proposed restoration actions in the preferred alternative to the injury or services lost due to the release of hazardous substances (LeJeune et al., 2004, Stratus 2004, and Trost 2004).

Comment 7: "42 CFR § 11.81(a)(2) provides that a restoration plan "shall be of sufficient detail to evaluate the possible alternatives for the purposes of selecting the appropriate alternative. …. In addition, the plan should include provisions that establish performance standards (materials and methods), performance criteria (measures of success) and describe legal protections (easement, deed restriction) established for the completed projects." The descriptions of the seven proposed projects contain no such detail, performance standards, performance criteria, or legal protections. The descriptions of projects are too vague to support meaningful National Environmental Policy Act analysis."

Response: The Interim Restoration Plan is an overarching plan intended to guide interim restoration actions in the near term. In the IRP, the Trustees intend to make decisions about general locations and types of actions that would be carried out, but do not intend to make decisions regarding specific project designs and locations at this time. The Trustees will be completing site-specific National Environmental Policy Act (NEPA) requirements as appropriate during the course of making project level decisions under this plan. Performance standards, performance criteria and legal protections were described to the extent possible given that the projects will undergo further development when site-specific designs are produced. Where additional information was available it was provided; for example, as stated in the IRP information about performance standards that will be used to guide the Pine Creek project is contained in the Integrated Stream Protection Guidelines (Washington State, 2003). This type of information is available for Coeur d'Alene Indian Reservation Enhancement Projects from Vitale et al., (2002 a. and 2002b.), see section 2.3.4 of IRP. The IRP discusses legal protections for projects that involve protection of lands, see sections 2.3.4 and 2.3.5.2.

Comment 8: "Interior's May 7, 2004 restoration memorandum states that: "the alternatives should be evaluated according to the criteria outlined in 43 CFR part 11." The reference is to the ten

"factors to consider when selecting the alternative to pursue" set forth in 43 CFR § 11.82(b). The IRP is totally devoid of any analysis utilizing these ten factors."

Response: As discussed in section 1.3 of the plan, the Trustees considered the ten factors, as well as other factors during discussions and Trustee meetings which lead to the development of alternatives. In addition, the IRP states in Section 1.3 that the Trustees will be revisiting the ten factors when making the final decision on the IRP. The Trustees are not confined to considering these ten factors, and as discussed in sections 1.2 and 2.2.2 of the plan additional prioritization factors appropriate to the Coeur d'Alene Basin, and EPA's remedial actions and timeline were considered.

Comment 9: "Another major deficiency of the IRP is it presents no detail on the estimated cost of the projects."

Response: As discussed in section 2.2.2 of the IRP, the costs outlined in Stratus (2004) were followed in initial restoration planning and project selection. Stratus Consulting (2004) developed detailed cost estimates for various restoration project types. Additional information regarding cost estimates for the projects in the preferred alternative were generally based on the more detailed cost estimates from LeJeune et al., (2004), Stratus (2004), and Trost (2004). In addition, more detailed cost information will be developed as part of site-specific restoration projects.

HMC specific comments and the Trustees' response

Overall Comments on the seven proposed projects

Comment 10: "The majority of the proposed funds … are to be spent on projects outside the Coeur d'Alene River Basin … Available funds should be limited to projects with complement the source control of metals contamination in the Coeur d'Alene River drainage and it tributaries."

Response: The Trustees note Hecla's preference for expending settlement dollars. First, some of the restoration projects are in the area directly affected by, and complement source control of metals contamination; for example, Pine Creek Restoration, Moon Creek, and likely some of the wetland-based restoration projects. Second, restoration pursuant to natural resource damage assessments is focused on addressing injured natural resources and the services they provide. This restoration can occur both in and outside contaminated areas. The set of the Trustees' current priorities for projects are laid out in section 2.2.2 of the IRP and some of the factors were, for example: quality of the restoration opportunity, relationship to losses, potential for habitat quality improvement, and minimal metal contamination and low propensity for recontamination. These prioritization factors led the Trustees to include proposed projects in the IRP that are outside the areas immediately affected by the release of mining related hazardous substances. The projects outside the areas directly affected by mining related hazardous substances meet the requirement to restore, rehabilitate, replace, or acquire the equivalent of the injured natural resources. 42 U.S.C. 9607(f)(1).

Comment 11: "Insufficient detail is given on all of the projects to compare them to the ten NRDA selection factors …"

Response: See response to comment 7 and 8.

Comment 12: "In general it is difficult to comment on any of these projects due to the lack of details given …."

Response: See response to comment 7.

Several of Hecla's comments on the seven proposed projects are similar. These similar comments will be combined and given one response. Other unique comments will be responded to under the specific project heading.

Comment 13: "Comment on several projects state that the proposed project is "not included in the 2004 RAP."

Response: While "RAP" is never defined in the comment letter, the Trustees will assume that the RAP is the Coeur d'Alene Basin NRDA Restoration Plan (Ridolfi and Falter, 2004). There is no requirement for the proposed projects to be listed in the RAP. The Ridolfi and Falter (2004) report was based on goal of restoring mining-related natural resource injury throughout Coeur d'Alene Basin. Following The United States District Court, District Court of Idaho ruling, the Trustees produced damage assessment and restoration documents (LeJeune et al., 2004, Stratus 2004, and Trost 2004) that focused on the resources that the Court found to be injured [US v. Asarco Inc. et al., 2003; Coeur d'Alene Tribe v. Asarco Inc., et al. 2002]. Together these documents provide a foundation for restoration options focused on restoring injured natural resources to baseline conditions. All of the projects or project types in the preferred alternative are included in the damage assessment and restoration document that discuss restoring injured natural resources to baseline conditions.

Comment 14: "Comment on several projects state that the proposed project does not include enough detail information."

Response: See responses to comments 7 and 9.

Comment 15: "Comment on several projects state that the proposed project is not located in areas affected by mining and so should not be included in the IRP".

Response: See response to comment 10.

Sherlock Creek:
Comment 16: "The restoration activities propose for Sherlock Creek apparently are part of a much larger, $2 million project that is not described anywhere in the IRP."

Response: The IRP is an overarching plan; specific project designs will be presented in site-specific NEPA documents as appropriate. As a general matter, the Sherlock Creek project is expected to restore critical habitat for bull trout via floodplain restoration and stream reconstruction.

Restoration of Tundra Swan Habitat:
Comment 17: "No information is given on how the Trustees will prevent restored wetlands from becoming recontaminated."

Response: Due to the hydrologic dynamics of the Coeur d'Alene system and the continued presence of large amounts of metal-contaminated soil, sediment and water, contamination and potential recontamination of natural resources was a significant factor for Trustee consideration in the selection of restoration project areas. For activities under this interim restoration plan, the Trustees will not target areas for wetland restoration where high levels of contamination already exist and/or the potential for recontamination is high. The only exception to this is where the action follows behind and complements EPA's OU-3 remedial actions. An example of this type of restoration is an easement purchase and wetland restoration in the lower floodplain of the Coeur d'Alene River. The use of the railroad dike is being used to protect the proposed project from potential recontamination.

Comment 18: "No information is given on how the proposed wetland restoration will supplement and not preclude remedial activities proposed in the ROD."

Response: The Trustees will coordinate our actions with EPA and State remedial actions and have stated so in the IRP. Section 1.3 of the IRP states: "Consistent with the National Contingency Plan, the Trustees would implement the selected alternative in coordination with the remedial activities of USEPA and the State of Idaho in the Basin. See subpart G of the National Oil and Hazardous Pollution Contingency Plan. 40 CFR 300.600-615." In addition to coordinating our actions with EPA and the State remedial actions, the preferred alternative mainly focuses wetland restoration on areas where levels of contamination are low or at background levels and thus will not be targeted by EPA for ecological remediation.

Comment 19: "The IRP suggests that Tundra swans in the Basin need loafing and roosting habitat. There is no evidence to support this conclusion."

Response: As stated in the IRP, the Trustee's goal is to reduce Tundra swan lead related mortality. To meet this goal, the Trustee's will focus on wetland restoration to provide clean feeding habitat. See the highlighted sections of the IRP section 2.3.5.1 excerpt below. The particular IRP statement referred to in Comment 19 did not suggest that Tundra swans in the Coeur d'Alene Basin need loafing or roosting habitat (see the highlighted section of paragraph two in the excerpt below). The context of the IRP statement is that loafing and roosting areas are part and parcel of functioning wetlands. However, Tundra swans have been observed both loafing and roosting in the Coeur d'Alene Basin and this is a normal part of waterfowl behavior.

> "The Trustees propose to compensate the public for ongoing Tundra swan injury caused by the release of mining-related metals by **providing clean swan feeding areas through the reduction of sediment lead concentrations to levels that are below those that affect swans** (preserve, reestablish, restore and/or enhance wetland habitat safe for use by Tundra swans). Proposed activities include the acquisition and/or restoration of resources associated with injured wetlands, **restoring wetland structure, function,** and services to Tundra swans. The goal of projects conducted in the Basin would be **the reduction of Tundra swan year losses due to reduced lead related mortality."** [emphasis added].
>
> Wetland reestablishment, restoration and enhancement will help replace services to Tundra swans within the Basin that have been injured from mining-related metals release. **Functioning wetlands will provide areas for feeding, loafing,**

and roosting for Tundra swans. To preserve wetlands, Trustees will focus on wetland acquisition or acquisition of land preservation agreements on wetlands or historic wetland areas of high natural quality. Final selection of specific areas that would be preserved will include consideration of the ecological value of the wetland habitats, inherent improvement of water quality, ownership/protection opportunities, geographic/ecological diversity, local/regional planning, citizens' concerns, and the ability to find willing landowners. Preservation will be obtained through fee title or land preservation agreement purchase."

Kootenai Environmental Alliance's (KEA) comments and the Trustees' responses

Pine Creek

Comment 1: "The background section 2.3.1.1 does not include a listing of the amount of land in the watershed that is owned by private industrial logging companies, the State of Idaho, BLM, and the Forest Service. There is also no information presented regarding the logging activities in the watershed. …. Is there data available regarding the historical and current stream flows in the drainage?"

Response: Approximately 43 percent of the Pine Creek watershed is managed by the BLM; more detailed land ownership and logging information is available at the Idaho Department of Lands. Also, BLM can provide a general land ownership map if requested. There are three operating stream flow gages in Pine Creek (two in the East Fork and one on the mainstem). The stream gages on mainstem Pine Creek and East Fork Pine Creek have been in operation since 1997 and 1999, respectively. Design flows for the stream restoration projects will be derived from United State Geological Survey (USGS) regional regression equations. The USGS regional regression equations are based on many years of record for streams within the region.

Comment 2: "The restoration/stabilization techniques described on pages 16 and 17 do not appear to address the issue of peak flows and bedload movement in the drainage. ...are the planned restoration projects designed to withstand increased peak flows?"

Response: The projects will be designed to account for stream flows within the Pine Creek drainage. As explained in the IRP section 2.3.1.2, a geomorphic investigation (Kondolf and Matthews, 1996), and a follow-up field investigation (Matthews and Kondolf, 1996) were conducted to develop conceptual restoration plans with the goal of accelerating the natural recovery of the Pine Creek system. To account for stream flow and associated sediment loads the IRP further states: "Whether a particular reach of Pine Creek is recovering towards a narrower and less braided channel, or continuing to widen and aggrade, restoration efforts would be designed to allow for dynamic adjustment toward geomorphic equilibrium."

Comment 3: "Have monitoring studies been completed for previous restoration project that included the installation of large woody debris, log jams, or other instream devices?"

Response: The BLM routinely monitors Pine Creek. Ongoing BLM monitoring includes, for example, water quality, and geomorphic and photographic monitoring of instream restoration projects. The BLM uses this monitoring information to learn about local response to stream restoration techniques and practices adaptive management in designing new restoration projects.

Comment 4: "If high flows in the drainage has resulted in damage or destroyed instream structures in years other than 1996. …will the proposed restoration projects result in measurable improvements to stream reaches in Pine Creek and its tributaries?"

Response: BLM monitoring results indicate an upward trend in riparian vegetation of Pine Creek. Starting with the most critical sites, a variety of restoration projects, similar to those proposed in the IRP, have been conducted to stabilize the stream channel and flood plain. The more stable channel is allowing riparian vegetation to establish and grow. Flooding could set back riparian vegetation, but the restoration projects are designed to work with natural processes such as flooding. As stated in section 2.3.1.2 of the IRP: "The premise guiding Pine Creek restoration is that sediment source control and revegetation of the floodplain will eventually restore the stability of the watershed. Pioneer species will provide the initial stability of the floodplain deposits and channel alignment necessary to reduce sediment and inputs."

Comment 5: "… The analysis in the Final document for the Pine Creek Project should include hydrology information that will address the issue of increased peak flows in the drainage. … the analysis for the Pine Creek Project should list the number of acres of new logging that are on-going or planned on private industrial lands and State of Idaho Lands."

Response: The Trustees will use restoration methods that are appropriate to facilitating stream and riparian recovery where there are high stream flows. Also, see responses to KEA comments 1, 2 and 4.

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