Draft

Bunker Hill Mining and Metallurgical Complex Superfund Site

Superfund Cleanup Implementation Plan, 2012-2022

October 30, 2012

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Acronyms and Abbreviations

AMD	acid mine drainage
ARAR	applicable or relevant and appropriate requirement
ATV	all-terrain vehicle
AWQC	ambient water quality criterion/criteria
BEIPC	Basin Environmental Improvement Project Commission
BEMP	Basin Environmental Monitoring Program
BLM	U.S. Department of the Interior Bureau of Land Management
BPRP	Basin Property Remediation Program
CCC	Citizens' Coordinating Council
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CIA	Central Impoundment Area
COC	chemical of concern
CSM	conceptual site model
CTP	Central Treatment Plant
ECSM	Enhanced Conceptual Site Model
EMP	Environmental Monitoring Program
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FFS	Focused Feasibility Study
gpm	gallons per minute
I-90	Interstate 90
I-C	Interstate-Callahan
ICP	Institutional Controls Program
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
LLC	Limited Liability Company
MAU	multi-attribute utility
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List

NRDA	Natural Resource Damage Assessment
NRRT	Natural Resource Restoration Team
O&M	operation and maintenance
OU	Operable Unit
PFT	Project Focus Team
QA/QC	quality assurance/quality control
RAO	remedial action objective
RA	remedial action
RD	remedial design
ROD	Record of Decision
ROW	right-of-way
SFCDR	South Fork of the Coeur d'Alene River
TCD	typical conceptual design
TLG	Technical Leadership Group
Trust	Successor Coeur d'Alene Custodial and Work Trust
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WCA	waste consolidation area
WQX	Water Quality Exchange

SECTION 1.0

Introduction

This Superfund Cleanup Implementation Plan has been prepared in conjunction with the *Interim Record of Decision (ROD) Amendment, Upper Basin of the Coeur d'Alene River, Bunker Hill Mining and Metallurgical Complex Superfund Site* (U.S. Environmental Protection Agency [EPA], 2012b). This Implementation Plan summarizes and discusses cleanup activities included in the Upper Basin Interim ROD Amendment and prior decision documents for the Bunker Hill Mining and Metallurgical Complex Superfund Site ("the Bunker Hill Superfund Site", or "the Site") for the 10-year time frame from 2012 through 2022. Modifications and amendments to this Implementation Plan are anticipated on an annual basis as the cleanup work progresses.

The implementation of cleanup actions at the Bunker Hill Superfund Site presents unique challenges given the nature and extent of mining-related contamination, the number of remedial actions needed, and the size and complexity of the area. For these reasons, during the development of the Upper Basin Interim ROD Amendment EPA began the critical process of implementation planning and identifying priority cleanup actions working with the Basin Environmental Improvement Project Commission (the Basin Commission, or BEIPC) and the Commission's Technical Leadership Group (TLG) and Project Focus Teams (PFTs).[1] In addition to this level of coordination, there are specific aspects of the cleanup and implementation planning that are directly related to the EPA and State of Idaho partnership. (One such example is where there is a long-term operation and maintenance [O&M] and match requirement for the State when federal appropriations are used in the cleanup. In these situations, EPA works directly with the Idaho Department of Environmental Quality (IDEQ) outside the Basin Commission process.) The outcome of the process of implementation planning and identifying priority cleanup actions is documented in this Implementation Plan, which will guide site-specific cleanup actions in 2012 through 2022 with the objective of ensuring that the actions taken are the most effective in protecting human health and the environment and providing opportunities for substantive input by project stakeholders and community representatives.

This Implementation Plan will provide a basis for EPA's input into the Basin Commission's future one- and five-year work plans. On an annual basis since the establishment of the Basin Commission in 2002, EPA has provided a summary of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-related activities to the Commission, which has then updated its one-year and five-year work plans that have summarized the CERCLA-related activities to be conducted in the Basin (among other activities). The one-year work plans establish and maintain the sequencing of activities that are needed to complete the goals and objectives of the five-year work plan. The Basin Commission work plans focus on general areas of work and do not go into site-specific detail; site-specific

[1] The Basin Commission includes federal, state, Tribal, and local governmental involvement. EPA anticipates continuing to work as a member of this Commission for implementation of the Selected Remedy and development of the priorities and sequencing of cleanup activities. A list of the key stakeholders for the Bunker Hill Superfund Site is provided in Section 1.3.

details are developed through the pre-design, design, and construction phases of cleanup at each site.

Although this Implementation Plan focuses on cleanup actions selected in the Upper Basin Interim ROD Amendment, it also identifies (1) additional actions that have been selected by other decision documents for the Bunker Hill Superfund Site, and (2) additional studies that EPA plans to conduct at the Site including several in the Lower Basin. It is important to note that this Implementation Plan encompasses the entire Bunker Hill Superfund Site (Operable Units [OUs] 1, 2, and 3 as defined in Section 1.1), which includes both the Upper and Lower Basin portions of OU 3.

The remainder of this section provides background information on the Bunker Hill Superfund Site, lists the decision documents that prescribe the specific cleanup actions summarized in this Implementation Plan, identifies key stakeholders for the Site, presents the purpose and objectives of the Plan, and describes the organization of the Plan.

1.1 Site Name and Location

The Bunker Hill Superfund Site is located primarily in northern Idaho, in the Coeur d'Alene Basin. The Site includes mining-contaminated areas in the Coeur d'Alene River corridor, adjacent floodplains, downstream water bodies,[2] tributaries, and fill areas, as well as the 21-square-mile Bunker Hill "Box" where historical ore-processing and smelting operations occurred (Figure 1-1). The Site was listed on the National Priorities List (NPL) in 1983 and is assigned CERCLIS identification number IDD048340921.

EPA has divided the Bunker Hill Superfund Site into three OUs:

- OU 1 includes the populated areas of the Bunker Hill Box.
- OU 2 comprises the non-populated areas of the Bunker Hill Box.
- OU 3 includes all areas of the Coeur d'Alene Basin outside the Bunker Hill Box where mining-related contamination is located. OU 3 extends from the Idaho-Montana border into the State of Washington and contains floodplains, populated areas, lakes, rivers, and tributaries. OU 3 includes areas surrounding and including the South Fork of the Coeur d'Alene River (SFCDR) and its tributaries, and areas surrounding and including the main stem of the Coeur d'Alene River down to the depositional areas of the Spokane River, which flows from Coeur d'Alene Lake[3] into Washington State.[4]

1.2 Previous Decision Documents for the Site

The original RODs for the three OUs at the Site were issued on the dates indicated below.

[2] Downstream water bodies extend to portions of the Spokane River, located in eastern Washington.

[3] Coeur d'Alene Lake is being managed by state, Tribal, federal, and local governments outside the Superfund process through revision and implementation of the *Coeur d'Alene Lake Management Plan* (IDEQ and Coeur d'Alene Tribe, 2009).

[4] Note that the river corridor portions of the SFCDR and Pine Creek located within the Bunker Hill Box are considered to be part of OU 3.

- **ROD for OU 1** (*EPA Superfund Record of Decision, Bunker Hill Mining and Metallurgical Complex Residential Soils Operable Unit, Shoshone County, Idaho*): August 30, 1991.
- **ROD for OU 2** (*EPA Superfund Record of Decision, Bunker Hill Mining & Metallurgical Complex, EPA ID: IDD048340921, OU 02, Smelterville, ID*): September 22, 1992.
- **ROD for OU 3** (*Record of Decision, The Bunker Hill Mining and Metallurgical Complex Operable Unit 3*): September 12, 2002.

In addition, ROD Amendments and Explanations of Significant Difference (ESDs) were issued on the following dates:

- **First ROD Amendment for OU 2** (*EPA Superfund Record of Decision Amendment: Bunker Hill Mining & Metallurgical Complex, EPA ID: IDD048340921, OU 02, Smelterville, ID*): September 9, 1996.
- **Second ROD Amendment for OU 2** (*EPA Superfund Record of Decision Amendment: Bunker Hill Mining & Metallurgical Complex, EPA ID: IDD048340921, OU 02, Smelterville, ID*): December 10, 2001.
- **First ESD for the OU 2 ROD** (*Explanation of Significant Differences for Revised Remedial Actions at the Bunker Hill Superfund Site, Shoshone County, Idaho*): January 1996.
- **Second ESD for the OU 2 ROD** (*Explanation of Significant Differences for Revised Remedial Actions at the Bunker Hill Superfund Site OU 2, Shoshone County, Idaho*): April 1998.
- **Interim ROD Amendment for OUs 1 and 2 and the Upper Basin portion of OU 3** (*Interim Record of Decision [ROD] Amendment, Upper Basin of the Coeur d'Alene River, Bunker Hill Mining and Metallurgical Complex Superfund Site*): August 2012.

As indicated above, the most recent decision document for the Bunker Hill Superfund Site was the Interim ROD Amendment for the Upper Basin of the Coeur d'Alene River, which is the main area of historical mining and industrial activities and the primary historical source of downstream metals contamination. The Upper Basin is mostly located in Shoshone County, Idaho, and contains OUs 1 and 2 (in the Bunker Hill Box) and the eastern portion of OU 3 (see Figure 1-1). The 300-square-mile Upper Basin includes areas of mining-related contamination along the SFCDR and its tributaries downstream to the confluence of the South and North Forks of the Coeur d'Alene River. The Selected Remedy for the Upper Basin, which is presented in the Interim ROD Amendment, is an interim remedy that includes actions within the Upper Basin and extending downstream one mile from the confluence of the North and South Forks of the Coeur d'Alene River to include the town of Kingston. The Selected Remedy includes remedial actions in portions of OU 1, OU 2, and OU 3.

Substantial progress has been made in implementing the remedies selected in the RODs and other decision documents issued through 2002 for the three OUs, primarily the remedies

that focused on reducing the risks posed to human health by exposure to mining-related contamination.[5]

1.3 Key Stakeholders

EPA will continue to work with key stakeholders for the Site, State and Tribal partners, and other local jurisdictions when implementing cleanup actions. These entities include, but are not limited to, the following:

- Coeur d'Alene Tribe
- Spokane Tribe
- Idaho Department of Environmental Quality (IDEQ)
- Idaho Department of Fish and Game (IDFG)
- Washington State Department of Ecology
- Shoshone County
- Kootenai County
- Benewah County
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Forest Service (USFS)
- U.S. Department of the Interior Bureau of Land Management (BLM)
- Basin Environmental Improvement Project Commission (the Basin Commission)

Several of these entities (the Coeur d'Alene Tribe, BLM, USFWS, USFS, IDFG, and IDEQ) also provide technical experts to the Natural Resource Restoration Team (NRRT), which is committed to working together to develop, adopt, and implement restoration actions using funding sources that have been made available through various Natural Resource Damage Assessment (NRDA) settlements in the Coeur d'Alene Basin.

As noted previously, the Basin Commission has established the TLG, which serves as an advisory council and consists of federal, state, local, and Tribal representatives with regulatory or land management responsibilities in the Coeur d'Alene Basin that may be affected by remedial actions. More information about the TLG and the Basin Commission can be found at: www.basincommission.com.

1.4 Purpose and Objectives

The purpose of this Implementation Plan is to provide an overview of EPA's plan for implementing cleanup actions at the Bunker Hill Superfund Site during the next 10 years. At the present time the cleanup actions are primarily intended for the Upper Basin, as described in the most recent decision document for the Site (the Upper Basin Interim ROD

[5] A comprehensive list of the remedial and removal actions conducted specifically in the Upper Basin is provided in Table 2-1 in the *Focused Feasibility Study* [FFS] *Report*, *Upper Basin of the Coeur d'Alene River*, *Bunker Hill Mining and Metallurgical Complex Superfund Site* (EPA, 2012a).

Amendment [EPA, 2012b]). Work in the Lower Basin will continue with additional data collection, development of pilot projects, and identification of potentially effective remedial actions. EPA continues to pursue data collection and analysis efforts in the Lower Basin to support the development and evaluation of remedial alternatives for subsequent decision documents. This Implementation Plan is intended to provide an overall vision and strategy for implementing these actions, and will be modified as new information is acquired or becomes available.

This Implementation Plan also provides a framework for implementing remedial actions with regard to funding considerations and the different entities involved in the project planning, design, construction, and monitoring phases of the work. The Successor Coeur d'Alene Custodial and Work Trust (the Trust) was established as part of a settlement agreement between the United States and Asarco LLC and its subsidiaries[6] to provide funding for remedial actions in the Coeur d'Alene Basin outside the Bunker Hill Box. As described throughout this document, EPA and the Trust will work together to implement the remedial actions for mine-waste-contaminated areas in OU 3,[7] while EPA and IDEQ will work together to implement remedial actions in the Box (OUs 1 and 2).

This Implementation Plan is intended to achieve the following objectives:

- Identify EPA's priority cleanup actions at the Bunker Hill Superfund Site for the next 10 years and provide a strategy for implementing these cleanup actions.
- Provide the basis for EPA's input into the Basin Commission's one-year and five-year work plans.
- Describe the process EPA will use to implement cleanup actions in cooperation with stakeholders and partners for the Site, as well as the Trust and other entities.
- Describe existing funding sources and considerations for management of funds.
- Clarify how stakeholders and partners, local communities, and the public can be involved during the annual implementation planning process.
- Describe how the adaptive management process will be used to evaluate the effectiveness of cleanup actions and to make modifications to the implementation and cleanup approaches.

1.5 Plan Organization

The remainder of this Implementation Plan is organized as follows:

- **Section 2.0, Identification of Priority Actions**: Describes how EPA has identified priority cleanup actions that are expected to be implemented at the Site during the next 10 years**.**

[6] The case was decided in the United States Bankruptcy Court for the Southern District of Texas, Corpus Christi Division, in 2009.

[7] The settlement agreement allows for the Trust to conduct cleanup work only in OU 3.

- **Section 3.0, Implementation of Remedies:** Provides details of the cleanup actions summarized in Section 2.0, and presents the general approaches and timeframes for implementing these actions.
- **Section 4.0, Implementation Process**: Provides an overview of the process for implementing cleanup actions at the Site.
- **Section 5.0, Funding Considerations**: Presents considerations for the manner in which EPA will manage the cost of the cleanup.
- **Section 6.0, Community Involvement**: Describes the ways in which EPA will continue to gather and consider input from stakeholders and the local community during the implementation of cleanup actions.
- **Section 7.0, Continued Implementation Planning**: Describes the continued planning activities that will be conducted to implement the cleanup, including the prioritization of cleanup actions using adaptive management and evaluation of the effectiveness of remedial actions.
- **Section 8.0, References:** Lists in full the references cited in the sections above.
- **Figures and tables** referenced in Sections 1.0 through 7.0 are provided under separate tabs following Section 8.0.

SECTION 2.0

Identification of Priority Actions

Cleaning up the Coeur d'Alene Basin will require many years of design and construction, effectiveness monitoring and O&M of in-place remedial actions, and coordination with stakeholders, partners, and the public. Cleanup includes ongoing and future work that must be prioritized and sequenced over a long period.

As in the past, establishing priorities for implementing cleanup at the Bunker Hill Superfund Site has incorporated both qualitative and quantitative methods. Qualitative methods include gathering input from stakeholders, partners, and the local community on their concerns and areas of highest need, identifying logistical and financial constraints that will affect the sequencing of the work, and ensuring that the work is consistent with the regulatory requirements that guide EPA. Quantitative methods include evaluating data from ongoing monitoring programs such as the Basin Environmental Monitoring Program (BEMP) to help evaluate the effectiveness of remedial actions, and using tools such as predictive models (for example, models that estimate the impact of local cleanup actions on water quality) and decision analysis models that help in prioritizing areas for cleanup or making choices among options (for example, where to build or expand repositories for containing contaminated soil). Other factors that are part of this evaluation include the sources of available funding and the identification of projects that provide the greatest value in protection of human health and improvement in water quality for the cost.

EPA's first priority for the Site has consistently been and will continue to be focused on actions that protect human health, while actions that protect the environment are important as well. Along these lines, the remedial actions, implementation strategies, and implementation timeframes presented in this Implementation Plan are grouped and discussed as follows:

- Protection of human health in communities
- Protection of human health and the environment outside communities
- Additional supporting activities

For each of these groups, EPA used qualitative and/or quantitative strategies to identify priority cleanup actions for the next 10 years, as described in the following sections. Further descriptions of and implementation strategies for these cleanup actions are provided in Section 3.0.

2.1 Protection of Human Health in Communities

EPA's highest priority for the Bunker Hill Superfund Site will always be the protection of human health in Upper and Lower Basin communities. These communities include incorporated cities such as Mullan, Wallace, Osburn, Wardner, Kellogg, Smelterville, and Pinehurst as well as other residential areas (i.e., Silverton, Kingston, Cataldo, etc.). In these communities and residential areas during the next 10 years, EPA will focus on the

completion of (1) the property cleanup program in OU 3 that began in 2002[8] with particular emphasis on high-risk homes where children and pregnant woman reside; (2) actions to address roads that may have been damaged by cleanup activities, so that those roads can continue to serve as barriers to underlying contamination; and (3) actions that protect existing remedies that have already been implemented. These actions are summarized below, and strategies for the anticipated implementation of these actions are presented in Sections 3.1.1 through 3.1.3, respectively. EPA will conduct these efforts in partnership with IDEQ and the existing Institutional Controls Program (ICP) administered by the Panhandle Health District,[9] which has been established to help ensure that future construction and maintenance work in the Coeur d'Alene Basin does not result in exposures to contaminated soil or mishandling of contaminated soil wastes. Another important part of implementing actions to protect human health is ensuring that appropriate repositories are available for disposal of contaminated soil; repository development and management priorities are discussed in Section 2.3.

2.1.1 Basin Property Remediation Program

In 2008, EPA and IDEQ certified completion of the OU 1 residential property remediation program conducted under the 1991 ROD for the communities located within the Bunker Hill Box (EPA, 2010). Implementation of the Phase I remedies that focused on the protection of human health in OU 2 (commercial and public properties in the Box) are also largely complete (EPA, 2010).

The OU 3 property remediation program that began in 2002 is anticipated to be substantially complete in 2016 (as discussed further in Section 3.1.1; BEIPC, 2011). EPA and IDEQ will continue to focus on completing the ongoing cleanup of residential, commercial, and public right-of-way (ROW) properties in the Upper and Lower Basins through the Basin Property Remediation Program (BPRP). Properties where children (up to 7 years of age) or pregnant women live are the highest priority. Continuation of these actions along with monitoring of blood-lead levels in children, house dust, private drinking water supplies, and recreational-use areas is needed to meet risk-based goals for the protection of human health specified in the ROD for OU 3 (EPA, 2002).

2.1.2 Roadway Surface Remediation

EPA and IDEQ have developed a Road Surface Remediation Strategy to address the deterioration of paved roads that are intended to serve as barriers to human exposure, as well as unpaved roads and road shoulders that contain contaminated soil. The cleanup work in communities to date has been focused on remediating contaminated residential and commercial properties, common-use areas such as parks and playfields, and a limited number of ROWs including unpaved roads and road shoulders. As property cleanups in the Basin near completion, there is a need to define how to address public roads in all three OUs to ensure the long-term effectiveness of roads and road shoulders that act as part of the remedies for the Bunker Hill Superfund Site.

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[8] The Basin Property Remediation Program (discussed below) began in 2002 pursuant to the ROD for OU 3 (EPA, 2002).

[9] Idaho Administrative Procedures Act (IDAPA) 41.01.01, Rules of Panhandle Health District 1, is the promulgated rule establishing the ICP. It describes the Panhandle Health District's authority and the ICP's scope and intent.

The basic elements of the Roadway Surface Remediation Strategy include the identification and approval of proposed projects, dispersal of EPA funds to local jurisdictions to design and construct the projects, construction of the projects, and documentation of the completed work. The local jurisdictions will be responsible for project planning, project construction, and documentation of the completed work.

Paved and unpaved public roads meet the transportation needs within and between the communities in the Bunker Hill Superfund Site and beyond. Responsibility for constructing and maintaining these transportation facilities lies with state and local jurisdictions (EPA and IDEQ are neither road construction nor road maintenance agencies). EPA's and IDEQ's mission at the Site is to reduce exposures to site-related contaminants. By including ROWs in the RODs that have been issued for the Site, EPA has recognized the need for clean roadway surfaces to serve as protective barriers between contaminated materials that lie under these surfaces and people living near and using those roadways. In addition, EPA recognizes that cleanup activities and the associated heavy vehicle traffic within and between communities have likely contributed to the deterioration of some road surfaces. The Roadway Surface Remediation Strategy has been developed from the perspective of protecting human health and is designed to provide a mechanism to address on a one-time basis the deterioration of road surfaces resulting from heavy vehicle traffic during remediation activities, to ensure that road surfaces continue to serve as barriers that reduce or eliminate exposures to underlying contamination. Following this one-time repair, it is expected that local jurisdictions will continue to maintain roadway surfaces as part of providing basic services to the communities they serve.

The Road Surface Remediation Strategy applies to existing public roads located within the administrative boundaries of the ICP. These roads fall under the jurisdiction of the cities of Mullan, Wallace, Osburn, Wardner, Kellogg, Smelterville and Pinehurst, as well as Shoshone County and the Eastside Highway District (Kootenai County). Existing private roads located within the ICP Administrative Boundary and these jurisdictions will be addressed as part of the BPRP. New road construction is subject to the requirements of the ICP and is not eligible for funding under this Strategy. The Strategy does not apply to roads that fall under the jurisdiction of BLM, USFS, or the Idaho Transportation Department.

2.1.3 Remedy Protection

The Upper Basin Interim ROD Amendment (EPA, 2012b) identifies actions (referred to as remedy protection actions) to protect in-place barriers within the Upper Basin communities that may be at risk from tributary flooding. These projects typically include improvements to existing stormwater control systems that are located within communities and are a high priority for EPA due to their proximity and risks posed to constructed barriers. Similar to the Roadway Surface Remediation Strategy, remedy protection work will require significant logistical planning with the local communities including private property easement requirements and permitting substantive requirements. It is anticipated that projects with fewer logistical constraints will be implemented first.

2.2 Protection of Human Health and the Environment Outside Communities

This section describes the priority cleanup actions for the Bunker Hill Superfund Site outside Upper and Lower Basin communities. EPA is prioritizing cleanup actions at OU 2 and OU 3 sites that are currently adversely affecting human health and the environment. Over time other sites may be identified that pose a risk to human health or the environment. As noted in the Upper Basin Interim ROD Amendment, information obtained during cleanup may lead to the identification of sites where risks to human health or the environment require response actions not selected in the Interim ROD Amendment. In such circumstances, response actions will be selected from the typical conceptual designs (TCDs) presented in the Focused Feasibility Study (FFS) Report for the Upper Basin (EPA, 2012a) via an Action Memorandum, an ESD, or an appropriate decision document.
The sections below provide general descriptions of the Upper and Lower Basins and present the information used by EPA to identify priorities for cleanup during the next 10 years.

2.2.1 Upper Basin

The Upper Basin is the main area of historical mining and industrial activities and the primary source of downstream metals contamination. The Upper Basin is mostly located in Shoshone County, Idaho, and contains OUs 1 and 2 (in the Bunker Hill Box) and the eastern portion of OU 3 (see Figure 1-1). The 300-square-mile Upper Basin includes areas of mining-related contamination along the SFCDR and its tributaries downstream to the confluence of the South and North Forks of the Coeur d'Alene River.

Implementation of the Selected Remedy for the Upper Basin will present unique challenges given the nature and extent of mining-related contamination, the number of remedial actions needed, and the size and complexity of the area, as illustrated by figures taken from the Upper Basin Interim ROD Amendment (EPA, 2012b). Figure 2-1 identifies the total number of mine and mill sites in each watershed that are planned to undergo source control actions in the Upper Basin portion of OU 3 per the Selected Remedy. Figure 2-2 identifies the total number of sites planned for water collection and treatment actions in the Upper Basin portion of OU 3 per the Selected Remedy. Figure 2-3 shows the components of the Selected Remedy for OU 2 (in the Bunker Hill Box). In addition to the size and complexity of the work, EPA must take into account different funding mechanisms, and restrictions on those funding mechanisms, for implementing cleanup in OU 2 versus the Upper Basin portion of OU 3.

EPA's initial strategy for prioritizing the cleanup actions at the vast number of sites included in the Selected Remedy for the Upper Basin is based on addressing the most serious human health and ecological risk concerns first. The remedial actions included in the Selected Remedy are primarily focused on collecting and conveying water for treatment at the Central Treatment Plant (CTP) in Kellogg and on excavating and/or containing mining-related contaminants, thereby reducing concentrations of dissolved metals and particulate lead in rivers and streams and direct contact exposures to these contaminants. Such actions will reduce unacceptable risks to humans and the environment. For example, mine and mill sites were reviewed with regard to their proximity to residences, camping and or river

access areas, and trails for hiking, all-terrain vehicles (ATVs), and motorcycle use; their potential for erosion and sluffing; and their potential for affecting public drinking water.[10]

Dissolved zinc concentrations compared to ambient water quality criteria (AWQC), in the form of an AWQC ratio, are used as a key indicator of surface water quality.[11] As shown in Figures 2-4 and 2-5, the locations with the highest dissolved zinc AWQC ratios (2002 to 2008) are Ninemile and Canyon Creeks upstream of Wallace (in OU 3), and Government Creek and tributaries to Bunker Creek in the Bunker Hill Box (in OU 2). Dissolved zinc AWQC ratios range up to 73 in Ninemile Creek, 40 in Canyon Creek, and 85 in the Box. In addition to dissolved zinc, total lead is also used as an indicator of surface water quality. Figure 2-6 shows a map view of total lead concentrations in Upper Basin surface water during high-flow conditions in May 2008.[12] Total lead concentrations upstream of the Box are highest in Canyon Creek and Ninemile Creek (consistent with dissolved zinc). Therefore, EPA is prioritizing actions that address source control and water treatment actions in the East Fork of Ninemile Creek, in Canyon Creek, and in the Box during the initial phase of remedy implementation. As shown in Figure 2-1, the Ninemile and Canyon Creek Watersheds contain the highest density of mine and mill sites, with estimated contaminated waste volumes of 1.1 and 1.7 million cubic yards, respectively. Priority actions in these watersheds are discussed in more detail in Section 3.0.

Because additional infrastructure (e.g., water treatment pipelines) and a repository to consolidate wastes are needed to implement many of the actions in the Canyon Creek Watershed, actions in OU 2 and the Ninemile Creek Watershed will be implemented first. OU 2 actions will also be sequenced to account for the need to upgrade and expand the CTP prior to increasing the flow that will result from other OU 2 and/or OU 3 water collection actions.

After implementation of the majority of the East Fork of Ninemile Creek actions and OU 2 water collection and treatment actions near the Central Impoundment Area (CIA), Canyon Creek water collection and treatment actions are anticipated to be initiated. These will include groundwater collection and treatment in Woodland Park (an area of Canyon Creek near the confluence with the SFCDR) and collection and treatment of discrete adit drainages throughout the Canyon Creek Watershed.

In mid-2011, EPA received notification from Hecla Mining Company (Hecla) that it may seek to refurbish and re-open the Hecla-Star Mine and Mill Site Complex (BUR128) located in the Canyon Creek Watershed, pending the outcome of viability analyses that Hecla is currently conducting. Should Hecla decide to re-open this area for active mining, EPA would be responsible for completing the remedial actions identified in the Upper Basin Interim ROD Amendment at a schedule and sequence that would enable Hecla to conduct

[10] Input and observations from the BPRP and the Upper Basin PFT were obtained for these evaluations.

[11] The AWQC ratio is the concentration of a chemical in surface water divided by the AWQC for that chemical. For example, an AWQC ratio of 10 means the concentration is 10 times greater than the AWQC (the level that is considered to be protective of aquatic life). An AWQC ratio of one or less indicates that the water quality criterion is met. Site-specific AWQC for cadmium, lead, and zinc for ecological protection of the SFCDR watershed were developed by the State of Idaho (IDAPA 58.01.02.284) and have been adopted by EPA. Reference to AWQC in this document refers to these standards.

[12] Total lead concentration data represent the maximum values reporting for samples collected in May 2008 as part of the High-Flow and Low-Flow Surface Water Study (CH2M HILL, 2009a) and the Coeur d'Alene Basin Remedial Action Monitoring Program (CH2M HILL, 2009b).

its work of refurbishing and reopening the complex. Therefore, these actions are also currently being prioritized by EPA pending any further decisions by Hecla with regard to this property.

Within and among Upper Basin watersheds, EPA will also prioritize the implementation of cleanup actions to reduce the potential for recontamination of previously remediated areas. This will typically mean conducting work at sites that are topographically higher in a drainage area first, in order to avoid recontamination from sites above them.

EPA's initial implementation strategy for the Upper Basin will begin the cycle of adaptive management (described in Sections 4.5 and 7.1), whereby future decision-making incorporates and reacts to new data, conditions, constraints, and/or input from stakeholders and the local community. The strategy will be responsive to changed and emergent situations, such as accelerating cleanup to enable coordination with mining activities (e.g., the Hecla-Star Complex in the Canyon Creek Watershed) or adjusting projects to coordinate with the federal, Tribal, and state Natural Resource Trustees' plans or priorities.

EPA will also continue to work with the Upper Basin PFT as the cleanup proceeds, to review and discuss data and evaluate the effectiveness of implemented remedial actions, which will help focus and prioritize future cleanup actions. The PFT was instrumental in refining the actions selected in the Upper Basin Interim ROD Amendment (EPA, 2012b).[13] The Upper Basin PFT has been involved in the development and refinement of the tools and methodology used for remedial action prioritization and the implementation planning process since its inception, and the valuable input from this group will continue to be an important component of the adaptive management process.

2.2.2 Lower Basin

The SFCDR, which flows through the steeper, mountainous terrain of the Upper Basin, merges with the North Fork to form the main stem of Coeur d'Alene River, which flows through the palustrine Lower Basin into Coeur d'Alene Lake. The Lower Basin consists of an approximately 37-mile-long sinuous river channel connected with numerous floodplain lakes, marshes, and wetlands. Approximately 30 square miles of waterfowl habitat are located in the Lower Basin, 80 percent of which contain lead from mining wastes at concentrations acutely toxic to waterfowl; 95 percent of the wetlands have contaminant concentrations above chronic toxicity levels. The river channel contains an estimated 21 million cubic yards of contaminated sediments, and river banks and beaches along its length present exposed surfaces of contaminated material at concentrations up to 30 times the human health cleanup level. The ROD for OU 3 (EPA, 2002), which includes the Lower Basin, identifies preliminary or pilot-scale actions to address this contamination. Table 2-1 presents these actions identified in the ROD for OU 3. Since the ROD for OU 3 was issued, additional data have been collected and EPA's understanding of the nature and extent of

[13] The PFT is a subgroup of the Basin Commission primarily composed of representatives from EPA, the State of Idaho, Shoshone and Kootenai Counties, the Coeur d'Alene and Spokane Tribes, the State of Washington, BLM, USFWS, USFS, and interested citizens.

contamination in the Lower Basin has continued to evolve, and these actions may need to be modified and/or expanded upon in subsequent decision documents.

EPA also continues to pursue data collection and analysis efforts in the Lower Basin to support the future development and evaluation of remedial alternatives. After these studies have been completed, EPA expects to select additional cleanup actions, subject to public comment, to address contamination issues in the Lower Basin. Although the Lower Basin is not included in the Upper Basin Interim ROD Amendment, actions in the Upper Basin are expected to improve water quality and reduce the movement of contaminated sediments downstream into the Lower Basin. Thus, the Upper Basin cleanup is expected to complement cleanup activities in the Lower Basin by reducing the flow of contaminated materials and reducing the potential for recontamination from the Upper Basin to the Lower Basin. Subsequent versions of this Implementation Plan will include additional specific cleanup actions for the Lower Basin.

2.3 Additional Supporting Activities

Throughout the duration of the cleanup it will be necessary for EPA to continue various studies, technical oversight, and ancillary activities necessary to implement a cleanup program of the size and complexity of that required for the Bunker Hill Superfund Site. These additional activities and demands on available funding will include:

- Repository development and management: Existing repositories currently being used to manage contaminated soil include those at Big Creek, Page, and East Mission Flats. Two new repositories, the Lower Burke Canyon Repository (formerly the Star Tailings Impoundment) and the Osburn Tailings Impoundment, are planned for development in the Upper Basin. To the extent practicable, operation of these repositories will utilize options for waste segregation, reuse, or other approaches to preserve the long-term capacity of these repositories.
- Environmental monitoring: The BEMP and project-specific monitoring are ongoing activities that will be used to support the adaptive management process. The BEMP will consolidate all the Basin-wide environmental monitoring efforts to look at the Upper and Lower Basins more holistically and to monitor long-term status and trends, while project-specific monitoring will be used to evaluate the effectiveness of specific remedial actions. This work will include support agency agreements with USFWS, the U.S. Geological Survey (USGS), and the Coeur d'Alene Tribe for conducting monitoring activities.
- Support agency agreements with the State of Idaho to provide oversight, conduct monitoring, and/or implement cleanup actions at the Bunker Hill Superfund Site in coordination with EPA.
- Community outreach activities and facilitation of meetings.

SECTION 3.0

Implementation of Remedies

This section provides summaries of and general implementation approaches and timelines for the remedial actions planned to achieve protection of human health in communities, the remedial actions planned to achieve protection of human health and the environment outside communities, and additional supporting activities. Throughout this section, general implementation timeframes are presented in graphical form. These graphics show cleanup designs and actions currently anticipated as being "more certain" or "less certain" based on EPA's priorities and funding considerations. In general, actions planned for the next few years are more certain than actions planned towards the end of the 10-year period. In general, as the cleanup moves forward adjustments in the specific types and locations of work will be made, especially where the goals and approaches of several remedies are best employed together. As discussed in Section 7.0, EPA will update this Implementation Plan as necessary to reflect adjustments to the implementation approach.

3.1 Protection of Human Health in Communities

As discussed in Section 2.0, EPA's priority for the Site has consistently been and will continue to be focused on actions that protect human health. During the next 10 years, EPA will focus on the completion of (1) the property cleanup program in OU 3 that began in 1997, (2) actions to address roads that may have been damaged by cleanup activities, so that those roads can continue to serve as barriers to underlying contamination (the Roadway Surface Remediation Strategy), and (3) actions to protect existing remedies that have already been implemented and may be at risk from stormwater runoff or tributary flooding. These actions and general implementation approaches and timeframes are described in Sections 3.1.1 through 3.1.3, respectively.

3.1.1 Basin Property Remediation Program

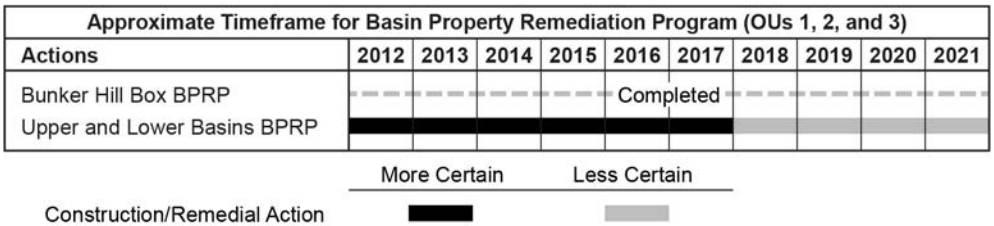
Description of the Work

The property cleanup work that remains for OU 3 will be a continuation of the existing BPRP. As with the OU 1 and OU 2 property cleanup programs, residential, commercial (e.g., churches, schools, parks, and businesses), and ROW properties in OU 3 with soil sampling results exceeding action levels for lead or arsenic are being remediated, if landowners provide their consent for the work. When necessary, the remediation involves removal of up to 12 inches of contaminated soil and replacement with clean soil and sod or clean gravel or covering the surface with asphalt, forming a clean barrier. Individual properties must be properly managed to prevent clean barriers from becoming recontaminated. As this program nears completion, particularly for community areas, the remaining work may need to be prioritized in consideration of the risks and the availability of cleanup funds.

General Implementation Approach and Timeframe

Property cleanups in OU 3 have continued during the 2012 field season. Targeted property sampling to identify the remaining properties requiring cleanup is expected to be completed

by 2013, and the cleanup program is anticipated to be substantially complete in 2017 (BEIPC, 2011) depending on the amount of work funded each year. After that point it is expected that the program will continue at a smaller scale, and will focus on smaller projects and addressing potential issues with previously remediated properties. After 2017 the BPRP is expected to be nearing completion, but it is uncertain when it will be fully implemented. This program will continually be evaluated to ensure that it is being effectively and efficiently implemented, and adjustments may be made over time.



3.1.2 Roadway Surface Remediation

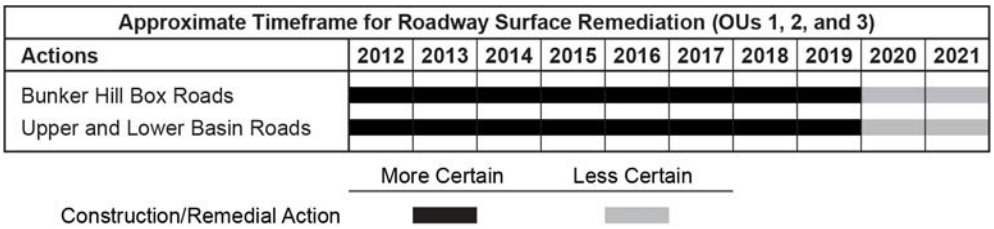
Description of the Work

As discussed in Section 2.1.2, the basic elements of the Roadway Surface Remediation Strategy involve the identification and approval of proposed projects, dispersal of EPA funds to local jurisdictions to design and construct the projects, construction of the projects, and documentation of the completed work.

The work will involve sampling unpaved road surfaces, shoulders, and embankments to determine whether metals concentrations exceed cleanup action levels. It is assumed that local entities will continue to maintain transportation infrastructure within their respective jurisdictions, including paved and unpaved roads that serve as barriers to exposure. However, due to the increased wear and tear associated with the residential cleanup activities, one-time remediation funding will be provided to local jurisdictions to help repair the paved roads or road segments in the most deteriorated condition. The Roadway Surface Remediation Strategy developed by EPA and IDEQ provides details of how this work will be funded and conducted.

General Implementation Approach and Timeframe

EPA and IDEQ anticipate that unpaved road surface sampling will be completed by the end of the 2012 field season, and work to clean up contaminated unpaved roads within OU 3 will begin shortly thereafter. The planning and implementation of this work will be conducted in close coordination with local jurisdictions and with the BPRP. For paved roads, the Roadway Surface Remediation Strategy identifies roads or road segments within OU 1, OU 2, and OU 3 that are eligible for funding and provides prioritization guidelines for local jurisdictions to use in proposing specific projects. It is anticipated that the Roadway Surface Remediation Strategy will be implemented during the next eight years, depending on available funding. Because the residential cleanup work contributing to road deterioration has been completed in the Bunker Hill Box (OU 1 and OU 2), EPA expects that the paved roadway work in these areas may be completed before the work in OU 3.



3.1.3 Remedy Protection

Description of the Work

Remedy protection actions in the Upper Basin include stormwater control actions to protect the existing human health remedies against stormwater runoff, tributary flooding, and heavy rain and snowfall which could cause damage leading to human exposure to underlying contamination. These actions are intended to reduce the potential for erosion and recontamination of existing clean barriers installed within community areas in the Upper Basin (including the Bunker Hill Box). Major components of these actions include:

- Specific remedy protection actions, such as culvert replacements, channel improvements, diversion structures, and asphalt ditches, identified in the eight primary Upper Basin communities (Pinehurst, Smelterville, Kellogg, and Wardner in OUs 1 and 2; Osburn, Silverton, Wallace, and Mullan in OU 3), and
- Identification of generalized remedy protection actions that will be needed in side gulches in the Upper Basin (in OUs 1, 2, and 3).[14]

Figure 3-1 shows the remedy protection projects identified for the eight primary Upper Basin communities listed above, and indicates the side gulch areas located outside these communities. Appendix G (particularly Attachment G-3) in the FFS Report for the Upper Basin (EPA, 2012a) provides additional details regarding the remedy protection projects described in the Upper Basin Interim ROD Amendment (EPA, 2012b).

EPA and IDEQ plan to conduct additional analyses to define remedy protection projects in the side gulches to the same level of detail as the projects defined for the eight primary communities. Detailed remedy protection projects have not been identified for the side gulches because less information is currently available about the side gulch drainage areas. Selection of site-specific remedy protection actions for the side gulches will be accomplished through future ESDs or other decision documents.

At this time, remedy protection projects focus on the Upper Basin. As previously discussed, remedy protection projects aim to reduce the potential for erosion and recontamination of existing clean barriers installed within community areas resulting from stormwater runoff, tributary flooding, and heavy rain and snowfall. Due to the relatively steep topography in the Upper Basin this potential for damage to existing barriers is greater than in the Lower

[14] Side gulches are defined as tributaries of the SFCDR where lower densities of residential populations are located in the Upper Basin and, therefore, fewer of the existing Selected Remedies have been implemented. Section 9.0 of the FFS Report (EPA, 2012a) provides a list of the Upper Basin side gulches.

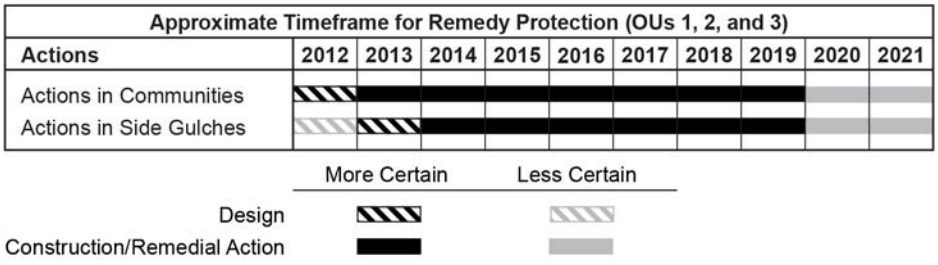
Basin. If remedy protection projects are identified for the Lower Basin in the future, these projects will be described in future decision documents.

General Implementation Approach and Timeframe

Design of remedy protection projects began in 2012 and construction of these projects is expected to begin in 2013. Depending on funding rates, the remedy protection actions may be completed in approximately eight years.

The sequence in which remedy protection projects will be implemented will be determined based on frequency of flooding and storm events for a watershed, construction impacts to local communities, geographical locations, scopes of work, seasonal construction limitations, permitting, funding availability, agreements by local parties to perform long-term maintenance, and private property easement needs. For example, those projects that require fewer private property easement issues to be addressed, need less permitting, and/or are not dependent on seasonal construction may be implemented first because the time necessary for design will be less. In contrast, remedy protection projects that require more comprehensive design, permitting, and/or easement needs (e.g., projects located within the ROWs of Interstate 90 [I-90] or the Trail of the Coeur d'Alenes) will be implemented in later years.

EPA, IDEQ, and the Trust will communicate design plans, easement and maintenance needs, and implementation schedules for specific remedy protection projects to local communities, affected residents, and jurisdictions (i.e., cities and counties). This will allow communities to plan accordingly for construction activities and, in some cases, may provide opportunities for communities to conduct other locally-funded capital improvement projects in coordination with remedy protection activities.



3.2 Protection of Human Health and the Environment Outside Communities

As discussed in Section 2.2, EPA is prioritizing cleanup actions at OU 2 and OU 3 sites that currently pose the greatest risks to human health and the environment. Based on this approach, in the Upper Basin EPA plans to conduct cleanup actions that address source control and water treatment in Ninemile Creek (Section 3.2.1) and water treatment in the Bunker Hill Box (Section 3.2.2), As these cleanup actions are nearing completion, EPA will begin implementing water treatment actions in Canyon Creek as well as potential cleanup of the Hecla-Star Complex (and adjacent sites) in Canyon Creek (Section 3.2.3). In the Lower Basin (Section 3.2.4), EPA is prioritizing pilot studies and pilot projects that can be used to identify appropriate remedial actions to be taken as soon as possible.

3.2.1 Upper Basin: Ninemile Creek Watershed

Description of the Work

The Ninemile Creek Watershed has been identified as a priority for cleanup as discussed in Section 2.2.1. The Selected Remedy for the Ninemile Creek Watershed, presented in the Upper Basin Interim ROD Amendment (EPA, 2012b), primarily includes source control remedial actions to address contaminated surface water, soil, sediments, and source materials. The majority of the remedial actions in the Ninemile Creek Watershed will focus on source control versus water treatment and, therefore, can be implemented before active water treatment infrastructure is in place. Major components of the remedial actions in the Ninemile Creek Watershed include:

- Extensive excavation and consolidation of waste rock, tailings, and floodplain sediments.
- Consolidation of excavated materials in a waste consolidation area located in the Ninemile Creek Watershed above the floodplain.
- Capping, regrading, and revegetation of tailings and waste rock areas.
- Collection and treatment of contaminated adit discharges and seeps either onsite (using semi-passive treatment systems) or at the CTP.
- Stream and riparian stabilization actions in conjunction with sediment and floodplain remedial actions.

General Implementation Approach and Timeframe

Based on principles of adaptive management, using qualitative input from stakeholders and quantitative data (e.g., water quality data; waste types, volumes, and contaminant concentrations; and modeling results), selected source sites within the East Fork of the Ninemile Creek Watershed were identified as the highest priority for initial remedial actions in the Upper Basin. Table 3-1 lists the mine and mill sites identified for prioritized remedial action in the Ninemile Creek Watershed. Additional field data gathering and pre-design efforts have begun to further characterize the mine and mill sites identified for the initial phase of remedial design (RD) and remedial action (RA). These additional efforts and the sites identified for RD/RA include:

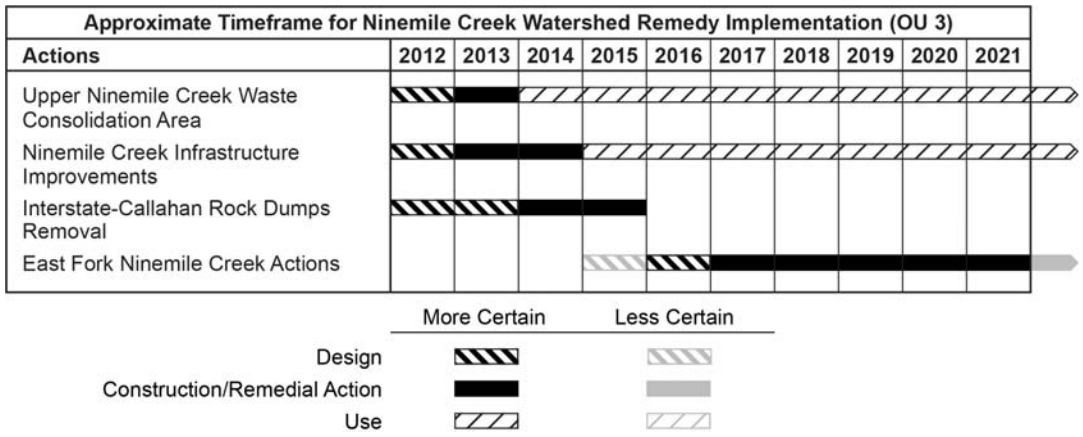
- Soil and groundwater sampling at the Interstate-Callahan (I-C) Rock Dumps (BUR053 and BUR160).
- Soil and groundwater sampling at the Tamarack Complex (BUR056, BUR058, BUR170, BUR171, BUR172, and BUR173).
- Soil and groundwater sampling at potential waste consolidation areas (WCAs).
- Soil and groundwater sampling at the Interstate Millsite (BUR055).
- Soil and sediment sampling of the East Fork Ninemile Creek impacted floodplain sediments (BUR140, OSB056, OSB057, OSB058, and OSB048).
- Soil sampling of the road infrastructure within the East Fork of Ninemile Creek.

- Initial remedial design of a WCA south of the I-C Rock Dumps.
- Initial remedial design for the removal of the I-C Rock Dumps to the WCA, including revegetation and re-establishment of a stable creek corridor through the site area.
- Initial design of infrastructure improvements (primarily access roads and culverts).
- Stream and riparian stabilization actions in conjunction with sediment and floodplain remedial actions as appropriate.

As described further in Section 4.0, EPA will be responsible for selecting which projects will be conducted and in which order.

Figure 3-2 shows the locations of the highest-priority remedial actions that will be implemented within the Ninemile Creek Watershed during the next 10 years. Stakeholder input will continue to be sought during the remedial action prioritization and implementation planning process (e.g., through the Basin Commission's Upper Basin PFT).

In the near term, design activities associated with the I-C Rock Dumps, a WCA located south of the I-C area, and infrastructure improvements have begun, and it is anticipated that designs will be completed (to the 100-percent design level) early in 2013. The construction phase of the Upper Ninemile Creek WCA project will be implemented first to provide the necessary storage capacity for the I-C waste. It is anticipated that construction of the Upper Ninemile Creek WCA will begin in 2013 and the I-C Rock Dumps removal actions in 2014. After the I-C Rock Dumps removal actions are complete or nearing completion, EPA will begin the design and implementation of remedial actions at other East Fork Ninemile Creek sites (as identified in Figure 3-2).



3.2.2 Upper Basin: Bunker Hill Box (OU 2)

Description of the Work

The Upper Basin Interim ROD Amendment (EPA, 2012b) includes a number of OU 2 Phase II cleanup actions[15] to address ongoing water quality issues. Major components of the Phase II remedial actions for the Bunker Hill Box identified in the Interim ROD Amendment are:

- Actions to reduce the flow of contaminated groundwater entering the SFCDR and Government Creek.
- Conveyance of the CTP effluent (i.e., clean, treated water) directly to the SFCDR in a pipeline to prevent recontamination through contact with contaminated subsurface Box soil.
- Water management actions and/or collection and treatment of contaminated flow from the Reed and Russell Adits.
- Expansion and upgrade of the CTP to provide treatment of collected water from OU 2, consistently achieve discharge requirements, allow for operation of the CTP in high-density sludge mode, and reduce the volume of waste sludge generated.

The specific remedial actions for the Bunker Hill Box consist of:

- Installing a groundwater interception drain along the northwest end of the CIA that would then extend south from the drain across the SFCDR valley, terminating on the east side of Government Gulch.
- Conveying the collected water from the groundwater interception drain to the CTP for treatment.
- Lining Government Creek; installing a slurry wall (on the upgradient end of the liner) and extraction wells across Government Gulch.
- Installing extraction wells across the mouth of Government Gulch and conveying the collected water to the CTP for treatment.
- Conveying treated CTP effluent directly into the SFCDR via a pipeline installed on the east side of the CIA or in a pipe along Bunker Creek.
- Phased implementation of the Reed and Russell Adit actions discussed above. The initial phase of this action consists of installing a check dam within the Reed and Russell Adits to redirect acid mine drainage (AMD) back into the mine and prevent it from flowing out of the adit. If the required water quality criteria are not achieved in the residual Reed and Russell Adit discharge, additional measures will be implemented to collect and convey the AMD to the CTP for active treatment[16].

[15] The ROD for OU 2 (EPA, 1992) identified source control actions (referred to as Phase I cleanup actions) for OU 2 and groundwater collection and treatment actions (referred to as Phase II cleanup actions). This Implementation Plan summarizes the Phase II cleanup actions for OU 2, which were further defined in the Upper Basin Interim ROD Amendment and focus on groundwater collection and treatment.

[16] The Reed and Russell Adits are part of the Bunker Hill Mine, and the implementation of actions at the Reed and Russell Adits may be affected by potential changes in ownership and/or operation of the Bunker Hill Mine.

- Upgrades to the CTP to increase treatment capacity for an estimated average flow of 3,900 gallons per minute (gpm) of contaminated groundwater from actions listed above.
- Construction of a new sludge storage facility for the CTP sized to accommodate sludge generated from OU 2, OU 3, and Bunker Hill mine water.

Figure 2-3 and Table 3-2 present the planned remedial actions for the Bunker Hill Box.

General Implementation Approach and Timeframe

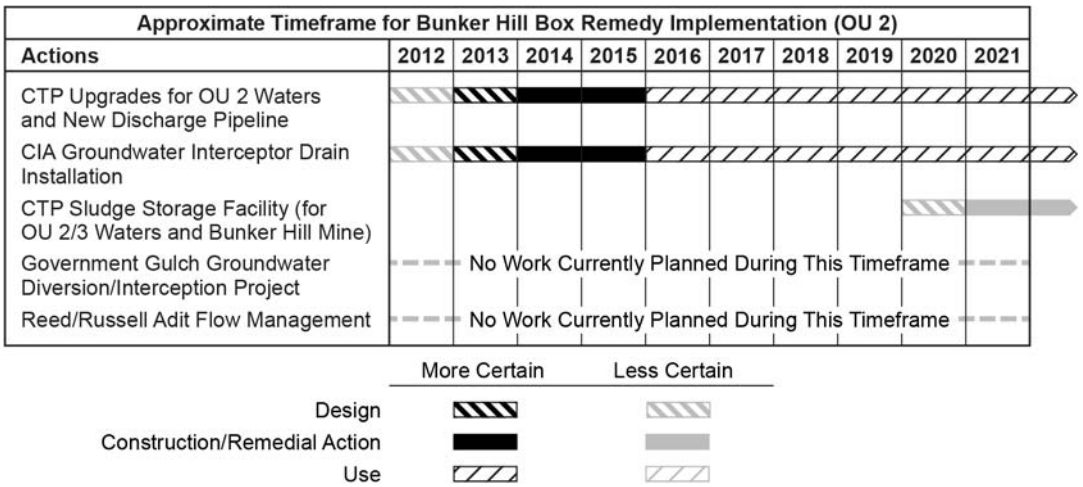
The highest-priority actions for OU 2 are groundwater collection and treatment. These include installing the CIA groundwater collection drain and conducting upgrades to the CTP. CTP upgrades will include changing the discharge location from Bunker Creek directly to the SFCDR to avoid recontamination.. These groundwater collection and treatment actions are expected to provide the single greatest load reduction of dissolved zinc to surface water out of all the remedial actions identified in the Upper Basin Interim ROD Amendment. These actions are also of relatively low cost: they account for only 3 percent of the total capital cost presented in the Interim ROD Amendment.

Prior to implementing the full actions, pre-design data gathering; consideration of the recommendations resulting from the CTP optimization evaluation (Tetra Tech, 2012); consideration of the outcome of negotiations between EPA and IDEQ about IDEQ potentially taking on O&M for OU 2 water collection and treatment actions, including CTP operation; and engineering analyses will be taken into account during remedial design. The data gathering and analyses will include the following:

- Developing a refined version of the Basin-wide groundwater flow model in the vicinity of the CIA groundwater collection drain, and performing simulations to identify key data gaps and optimize drain configuration and performance.
- Geotechnical drilling and aquifer testing to better understand constraints that may impact implementability, constructability, and future operations.
- Pilot-scale treatability studies of a blend of OU 2 groundwater and Bunker Hill mine water to support CTP upgrades and optimization of the water treatment process.

It is expected that remedial design work for the CIA groundwater collection drain and the CTP upgrades will be conducted from 2012 through 2013. These remedial actions are expected to be constructed from 2014 through 2016. The existing CTP sludge storage cell will need to be closed sometime in the future as it is expected to reach capacity, and a new sludge storage cell will be constructed. The exact timing will be determined by sludge disposal volume generation rates, but it is currently estimated that a new sludge disposal cell will be needed around 2021.

The OU 2 actions for Government Creek are of lower priority because they will provide significantly less reduction in dissolved metals loading to surface water. It is not expected that the Government Gulch actions will be implemented within the next 10 years. The timing of the implementation of actions at the Reed and Russell Adits is unknown at this time because of potential changes in ownership of the Bunker Hill Mine.



3.2.3 Upper Basin: Canyon Creek Watershed

Description of the Work

A portion of the Canyon Creek Watershed has also been identified as a priority area for cleanup, as discussed in Section 2.2. The Selected Remedy for the Canyon Creek Watershed, presented in the Upper Basin Interim ROD Amendment (EPA, 2012b), includes source control and water treatment remedial actions to address contaminated surface water, soil, sediments, and source materials. Major components of the remedial actions in the Canyon Creek Watershed include:

- Extensive excavation and consolidation of waste rock, tailings, and floodplain sediments.
- Consolidation of excavated materials in WCAs located above the floodplain and/or in regional repositories.
- Capping, regrading, and revegetation of tailings and waste rock areas.
- Collection and treatment of contaminated adit discharges at the CTP.
- Collection and treatment of contaminated groundwater in Woodland Park using a combination of stream liners and groundwater interception drains.
- Stream and riparian stabilization actions in conjunction with sediment and floodplain remedial actions.

General Implementation Approach and Timeframe

Based on principles of adaptive management, using qualitative input from stakeholders and quantitative data (e.g., water quality data; waste types, volumes, and contaminant concentrations; and modeling results), water treatment actions in Canyon Creek were identified as the priority for initial remedial actions in this watershed. The Upper Basin Interim ROD Amendment identifies a combination of stream liners and groundwater interception drains for areas of Woodland Park (see Figure 3-3). The Interim ROD Amendment also includes collection and treatment of adit drainages at various mine and

mill sites in the Canyon Creek Watershed (see Figure 3-4). Table 3-3 presents the prioritized water treatment actions identified for the Canyon Creek Watershed.

The collected surface water and groundwater will be treated at the CTP in Kellogg; therefore, a pipeline will need to be constructed from Kellogg to Canyon Creek. The route of the pipeline is not yet determined, and easement and access agreements will need to be obtained. In addition, the CTP will need additional upgrades in capacity to treat this additional water from Canyon Creek.

Prior to implementing the full actions, pre-design data gathering and engineering analyses will be conducted to aid in remedial design. The data gathering and analyses will include the following:

- Developing a refined version of the Basin-wide groundwater flow model in the vicinity of Woodland Park, and performing simulations to identify key data gaps and optimize the groundwater collection system configuration and performance.
- Geotechnical drilling and aquifer testing to better understand constraints that may impact implementability, constructability, and future operations.
- Obtaining various easements and access agreements to allow for the construction of a pipeline from the CTP to Canyon Creek.
- Conducting pilot-scale treatability studies of a blend of OU 2 groundwater, OU 3 groundwater, and Bunker Hill mine water to support CTP upgrades and optimization of the water treatment process.
- Sampling of adit drainages in Canyon Creek to optimize collection and treatment of these waters.

Significant uncertainty is associated with exactly when EPA will implement these Canyon Creek water treatment actions because of the number of projects that have been prioritized ahead of these actions. Section 2.0 describes some of the factors used in setting these priorities. At this time, EPA expects that remedial design for the Woodland Park groundwater collection system, Canyon Creek Watershed adit drainage collection, pipeline infrastructure to the CTP, and upgrades to the CTP treatment system will begin in approximately 2017 or 2018. Construction of these remedial actions will begin in approximately 2019, depending on funding availability.

As discussed in Section 2.2.1, EPA has received notification from Hecla that it may seek to refurbish and re-open the Hecla-Star Mine and Mill Site Complex (BUR128) located in the Canyon Creek Watershed, pending the outcome of viability analyses that Hecla is currently conducting. The Upper Basin Interim ROD Amendment identifies remedial actions for this complex. In addition, three other mine sites requiring remedial actions are immediately adjacent to the Hecla-Star Complex (Hidden Treasure Mine [BUR097], Hercules No. 5 [BUR098] and Tiger-Poorman Mine [BUR129]). For cost efficiency, it is anticipated that these sites will be addressed at the same time as the Hecla-Star Complex. Figure 3-5 shows the locations of these sites.

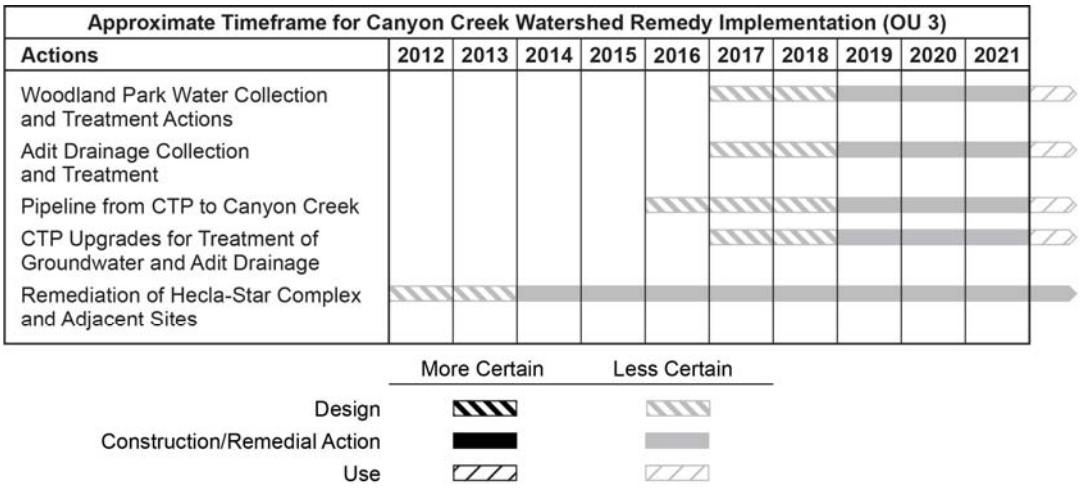
The actions identified for these sites in the Upper Basin Interim ROD Amendment include:

- Excavation and consolidation of upland tailings, and mill site decontamination at the Hecla-Star Mine and Mill Site Complex (BUR128).
- Regrading, consolidation, and revegetation of upland waste rock and adit drainage collection and treatment at the Hidden Treasure Mine (BUR097).
- Excavation and consolidation of upland waste rock (potentially intermixed with tailings) and adit drainage collection and treatment at Hercules No. 5 (BUR098).
- Excavation and consolidation of upland tailings and adit drainage collection and treatment at the Tiger-Poorman Mine (BUR129).

A summary of the remedial actions for addressing tailings, waste rock, and mill site decontamination for the Hecla-Star Complex and adjacent sites is provided in Table 3-4. It should be noted that Hecla will conduct demolition of existing buildings as needed to support its planned refurbishment of the area. Adit drainage collection and treatment actions for sites BUR097, BUR098, and BUR129 are included in Table 3-3 and Figure 3-4.

Because of the current uncertainty regarding when and if the Hecla-Star Complex will be reopened, EPA has begun pre-design data collection sufficient to support the initial source control actions at the four sites identified above. Pre-design data collection is anticipated to continue in 2013. This data collection effort will support the development of initial cleanup concepts and preparation of a basis-of-design document. Should Hecla decide to re-open the Hecla-Star Complex in the near term, EPA could accelerate the RD/RA process for this area.

As previously discussed, the Upper Basin Interim ROD Amendment specifies additional source control actions in the Canyon Creek Watershed (besides those at the Hecla-Star Complex) that will likely be needed, but these actions may not be implemented during the next 10 years.



3.2.4 Lower Basin Studies and Potential Pilot Projects/Remedial Actions

Description of the Work

Given the magnitude and complexity of contamination in the Lower Basin, EPA is working with stakeholders on streamlined approaches and pilot studies for remedial actions that can

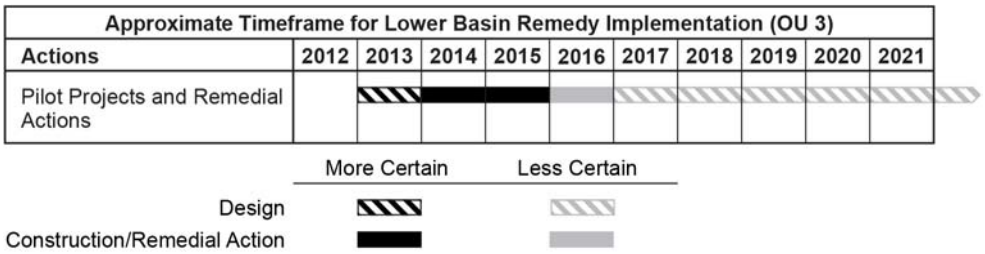
be implemented as soon as possible because of the ongoing risk of recontamination from regular flooding in the Lower Basin. EPA is also continuing to characterize Lower Basin contaminated sediment transport processes to support other effective source-control remedy decisions in the Lower Basin. This work will fill data gaps and help refine the Enhanced Conceptual Site Model (ECSM) for the Lower Basin (CH2M HILL, 2010); it will also include sediment transport modeling that will help guide effective decision-making regarding future remedial actions in the Lower Basin.

General Implementation Approach and Timeframe

To date, data collection and analysis in the Lower Basin have focused on defining the details of contaminant sources, pathways, and deposition areas); model development and calibration; and refinement of the ECSM in order to identify effective remedies that will target the sources of contamination and minimize the risk of recontamination. Going forward, the general Lower Basin approach consists of:

- Synthesizing the data collected to date and conducting preliminary simulations using one and two-dimensional hydraulic modeling tools to characterize the system (i.e., evaluate the suspension, transport, and distribution of contaminated sediments during various historical "design" flood events). This work is being conducted in 2012 and will continue in 2013.
- Continuing to fill data gaps to adequately understand the sources of contaminated sediments, how they move through the Basin, and where they are deposited.
- Developing sediment transport models to evaluate the effectiveness of potential remedial actions. This work will begin in 2013.
- Identifying and evaluating potentially effective remedial actions and the timing, locations, and sequencing of those actions. This work will also begin in 2013.
- Conducting pilot projects to help support evaluation of and/or remedial design for potential future remedial actions.
- Monitoring and assessing contaminant transport in the Lower Basin, including the effectiveness of implemented remedial actions.

Data collection in the Lower Basin is ongoing. Sediment movement occurs primarily during flooding events in the winter and spring, and sampling is focused on these events. Other studies will seek to better characterize the river channel and banks, and off-channel lake, wetland, and floodplain areas. The scale and complexity of contamination in the Lower Basin requires an iterative approach to data collection and remedial option evaluation. Opportunities to conduct pilot studies are being identified and evaluated, with consideration of potential effectiveness and risks of recontamination. These potential remedies will be considered in the context of the ROD for OU 3 (EPA, 2002) or other appropriate CERCLA decision documents in the future as needed to support planned actions. By 2017 it is expected that work in the Lower Basin will consist of design and development of appropriate CERCLA decision documents.



3.3 Additional Supporting Activities

Additional activities that will support the cleanup efforts described in Sections 3.1 and 3.2 include continued work in the siting of repositories to contain waste rock, soil, and sediments from cleanup and ICP-regulated activities, continued environmental monitoring, and other ongoing supporting activities. These are discussed in Sections 3.3.1 through 3.3.3.

3.3.1 Repository Development and Management

Description of the Work

Consistent with the Basin Commission's *Final Coeur d'Alene Basin Five-Year (2012-2016) Work Plan* (BEIPC, 2011), repository activities will center on three objectives: (1) operations at the Big Creek Repository and the East Mission Flats Repository; (2) development of additional repository sites in the Upper Basin to accommodate both cleanup and ICP wastes; and (3) revision and implementation of the Waste Management Strategy for the Basin. The Page Repository, located within the Bunker Hill Box, is also being considered for expansion. However, the Big Creek Repository, which is currently used to manage contaminated soil from areas in the Upper Basin, is projected to reach its maximum capacity by 2015. Therefore, development of additional repository space in the Upper Basin is a high priority.[17]

Beginning in 2007, EPA and IDEQ initiated a process that involved screening more than 90 Upper Basin sites as potential repository locations. The screening was based on two primary criteria: (1) the site is not being actively used by its owners, and (2) the site can provide a repository capacity of at least 500,000 cubic yards. Local residents came together in public workshops in 2009 and worked with EPA and IDEQ to shape the development of nine citizens' criteria that were used to narrow the list of sites to two: a portion of the Star Tailings Impoundment (now referred to as the Lower Burke Canyon Repository), and the Osburn Tailings Impoundment Repository. EPA and IDEQ initially favored developing the latter repository first, but in light of the prioritization of work in the Ninemile and Canyon Creek Watersheds (described in Section 3.2), EPA and IDEQ are now focused on developing the Lower Burke Canyon Repository first, as it is more aligned with the Upper Basin remedial strategy and implementation sequence. Figure 3-6 presents the locations of current and proposed repositories.

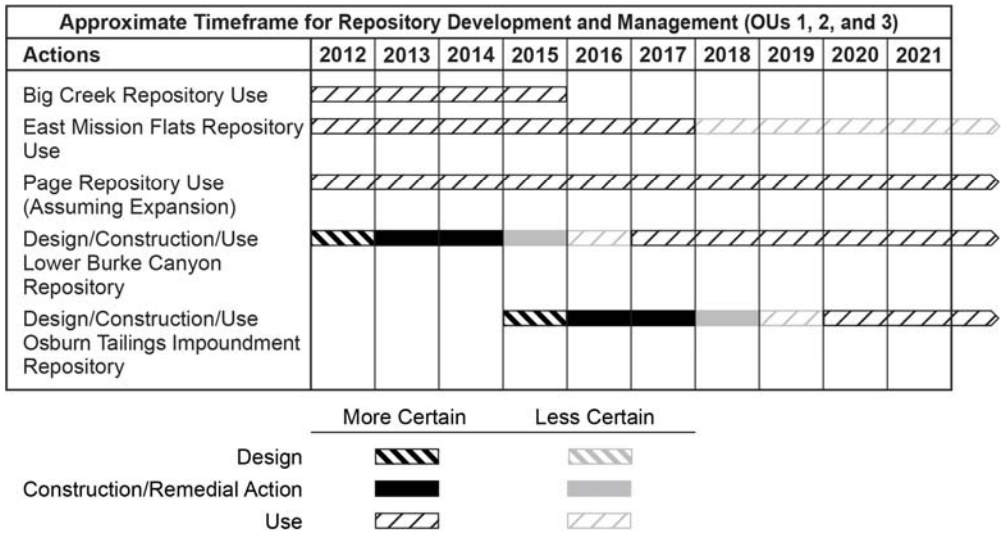
[17] As discussed in the Upper Basin Interim ROD Amendment (EPA, 2012b), EPA plans to minimize the amount of material placed in regional repositories by using local waste consolidation areas (WCAs) in SFCDR tributary drainages.

Additional repository space in the Lower Basin will also be needed in the future to accommodate the large volumes of contaminated floodplain sediments.

General Implementation Approach and Timeframe

EPA plans to have the Lower Burke Canyon Repository design completed in 2013[18] and the repository functional by 2015. Because the Osburn Tailings Impoundment Repository was originally intended to be developed first, significant progress has been made by IDEQ toward the 30-percent design for this repository. EPA, in coordination with IDEQ, still plans to acquire the Osburn Tailings Impoundment property from U.S. Silver Corporation in exchange for property owned by EPA at Burns-Yak, then to complete the design, provide the opportunity for public comment, and construct the repository to coordinate with other Upper Basin needs such as receiving wastes resulting from remedial actions and maintaining sufficient ICP waste capacity.

Continued study of the Lower Basin (discussed in Section 3.2.4) will allow EPA to predict and update repository volume needs in order to support the repository siting process for the Lower Basin. Subsequent updates to this Implementation Plan will identify the scoping and planning for a Lower Basin repository.



3.3.2 Environmental Monitoring

Environmental monitoring conducted as part of the BEMP or on a project-specific basis will continue during the next 10 years. As described in detail in Section 7.2.2, environmental monitoring will be used to inform the adaptive management process, evaluate the effectiveness of cleanup actions, and support statutorily required Five-Year Reviews of remedy effectiveness and protection of human health and the environment.

3.3.3 Ongoing Supporting Activities

EPA will continue to work with the State of Idaho in accordance with support agency agreements. These agreements will allow the State of Idaho to provide oversight, conduct

[18] The current plan is for the 60-percent design to be complete at the end of 2012.

monitoring, and/or implement cleanup actions at the Bunker Hill Superfund Site in collaboration with EPA.

In addition in collaboration with IDEQ, EPA will continue to conduct community outreach activities as described in detail in Section 6.0. EPA will also continue to facilitate public meetings and open houses as necessary and participate in meetings such as those of the Basin Commission.

3.4 10-Year Implementation Timeframe and Anticipated Major Accomplishments

Figure 3-7 presents an overall view of the anticipated remedial implementation timeframe for actions to protect human health and the environment in communities and outside communities, and to provide support for these actions.

As indicated in the figure, actions to protect human health, including those associated with the BPRP and the Roadway Surface Remediation Strategy, are expected to be completed within the next five to 10 years depending on funding availability. Priority actions along the East Fork of Ninemile Creek, including design and construction of the Upper Ninemile Creek WCA, Ninemile Creek infrastructure improvements, and removal of the I-C rock dumps, are expected to be completed within five years, as are the design and construction of upgrades to the CTP and of the CIA groundwater interception drain in OU 2. Implementation of the water treatment actions in Canyon Creek is expected to begin in approximately five years. Design and construction of the Lower Burke Canyon and Osburn Tailings Impoundment Repositories are also expected to be completed within approximately five years depending on funding availability and waste projections.

Remedy protection actions in both communities and side gulches may take longer than five years, as may additional remedial actions along the East Fork of Ninemile Creek, but these actions are expected to be completed by 2022. It is expected that the Big Creek Repository will be closed within 10 years; however, the East Mission Flats, Page, Lower Burke Canyon, and Osburn Tailings Impoundment Repositories will be used for many years in the future.

The major accomplishments expected by EPA at the Bunker Hill Superfund Site during the next 10 years include the following:

- Complete the BPRP.
- Conduct road repairs using the Roadway Surface Remediation Strategy to ensure continued protection of human health in communities.
- Complete remedy protection actions.
- Implement CTP upgrades for the combined OU 2 collected groundwater and Bunker Hill mine water, and construct the CIA groundwater interception drain in the Bunker Hill Box.
- Implement high-priority actions along the East Fork of Ninemile Creek.
- Begin the implementation of Canyon Creek water collection and treatment actions and some limited source control actions as funding allows.

- Conduct Lower Basin pilot projects that will improve the understanding of the Lower Basin and methods to address risks which can then be used to select and implement future remedial actions.

SECTION 4.0

Implementation Process

This section provides a description of the implementation process at the Site-wide and project-specific levels. This section focuses on the implementation of cleanup actions and does not account for other activities that are ongoing at the Bunker Hill Superfund Site (e.g., planning for Lower Basin pilot studies, repository siting, and environmental monitoring and reporting). EPA is the lead agency for the Site and is therefore responsible for making decisions regarding the funding and implementation of cleanup actions. As described previously, EPA will collaborate with many entities during the implementation of cleanup actions including IDEQ, the Coeur d'Alene and Spokane Tribes, the Trust, federal agencies (e.g., USFS and USFWS), the State of Washington, and other local entities.

The implementation process for the BPRP is well established, and that process will continue until remedial action objectives (RAOs) are achieved. For the remaining work including roadway surface remediation, remedy protection, remediation of mine and mill sites in the Upper Basin, and continued study and remedial actions in the Lower Basin, implementation is expected to be conducted using a phased approach.

Table 4-1 summarizes the implementation phases and the typical documentation expected to be developed for each phase. The implementation phases are:

- Program planning
- Project planning
- Remedial design
- Remedial action
- Effectiveness assessment/adaptive management

Figure 4-1 illustrates the generalized implementation process, showing how the work will be organized at the Site-wide and project-specific levels. An overview of each implementation phase is provided below.

4.1 Program Planning

Overall program planning by EPA will be driven by the remedies identified in the decision documents for OUs 1, 2, and 3 and subsequent Five-Year Reviews for the Bunker Hill Superfund Site. The program planning phase consists of initial program setup to provide the framework and the written procedures that will govern how the overall program will be managed, tracked, and reported. EPA will be responsible for selecting which projects will be conducted and in what order. Input from stakeholders will be taken into consideration, and the selection of projects will be guided by the decision documents for the Site, this Implementation Plan, and the adaptive management process.

EPA will develop the overall Program Management Plan while the Trust, and IDEQ for its designated areas of responsibility, will be responsible for developing the program-wide plans (or master documents) related to pre-design data collection (e.g., Health and Safety, Field Sampling, Quality Assurance, Data Management, and Reporting Plans), and design, construction, construction management, construction quality assurance/quality control (QA/QC), post-construction monitoring, and O&M. Trust- or IDEQ-prepared plans and documents associated with these activities will be subject to EPA review and approval.

4.2 Project Planning

The project planning phase consists of work related to the specific projects being implemented on an annual basis. This involves the development of project-specific plans during the pre-design phase (i.e., project-specific Health and Safety, Field Sampling, and Quality Assurance Project Plans). These project-specific plans can be subsets of or addenda to the overall program planning master documents.

4.3 Remedial Design

Remedial design is divided into pre-design and design phases, as shown in Table 4-1. Design of each project will begin with pre-design tasks aimed at addressing data quality objectives and RAOs, establishing required pre-design information needs, and developing the general design basis applicable to the project(s).

At this time it is envisioned that EPA will take the lead in defining the project-specific objectives and performance standards (consistent with the various decision documents), establishing the initial conceptual design technology approach, identifying historical data available for the site, identifying other considerations such as available site access, and the potential for collaborative work with the NRRT[19] projects. Project teams will identify key data gaps relative to RD/RA implementation for the project(s) that will form the basis of the initial work plan for RD development. It is also envisioned that EPA will lead cultural resource (National and State Historic Preservation Act) assessments, Clean Water Act assessments, and Endangered Species Act assessments for the work effort through a Basin-wide programmatic approach; however, after Basin-specific protocols for conducting these types of assessments have been established with the applicable agency, portions of this work may be transferred to IDEQ or the Trust.

Pre-design data gathering activities will be implemented based on the data gap evaluation conducted by EPA, and considering the pre-design elements needed to execute the RD/RA. As part of the Trust's (or IDEQ's) pre-design data gathering, existing site data will be reviewed, additional investigations will be conducted as needed to support the design and establish baseline conditions, site surveying and mapping will be performed, and property ownership and access will be considered. An initial assessment of waste consolidation and reuse opportunities will also be made by the designated pre-design entity, as well as of potential waste quantities needing disposal in a regional repository or a WCA. The findings of the initial assessments will be coordinated with and communicated in a timely manner to

[19] As noted in Section 1.3, the Natural Resource Restoration Team (NRRT) includes the Coeur d'Alene Tribe, BLM, USFWS, USFS, IDFG, and IDEQ.

the EPA/IDEQ waste disposal team so that the information can be used in the repository planning and management activities.

Remedial design will generally be implemented in three phases: preliminary design, intermediate design, and pre-final/final design (Table 4-1). Preliminary design will take the design to approximately 15 to 30 percent complete and will include an initial cost estimate. Intermediate design will further the design to between approximately 30 and 60 percent complete and will refine the cost estimate. Required easements and access agreements will be obtained, and any supplemental site investigations will be conducted. To the extent applicable for a specific site, EPA will coordinate with the NRRT during the design process for restoration components that can enhance the overall goals of the project. The design will be considered final when construction plans and specifications for project bidding have been completed and approved by EPA. An engineer's estimate of the project cost will also be developed. For smaller, more routine projects, the typical three phases of design may be adjusted down to two phases as applicable.

4.4 Remedial Action

The construction phase will consist of the development of bidding,[20] construction, and post-construction documents. The level of effort required for bidding will depend on project complexity as well as the procurement approach being used. While the actual work will vary considerably depending on the project type, the construction phase will need to be programmatically consistent. This includes handling of submittals, contractor questions and change orders, construction safety requirements, and documentation of QC monitoring and QA checks. Post-construction tasks will also need to be programmatically consistent. It is critical that as-built surveys and record documents be developed and that these are similar from project to project in terms of format, level of detail, and completeness. O&M Plans also will be finalized during this phase and incorporated into the program-wide O&M documentation. The duration of the construction phase will depend on the project scope, and may require multiple construction seasons for large projects.

Project-specific monitoring will be conducted to support project design, guide construction activities, and track measures used to contain construction-related contaminant releases. Monitoring will also be performed to document changes during construction and to monitor constructability and implementation issues. Post-construction monitoring will be key to assessing remedy effectiveness and the achievement of RAOs and performance standards, and to demonstrating RA completion. The duration of post-construction monitoring will depend on site conditions and the type of action conducted. Documentation will include monitoring design documents and pre- and post-construction summary and impacts assessments. The entity leading and funding the project (i.e., EPA, IDEQ, and/or the Trust) will be responsible for implementing monitoring activities and collecting required data. EPA will be responsible for coordinating the interpretation of the data with respect to the achievement of RAOs and performance standards.

[20] Bidding for the cleanup actions is expected to occur at the completion of the design phase, and bid opportunities will be advertised. The length of the bidding period will be variable depending on the size and complexity of the work. To the extent practicable, this work will be contracted to local businesses and workers.

O&M will consist of operating and maintaining each project according to its O&M Plan, as well as tracking and reporting O&M costs and site-specific remedial component system performance. Another important aspect will be to assess and document the long-term integrity of the various decision document remedies for OUs 1, 2, and 3. Periodic operations reports will be developed that EPA will use to conduct each CERCLA-required Five-Year Review of the work conducted at the Bunker Hill Superfund Site. Specific O&M responsibilities will be decided on a project-by-project basis.

4.5 Effectiveness Assessment/Adaptive Management

Assessment of the effectiveness of the remedial actions conducted at the Bunker Hill Superfund Site during 2012-2022 will begin with the evaluation of monitoring data collected prior to and following implementation of the actions. These data will be used to update the conceptual site model (CSM) of each watershed, and will provide the basis for technical memoranda discussing contaminant containment forecasts and potential refinements to remedial technologies. The overall effectiveness and performance of project-specific remedial actions will be evaluated using the updated CSM as well as implementation tools that are described in Section 7.2.2. Refinement of the implementation tools and evaluation of repository needs will also be documented.

Adaptive management considers uncertainty and monitors and evaluates the effectiveness of remedial actions and cleanup technologies, including progress towards long-term cleanup goals. An adaptive management approach will enable the identification of lessons learned and the enhancement of site understanding to support overall design and implementation improvement in terms of remedy protectiveness, achievement of the overall RAOs for the various decision documents, work efficiency, and cost performance. EPA will be responsible for the overall adaptive management process, which is described in Section 7.0, but will rely on entities performing the work and/or conducting monitoring for input. The remedial action effectiveness assessments and the adaptive management process will be used to provide updates to future implementation plans, also as described in Section 7.0, and to potentially support changes described in future decision documents.

SECTION 5.0

Funding Considerations

An important consideration affecting implementation planning will be the amount and sources of funding available for remedial design, remedial actions, and long-term O&M of the completed actions. EPA recognizes the importance of securing and preserving sufficient resources to implement the Upper Basin Selected Remedy and other cleanup actions throughout the Bunker Hill Superfund Site, including actions in the Lower Basin.

To date, under the federal government's Superfund program (CERCLA), the States of Idaho and Washington and potentially responsible parties (either through conducting the cleanup themselves or using settlement funds) have collectively funded the majority of the studies and cleanup work conducted at the Site. At this time, it is uncertain how much of Congressionally-appropriated additional funds will be directed to the Bunker Hill Superfund Site through the federal Superfund program. In addition, EPA is statutorily prohibited from using federal-government-appropriated Superfund dollars to fund or conduct O&M. While federal funding for this site has declined, EPA Region 10 will continue to request additional federal appropriations to supplement the settlement funds received. The currently available sources of funding for ongoing cleanup of the Bunker Hill Superfund Site are discussed below.

5.1 Current Sources and Management of Funding for Cleanup

This section describes two sources of funding currently available to EPA to support cleanup at the Bunker Hill Superfund Site and how these funds will be managed.

5.1.1 Current Sources of Funding for Cleanup

In December 2009, as part of the Asarco bankruptcy settlement, funding was secured for Superfund response actions at the Site, including the Bunker Hill Box and the broader Coeur d'Alene Basin. However, most of the settlement monies, about $486 million, can only be used to perform EPA-selected cleanup actions in mining-contaminated areas of OU 3, outside the Bunker Hill Box (OUs 1 and 2). As discussed below, these funds were placed in a Trust and a Trustee was appointed to manage the funds. From the bankruptcy settlement, EPA was reimbursed $8 million for human health protection actions that the Agency had completed in the Bunker Hill Box from 2002 to 2005. The $8 million is available for additional cleanup work in the Box.

In June 2011, a settlement of $263.4 million plus interest was reached between Hecla Mining Company and the United States, the Coeur d'Alene Tribe, and the State of Idaho that resolved legal claims stemming from releases of wastes from Hecla's mining operations. Hecla settlement funds include funds for remediation and restoration of natural resources in the Coeur d'Alene Basin and can be spent anywhere within the Bunker Hill Superfund Site. Of the $263.4 million, approximately $180 million will fund response actions throughout the Site, $17 million was provided to the State of Idaho to fund the ICP and the ICP repository (Page Repository) into perpetuity within OU 1, and $65.85 million will be paid to the

federal, Tribal, and state Natural Resource Trustees for use in restoration activities in coordination with cleanup actions.

EPA has received an additional approximately $5.8 million in settlements from *de minimis* parties, mostly smaller mining companies who operated throughout the Coeur d'Alene Basin. These funds are also available to fund response actions anywhere within the Bunker Hill Superfund Site.

5.1.2 Management of Funds

Most of the Asarco bankruptcy settlement funds were placed in the Successor Coeur d'Alene Custodial and Work Trust (the Trust). As stated above, the Trust funds can only be used to conduct cleanup work in mining-contaminated areas of OU 3, outside the Bunker Hill Box. The Trust is managed by a Trustee which must manage the funds as defined in the Successor Coeur d'Alene Custodial and Work Trust Agreement, which was approved by the bankruptcy court. In general, the Trust will perform work as a limited purpose successor to Asarco, which means that the Trust is "stepping into the shoes of Asarco" when performing response actions at the Bunker Hill Superfund Site. The Trustee will manage the Trust to maximize value and carry out cleanup actions selected and approved by EPA. EPA will provide oversight of the Trust. EPA's decision documents (e.g., Records of Decision, Amendments, Action Memoranda) will define the work the Trust performs, which will be further clarified in annual work plans prepared by the Trust and approved by EPA. This Implementation Plan includes the 10-year plan of major activities to be conducted by the Trust.

EPA will directly manage the settlement monies from the Hecla settlement and other settling parties in an EPA Special Account which is dedicated for use at any of the three OUs within the Bunker Hill Superfund Site. As EPA evaluates the best use of these Special Account funds, a top priority will be to ensure that there is sufficient funding to complete priority remedial actions in OUs 1 and 2 and to provide long-term funding for O&M of future OU 2 actions, EPA oversight of the Trust, and additional studies if necessary.

Through phased implementation planning, EPA is carefully considering how to maximize the Trust and the Special Account funds while moving forward with project priorities. While the settlement funds are significant, the funds represent only a portion of the overall site cleanup needs. The Selected Remedy identified in the Upper Basin Interim ROD Amendment (EPA, 2012b) is an interim remedy and is estimated to cost $635 million (30-year net present value in 2009 dollars). Cleanup of the Lower Basin is expected to cost at least as much as the Upper Basin cleanup and likely more. Therefore, to complete as much cleanup as possible and ensure that the necessary O&M is provided[21], it is imperative that EPA implement the work at a carefully planned and measured pace that will enable the Trust to gain interest over time and not be depleted by spending funds too aggressively.

[21] Currently, EPA anticipates that funding for O&M work conducted by the Trust will be preserved in the Trust and not used for future cleanup actions.

5.2 Current Sources of Funding for Restoration

As part of the 2009 Asarco bankruptcy settlement, the federal Natural Resource Trustees (the U.S. Departments of the Interior and Agriculture) received $79.4 million that is separate from the settlement money received by EPA. In addition, as noted above, the federal Natural Resource Trustees received nearly $66 million as part of the 2011 Hecla settlement.

This settlement money is designated for restoration efforts (separate from cleanup efforts) in the Coeur d'Alene Basin to address the documented natural resource damage resulting from historical mining activities. As noted in Section 1.3, the NRRT includes the Coeur d'Alene Tribe, USFWS, BLM, USFS, IDFG, and IDEQ. Once a plan is in place, the settlement funds will be used to restore, replace, rehabilitate, or acquire the equivalent of the damaged natural resources. The settlement provides only a portion of the money needed to restore natural resources damaged by mining and the release of hazardous substances in the Basin. The natural resource restoration planning and implementation will be coordinated with EPA's remedial action cleanup plans, and will be documented in subsequent versions of this Implementation Plan.

5.3 Anticipated Annual Cleanup Funding Levels

At this time, EPA anticipates near-term funding levels from all sources of approximately $20 to $25 million per year, on average, for cleanup activities, oversight, and studies within the Bunker Hill Superfund Site, with the large majority spent on cleanup activities. This estimated funding level is comparable to historical spending rates and assumes use of both the Trust and EPA Special Account funding sources for CERCLA-related work. The estimated funding level does not include funds that may be expended by the Natural Resource Trustees.

As described above, EPA's goal is to manage the spending rate of the Trust such that with interest gained on the invested Trust funds, the Trust will remain a viable source for cleanup funding throughout the Basin for many decades into the future. This approach could result in decisions to modify this Implementation Plan and spend fewer Trust cleanup funds in those years when rates of return are low or negative. Conversely, when rates of return on the Trust investments are high, EPA may decide to accelerate cleanup. Although management of funds is a necessary reality, EPA's primary focus will be on the protection of human health and the environment.

In contrast to the Trust funds, the EPA Special Account funds are required to be invested in U.S. Department of Treasury funds which yield a lower rate of return. It is expected that the rate of return on the Special Account funds will be less than 1 percent. Therefore, the spending approach for the Special Account funds differs somewhat from the approach for the Trust funds. In consideration of monetary inflation and the low-interest rate of return, the Special Account money may be spent on high-priority remedial actions, primarily in OU 2, at a faster rate than the Trust funds. In addition to funding cleanup actions, the Special Account will need to cover expenses associated with remedial design, monitoring, and additional studies within the Bunker Hill Box, if necessary, as well as oversight of the Trust. With anticipated expenses for OU 2 priority remedial actions, and setting aside funds for long-term O&M and oversight costs, it is anticipated that the funds in EPA's Special

Account could be depleted during the latter part of this 10-year implementation period. After depletion of these dollars, the only source of funding for actions in OU 1 and OU 2 will be from federally appropriated Superfund dollars, which are competed for at the national EPA level.

SECTION 6.0

Community Involvement

EPA and IDEQ actively seek meaningful participation of interested and affected members of the community. During development of the Upper Basin Interim ROD Amendment (EPA, 2012b), EPA, in coordination with IDEQ, conducted many outreach activities that were intended to provide timely information and opportunities for local community involvement. Public interest in the Basin cleanup is high, and members of the public were actively involved in providing input. From 2008 through 2012, EPA Project Managers attended approximately 75 meetings with local organizations, community leaders, and elected officials to provide information, discuss the Upper Basin Interim ROD Amendment and the documents that preceded it, and encourage involvement in the decision-making process. EPA, in coordination with IDEQ, hosted public workshops, meetings, open houses, and site tours to provide a range of community involvement opportunities.

EPA and IDEQ also routinely prepare fact sheets, news articles, and other materials, and posts new information on the EPA regional website to help the public stay informed and involved. Links are provided below.

EPA Region 10 Bunker Hill Superfund Site website:

http://yosemite.epa.gov/r10/cleanup.nsf/sites/bh

Link to download data from EPA's Water Quality Exchange (WQX)/STORET application:

http://www.epa.gov/storet/dbtop.html

EPA Region 10 Coeur d'Alene Basin Superfund Site Data Viewer application (which provides map-based access to a portion of the arsenic, cadmium, copper, lead and zinc results originating from EPA's WQX/STORET warehouse where the finalized data for this Superfund site are stored):

http://gispub9.epa.gov/CDA/

http://gispub9.epa.gov/CDA/help/CDAHelp.pdf

EPA has also created a ROD Amendment webpage where the public can find fact sheets, technical memoranda, meeting handouts and presentations, community involvement materials, draft documents, and other items related to the Upper Basin Interim ROD Amendment (EPA, 2012b). EPA plans to post additional implementation documents to this webpage:

http://yosemite.epa.gov/r10/cleanup.nsf/sites/bh+rod+amendment

Finally, EPA has developed a Facebook page to serve as an online forum and public information resource, giving local people another way to engage with EPA and get current news about the Bunker Hill Superfund Site:

http://www.facebook.com/CDAbasin

To encourage community participation in activities related to the Site, EPA has collaborated closely with the Basin Commission since its formation in 2002. The public is welcome to attend meetings held by the Basin Commission and its subgroups. EPA has provided updates about the remedy selection process as well as other cleanup-related activities at each Basin Commission meeting since October 2008. EPA has also worked with the Basin Commission's Citizens' Coordinating Council (CCC) and TLG to share information and increase stakeholder involvement.

In 2011, the Lower Basin Citizen Collaborative was formed by a group of concerned citizens to establish a forum and a process for meaningful early engagement in the Lower Basin Superfund cleanup decision process. This group has met periodically since its inception, and EPA has participated by providing informational updates on the progress of Lower Basin studies.

Links to key citizen groups are provided below (and are also available via the main EPA Region 10 website link provided above):

- Basin Environmental Improvement Project Commission (Basin Commission)
  - Contact: Terry Harwood, 208-783-2528
  - Website: www.basincommission.com
- Citizens' Coordinating Council (CCC)
  - Contact: Jerry Boyd, Chair, 509-455-6000
  - Website: www.basincommission.com/CCC.asp
- Lower Basin Citizen Collaborative
  - Website: http://lowerbasincollaborative.wordpress.com/

Because of the nature of this Implementation Plan, community participation is key, and EPA will once again go beyond regulatory requirements to ensure an inclusive and ongoing public involvement effort.

Each year, upon release of a draft of the revised Implementation Plan and/or an addendum (typically in late summer to early fall), EPA will offer a 30-day informal review opportunity. EPA will solicit and consider suggestions from affected community members and partner organizations. After the informal review period has ended, EPA will issue the revised Implementation Plan or addendum, along with information about how citizen input influenced the latest document. Issuance of full responses to individual comments is not currently anticipated.

EPA will continue to provide regular updates about remedial action implementation through many channels. These will include articles in the agency's Basin Bulletin newsletter, website updates, Facebook updates, local presentations, postal mailings and emails, and media notices. Site documents will be available online and in libraries.

As the cleanup progresses, the public will have continuing opportunities to provide input on how the cleanup is being implemented. EPA is committed to implementing selected remedial actions through the Basin Commission process. In addition, EPA will follow the

National Oil and Hazardous Substances Pollution Contingency Plan (NCP)-mandated public involvement process for all futures remedy decisions. Finally, EPA will continue to conduct Five-Year Reviews, as required by CERCLA, and the public will be invited to comment on drafts of Five-Year Review Reports.

SECTION 7.0

Continued Implementation Planning

Future implementation planning will continue to provide the basis for the Basin Commission's one- and five-year work plans. It will be driven, in part, by the adaptive management process and by Trust and EPA Special Account balances and rates of return. As noted earlier, the Basin Commission work plans focus on general areas of work and do not go into project-specific detail; project-specific information is developed as part of the pre-design process for individual cleanup projects.

This Implementation Plan is anticipated to be updated annually with an addendum (at a minimum), and fully revised at least every five years in conjunction with the CERCLA-required Five-Year Review process for the Bunker Hill Superfund Site. To provide input to the yearly Basin Commission work plans, EPA will update the anticipated remedial implementation timeframe (Figure 3-7) on an annual basis. The implementation of cleanup actions and the adaptive management process may reveal the need to make changes to the remedies for OU 1, OU 2, and/or OU 3 or future implementation approaches. If necessary, the Implementation Plan may be updated or revised more often to reflect such changes. Changes to the remedies may be considered non-significant, significant, or fundamental, and EPA will document future changes to remedies or new remedies as appropriate and consistent with CERCLA and the NCP. These documents may include memoranda to the official EPA Site file, ESDs, ROD Amendments, and/or Action Memoranda.

Updates of, and changes to, remedy implementation schedules, priorities, and/or sequencing will be documented through regular updates to this Implementation Plan. Such updates or changes will not be considered remedy changes, but may warrant more frequent updates to the Implementation Plan.

Adaptive management is a critical component of prioritizing and implementing many of the remedial actions at the Site because it is not possible for physical, biological, and chemical conditions to be fully defined and known for this large and complex area. Uncertainty is unavoidable, and the implementation of cleanup actions must be managed taking this uncertainty into account. Adaptive management will play a less crucial role in the implementation of cleanup actions to protect human health within communities because these actions (the BPRP, roadway surface remediation, and remedy protection [drainage control and improvement] projects) have significantly less complexity and uncertainty. Therefore, at this time, discussions of adaptive management focus primarily on cleanup actions to protect human health and the environment outside communities in both the Upper and Lower Basins. The following sections describe continued implementation planning for remedies focused on protection of human health within communities (Section 7.1) and remedies focused on protection of human health and the environment outside communities (Section 7.2). Remedies within the communities are expected to be largely complete within the next 10 years, while remedies outside communities will require longer timeframes to complete and will be a larger focus in future Implementation Plans and/or addenda.

7.1 Planning for the Implementation of Remedies in Communities

The following sections describe the general strategies to be used for continued planning related to implementation of the BPRP (Section 7.1.1), roadway surface remediation (Section 7.1.2), and remedy protection (Section 7.1.3) in Upper and Lower Basin communities.

7.1.1 Basin Property Remediation Program

The BPRP is well established, and continued planning and prioritization with regard to the BPRP will continue to focus on actions to prevent people (particularly young children and pregnant women) from coming into contact with unhealthy levels of metals. EPA and IDEQ continue to monitor house dust concentrations (in vacuum-cleaner bags and dust mats) as residential soil cleanup continues in OU 3. Site-wide blood-lead screening is currently offered annually through the Panhandle Health District to identify at-risk children and provide feedback on the effectiveness of cleanup efforts. This type of screening will aid in determining whether overall interior dust trends are continuing to decline in communities and whether the occurrences of residences with high lead levels are also declining in response to the implemented remedial actions. Additional monitoring includes visual assessment of remediated properties (including residential barriers and ROWs).

7.1.2 Roadway Surface Remediation

Continued refinement of the Roadway Surface Remediation Strategy will provide a mechanism to effectively address the deterioration of contaminated road surfaces due to heavy vehicle traffic during remediation activities, to help ensure that road surfaces continue to serve as barriers to reduce or eliminate exposures to underlying contamination. Continued road shoulder and unpaved road sampling, as well as sampling of snow pile sediments, potholes, and city sweepings, will inform this process.

7.1.3 Remedy Protection

Remedy protection projects will continue to be prioritized based on the frequency of flooding and storm events for a watershed, construction impacts to local communities, geographical locations, scopes of work, seasonal construction limitations, permitting considerations, funding availability, agreements by local parties to perform long-term maintenance, and private property easement needs. As noted earlier, those projects that generally require less in terms of design, permitting, and/or easement needs will likely be completed before more complex projects. Ongoing monitoring, including visual assessments of existing remedies, will inform this process.

7.2 Planning for the Implementation of Remedies Outside Communities

The following sections describe the adaptive management process (Section 7.2.1) and tools for evaluating remedial action effectiveness (Section 7.2.2). Both of these will be used to inform continued implementation planning for remedies outside Upper and Lower Basin communities.

7.2.1 Prioritization of Future Remedial Actions Using Adaptive Management

Adaptive management, illustrated in Figure 7-1, is a process wherein decisions are made as part of an ongoing science-based process. A key component of the success of the adaptive management process is refinement of the implementation process and remedial approaches as new information becomes available that clarifies uncertainties regarding the understanding of a site, the effectiveness of the remedial approaches and technologies used, and the responses of environmental receptors to changes in contaminant concentrations, ecological conditions, and habitat. Adaptive management reviews and adjustments, and incorporation of changes into the management objectives, strategies, approaches, and tools used in the implementation process, will be conducted in a timely manner and consistent with CERCLA-required Five-Year Reviews. Within the context of the cleanup actions, adaptive management simply means that EPA will implement specific cleanup actions included in the remedies for OUs 1, 2, and 3, monitor the effectiveness of those actions to determine whether cleanup goals are being achieved, and make adjustments to future cleanup actions to benefit from the information gained through the effectiveness monitoring. The intent of the adaptive management process is to guide the collection of valuable information so that the most effective cleanup is achieved for the lowest cost.

Prioritization of Remedial Actions

With help from stakeholders and community members involved in the Basin Commission's Upper Basin PFT, over the past two years EPA has developed a logical and transparent prioritization process for implementing remedial actions at Upper Basin mine and mill sites. EPA will continue to prioritize remedial actions outside communities at the Bunker Hill Superfund Site using similar processes as more data are gathered and the effectiveness of the initial remedial actions is determined. The following specific issues, at a minimum, will be considered in the prioritization, scheduling, and sequencing of remedial actions:

- **Human health exposure to contaminated mine waste materials.** EPA will place a higher priority on cleaning up sites that present current exposure risk to individuals from contaminated mine wastes, including exposures that may occur from damage to existing remedies.
- **Potential for recontamination of cleaned areas.** EPA will prioritize the implementation of remedial actions in order to reduce the potential for recontamination of previously remediated areas. This typically means conducting work at locations that are topographically higher in a drainage area first, in order to avoid recontamination from locations above them.

- **Metals loading to surface water, groundwater, and sediments.** EPA will prioritize the implementation of remedial actions at locations based on the potential to add or transport metals, such as lead and zinc, to surface water, groundwater, and sediments.

Additional factors that may be considered prior to the implementation of future remedial actions include, but are not limited to water treatment, waste management, restoration work, construction staging, design needs, and stakeholder and community input.

Adaptive Management at the Watershed Level

In general, EPA plans to implement remedial actions outside communities at the Site on a watershed basis, based on CSMs that will be developed to define the sources and potential pathways for metals contamination at the watershed level. This strategy will provide for efficiency in terms of resource management, logistical coordination, and the ability to monitor effectiveness. As remedial actions are implemented within specific watersheds, EPA will collect data and use the tools described in Section 7.2.2 in order to assess cleanup technologies and analyze the effectiveness of the actions. The results of these analyses will be documented and will help inform the adaptive management process and prioritization of remedial actions within a specific watershed, while providing for "lessons learned" to be applied during future implementation of actions at other watersheds.

7.2.2 Tools to Assess the Effectiveness of Remedial Actions Outside Communities

EPA has multiple tools that will be used to quantitatively assess the effectiveness of implemented remedial actions outside Upper and Lower Basin communities. This effectiveness assessment will inform the adaptive management process. Project–specific monitoring and the ongoing BEMP will provide key data with which to evaluate project- and watershed-specific data along with long-term Basin-wide status and trends for surface water, groundwater, sediments, and effects on ecological receptors. Ecological response metrics, specific to the Upper Basin, and effectiveness modeling tools will also be used to evaluate the improvement of environmental quality.

Project-Specific Monitoring

Project-specific monitoring for remedial actions outside the Basin communities will include collection and evaluation of pertinent media of concern depending on the particular project site and its location in a watershed (i.e., surface water, groundwater, sediment, and/or biological monitoring data). Key goals of project-specific monitoring are to (1) evaluate the effectiveness of remedial actions conducted to date, (2) evaluate progress toward the achievement of established cleanup levels, and (3) gain a better understanding of natural processes and data variability. It is anticipated that project-specific monitoring will be expanded to evaluate the effectiveness of individual or groups of cleanup actions within specific areas, as they are implemented. Project-specific monitoring will include evaluation of:

- Status and trends of dissolved zinc and cadmium concentrations and AWQC ratios in surface water.
- Status and trends of particulate lead concentrations and loads to surface water.

- Trends in lead concentrations in floodplain soil and sediments, levees, and/or river bed sediments.
- Progress toward achieving ROD-specific cleanup levels and RAOs.
- Potential unwanted impacts resulting from implementation of the remedies for OUs 1, 2, and 3.
- Changes or trends in biological resources (e.g., population diversity, chemical exposure, and bioavailability of metals).

Project-specific monitoring may be initiated in focused areas at an expedited data collection frequency in preparation for remedial design efforts, and may also be adjusted or terminated as actions and data collection objectives are satisfied. Project-specific monitoring data may also be used in conjunction with previous monitoring data and BEMP data (described in the next section). Project-specific monitoring data will be critical for continued implementation planning decisions.

Basin Environmental Monitoring Program (BEMP)

In support of the RODs for OU 2 (EPA, 1992) and OU 3 (EPA, 2002 and 2012b), EPA worked with stakeholders at the Bunker Hill Superfund Site to collaboratively develop initial monitoring programs to evaluate the success of the remedies specified for these OUs. The original monitoring programs were initiated for OU 3 and OU 2 in the BEMP (EPA, 2004) and the Environmental Monitoring Plan (EMP; CH2M HILL, 2006), respectively. EPA is currently working with stakeholders to finalize a combined update to the original BEMP and EMP to be consistent with the Upper Basin Interim ROD Amendment (EPA, 2012b) and to consolidate all the Basin-wide environmental monitoring efforts into an amended BEMP (EPA, in preparation).

The media of interest for the BEMP include:

- **Surface Water**: Dissolved and total metals concentrations, and hardness (calcium and magnesium). The surface water monitoring design emphasizes dissolved cadmium and zinc under a range of flow conditions, and total lead under high-flow conditions.
- **Sediments**: Metals concentrations in sediments in river (or stream) and riparian environments in the Upper Basin (particularly in Ninemile Creek, Canyon Creek, Pine Creek, and the SFCDR); metals concentrations in sediments in river (stream), riparian, lake, and wetland environments in the Lower Basin; and metals concentrations in sediments within depositional areas of the Spokane River. The BEMP aims to monitor sediments for long-term trends while soil in source areas may be targeted for action-specific testing and monitoring as appropriate.
- **Groundwater**: Dissolved metals concentrations of the primary chemicals of concern (COCs) including arsenic, cadmium, copper, lead, mercury, and zinc.
- **Biological resources**, which generally include:
  - Fish, macroinvertebrates, periphyton (algae, bacteria, microbes, detritus), and aquatic habitat in river (stream) environments

- Songbirds, small mammals, and vegetation in riparian environments
- Waterfowl in wetland environments
- Waterfowl and fish in lake environments

Ecological Response Metrics for the Upper Basin

EPA, in collaboration with the NRRT (which consists of the Coeur d'Alene Tribe, BLM, USFWS, USFS, IDFG, and IDEQ as noted previously), has developed ecological response metrics for evaluating remedial progress during the implementation of the Upper Basin Selected Remedy (Stratus Consulting, 2012). Ecological response metrics have been refined in part from the fishery tiers included in the ROD for OU 3 (EPA, 2002), and reflect the current understanding of the river system specific to the Upper Basin. Fishery tiers were developed to provide a relationship between dissolved metals concentrations in surface water and the health of fisheries (i.e., the abundance of fish species, age of fish, fish migration, etc.) in the Upper Basin (CH2M HILL and URS Greiner, 2001).[22]

Measurable ecological response metrics provide EPA with a means to evaluate, predict, and report on environmental improvements associated with remedial actions planned and implemented throughout the Upper Basin. The ecological response metrics are not ARARs; therefore, the intent of such ecological response metrics is to provide EPA and interested stakeholders with the following:

- Tools with which to estimate potential environmental and ecological improvements that could result from specific remedial actions.
- Target receptors with which to evaluate environmental recovery.
- A means for measuring environmental recovery and progress toward achieving cleanup goals during and after the implementation of watershed-specific remedial actions.

Data collected in the Upper Basin as part of the BEMP will be used to evaluate the ecological response metrics and evaluate the Basin-wide effectiveness of remedial actions as part of the Five-Year Review process. EPA will use this information for the adaptive management process and continued implementation planning.

Multi-Attribute Utility and "Simplified Tool" Models for the Upper Basin

EPA, in coordination with stakeholder and partners, plans to continue to use a multi-attribute utility (MAU) model that was developed to prioritize remedial actions at mine and mill sites throughout the Upper Basin, including the Bunker Hill Box, and to evaluate actions at specific mine and mill sites at the watershed level. The MAU model helps prioritize specific actions by analyzing multiple inputs (including data from the "Simplified Tool" described below). The MAU prioritization approach consists of the following steps:

1. Define objectives for prioritization.
2. Determine the list of actions to be prioritized.

[22] The Selected Remedy for the Upper Basin is an interim remedy and may not achieve applicable or relevant and appropriate requirements (ARARs) at all locations without additional actions. Although cleanup levels may take a long time to achieve after remediation, it is expected that planned interim remedial actions will result in significant improvements to the ecological health of fisheries in the Upper Basin.

3. Develop a method of measuring how well each action meets the objectives, and then score each action accordingly.
4. Develop weights that represent the relative importance of each objective.
5. Develop a weighted score for each action, representing the total "value" of that action toward cleaning up the Basin.
6. Prepare a value-cost ratio for each action.
7. Rank each action on the basis of value-cost ratio.
8. Test the sensitivity of the rankings to differences in relative weights.

The Simplified Tool (named because it is a simplified version of the Predictive Analysis tool used in the 2001 Feasibility Study Report for the Coeur d'Alene Basin [EPA, 2001a] and the 2012 Upper Basin FFS Report [EPA, 2012a]), uses synoptic data to evaluate changes in surface water quality between monitoring locations. The Simplified Tool provides screening-level estimates of the potential benefits of remedial actions that can be input into the MAU model and used to provide insight into remedial action prioritization efforts (per Step 3 above). The Simplified Tool will be useful in continued implementation planning as it can be easily modified and updated over time as additional data become available regarding source characterization, remedial action effectiveness, and surface water quality.

EPA anticipates that ongoing use of the MAU model will identify those sites where the implementation of remedial actions has the highest potential to (1) cost-effectively improve surface water quality for ecological receptors by reducing dissolved metals concentrations, and (2) improve soil and sediment quality for ecological receptors by reducing particulate metals. The assessment of how well each action performs in terms of these criteria will be performed using the projected results of proposed remedies at each site based on existing data. The model will result in a value score for each action that will be divided by the current estimate of the 30-year life cycle cost of each action (in present value terms), resulting in a value-cost ratio. Actions can then be ranked in descending order of this value-cost ratio.

As time goes on, it is expected that better information will be available to refine value scores and costs. This framework is flexible and can be updated and modified consistent with the principles of adaptive management.

SECTION 8.0

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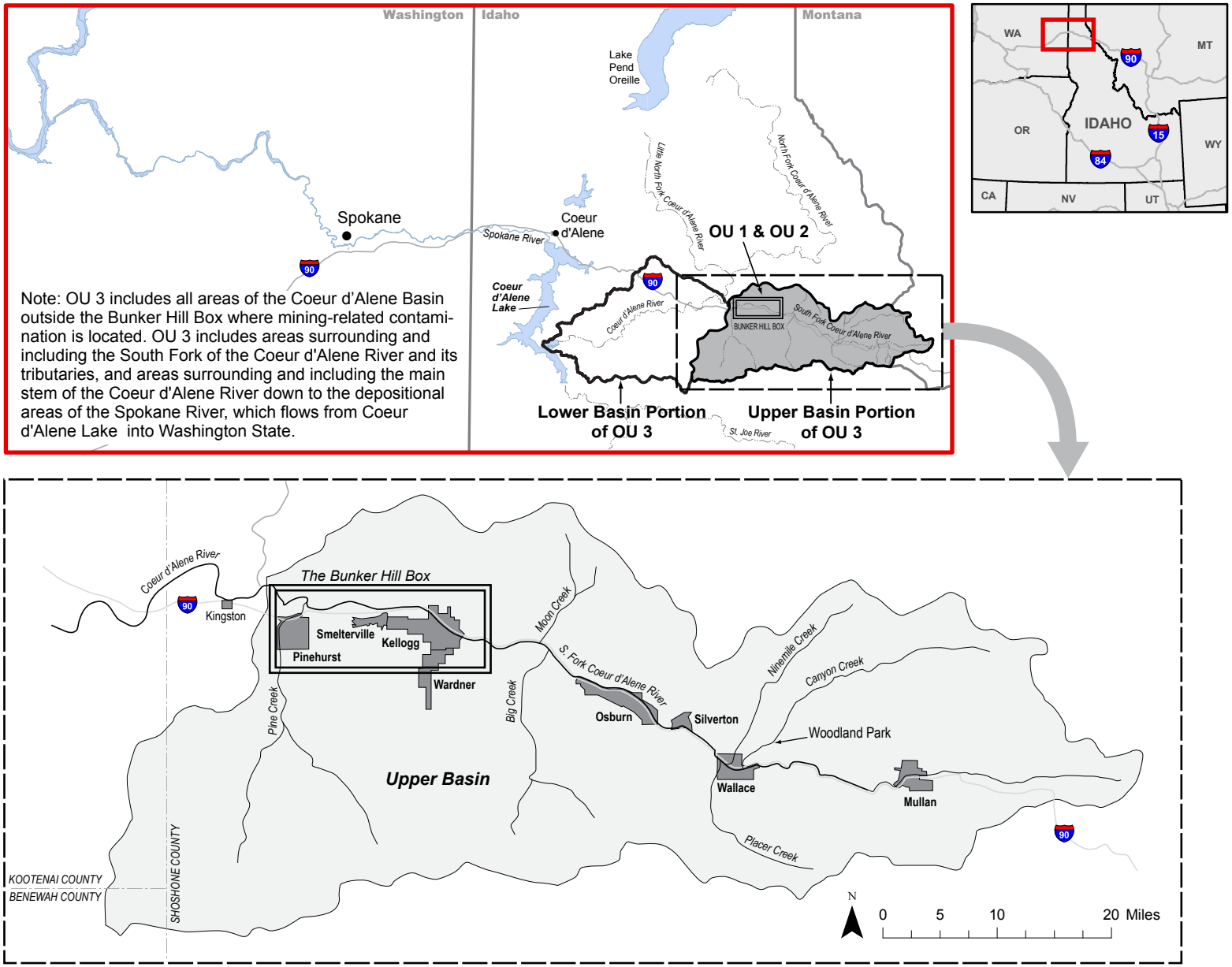
Figures

Vicinity Map of Coeur d'Alene Basin



OU = Operable Unit

Note:
The river corridor portions of the South Fork of the Coeur d'Alene River and Pine Creek located within the Bunker Hill Box are considered to be part of OU 3.

Figure 1-1
Location Map
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

WHAT THIS FIGURE SHOWS

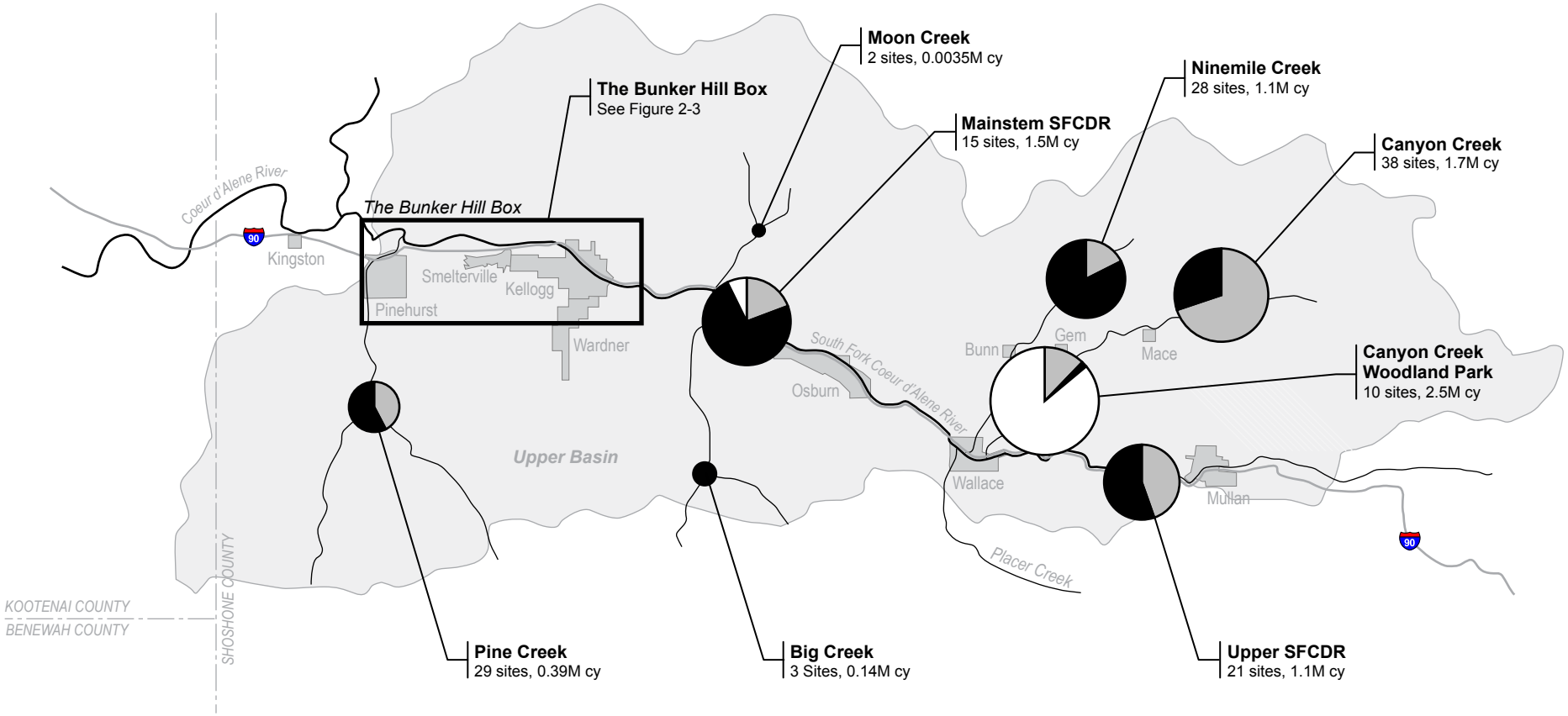
For the main and upper parts of the South Fork Coeur d'Alene River and major creeks, this figure shows the number of individual locations where remedial actions have been planned and the amount of material, such as contaminated tailings, waste rock, and floodplain sediments, that would be cleaned up. The "pie charts" for each portion of the river and creeks show the general breakdown by type of remedial action for the Selected Remedy. The volume (millions of cubic yards [cy]) listed for each watershed includes all material addressed by the Selected Remedy.

The bigger the pie chart, the more contaminated materials are planned to be addressed.

Cap – Includes engineered or soil covers, or regrading and planting.

Excavation – Includes removing materials and either consolidating locally or transporting to a separate repository.

Hydraulic Isolation – Includes preventing contaminated water (seeps, adit drainage, or groundwater) from entering the river and creeks.



Key to Pie Charts

Source Control Actions:

- Cap
- Excavation
- Hydraulic Isolation

Notes:

SFCDR = South Fork Coeur d'Alene River

Some source control actions may not be visible in some pie charts because of their proportionally small size.

N

0 1 2 4 Miles

Figure 2-1
Source Control Actions by Watershed in the Upper Basin
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

WHAT THIS FIGURE SHOWS

For the main and upper parts of the South Fork Coeur d'Alene River (SFCDR) and major creeks, this figure shows the number of individual locations where water treatment remedial actions have been planned. The "pie charts" for each portion of the river and creeks show the general breakdown by type of water treatment action for the Selected Remedy.

The bigger the pie chart, the larger the flow of contaminated water that will be treated by the Selected Remedy. This figure also shows the approximate location of the water conveyance pipeline to the Central Treatment Plant (CTP) in Kellogg. The size of the arrow represents the approximate amount of flow for the pipeline.

CTP Treatment – Includes collection of groundwater or adit discharge and active water treatment in Kellogg.

Onsite Treatment – Includes collection of groundwater or adit discharge and semi-passive treatment at the source site.

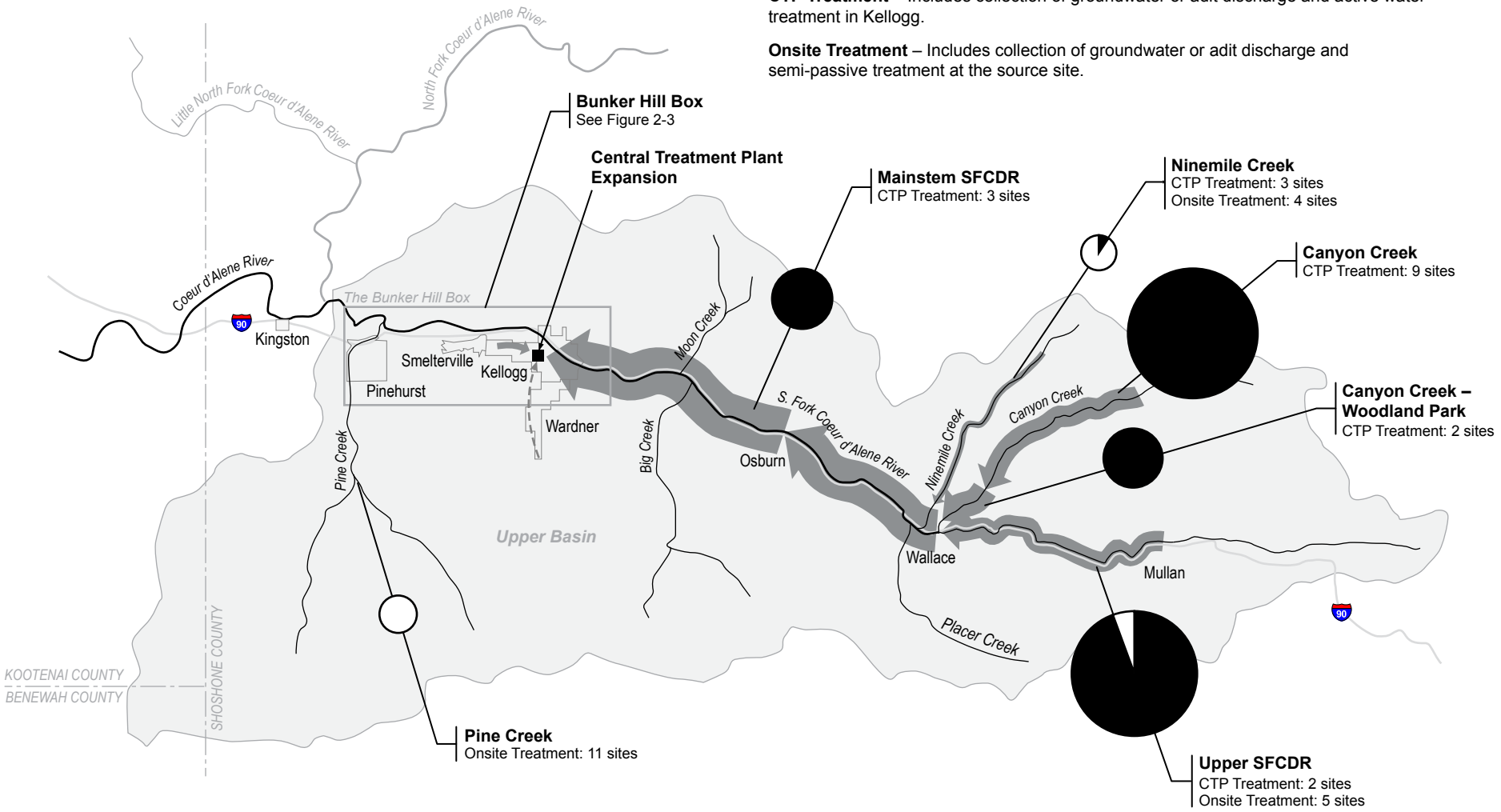
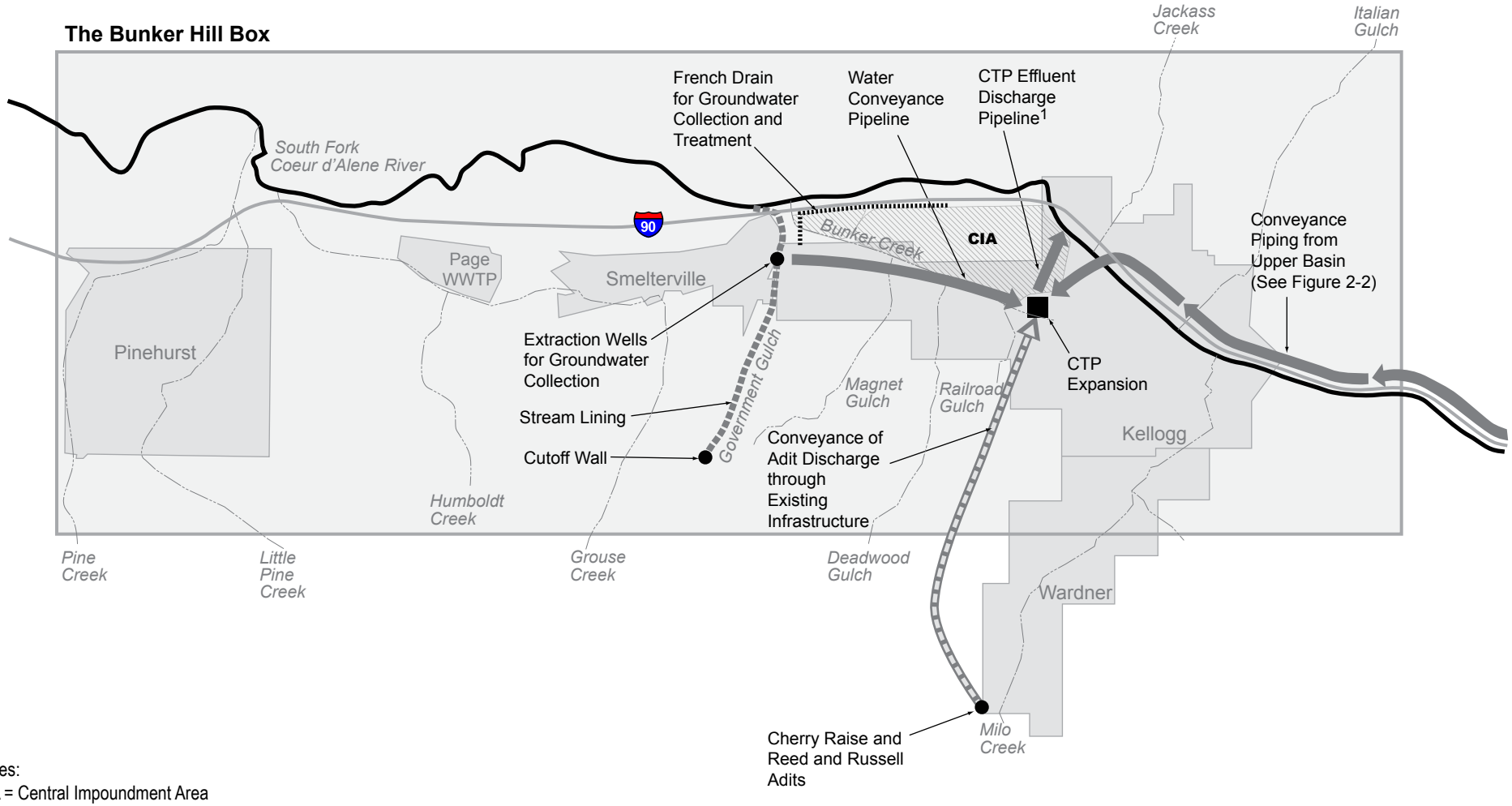


Figure 2-2
Water Collection and Treatment in the Upper Basin
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

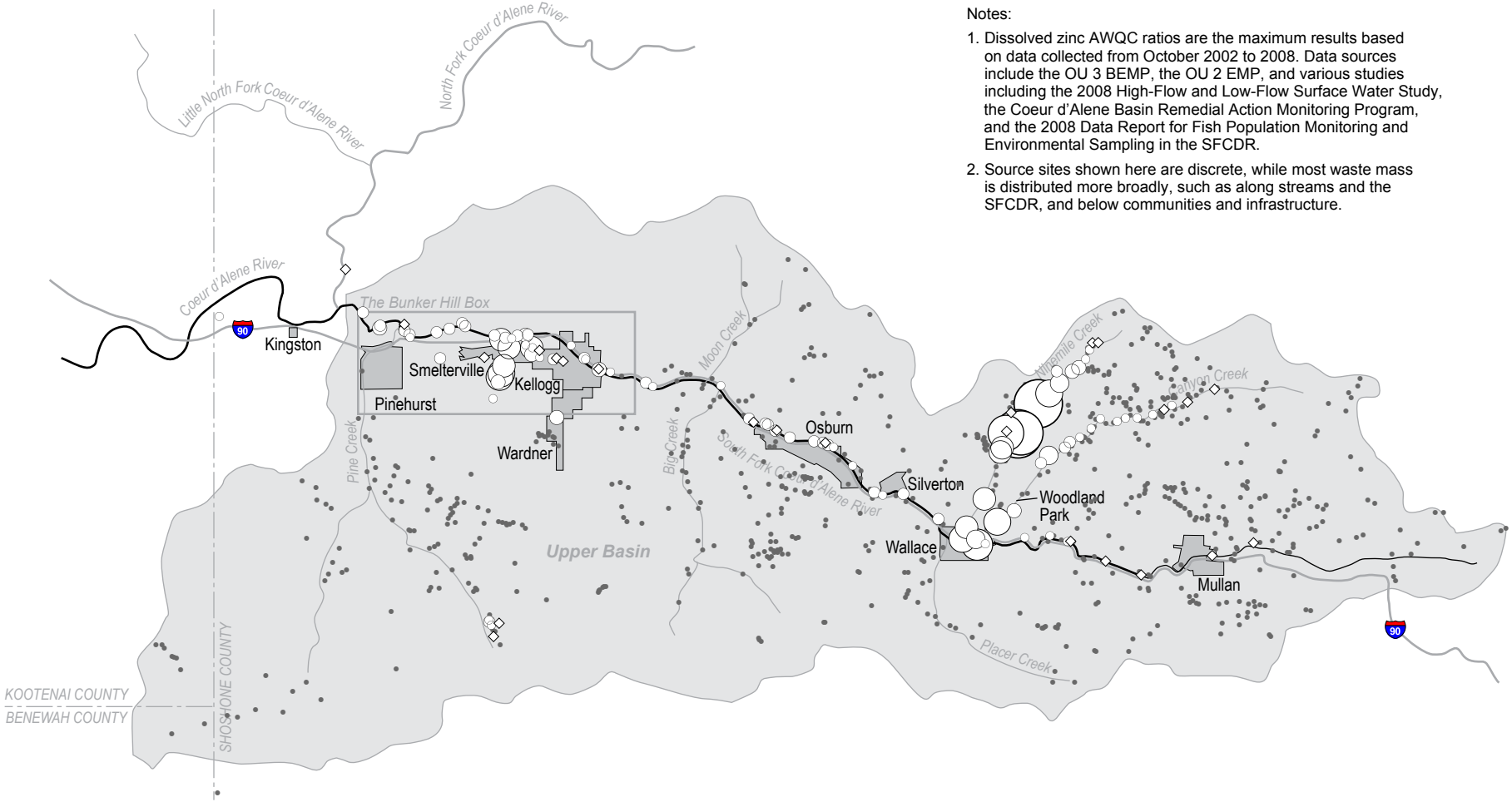


Notes:
CIA = Central Impoundment Area
CTP = Central Treatment Plant

[1] CTP effluent discharge pipeline may be conveyed to the South Fork Coeur D'Alene River (SFCDR) on the east side of the CIA (as pictured above) or along Bunker Creek.

N
0 2,000 4,000 Feet

Figure 2-3
Bunker Hill Box Remedial Actions
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site



Notes:

1. Dissolved zinc AWQC ratios are the maximum results based on data collected from October 2002 to 2008. Data sources include the OU 3 BEMP, the OU 2 EMP, and various studies including the 2008 High-Flow and Low-Flow Surface Water Study, the Coeur d'Alene Basin Remedial Action Monitoring Program, and the 2008 Data Report for Fish Population Monitoring and Environmental Sampling in the SFCDR.
2. Source sites shown here are discrete, while most waste mass is distributed more broadly, such as along streams and the SFCDR, and below communities and infrastructure.

AWQC Ratios

Representative Values

- ◇ < 1
- ○ 5
- ◯ 20
- ◯ 50
- ◯ 75

AWQC = Ambient Water Quality Criteria
BEMP = Basin Environmental Monitoring Program
EMP = Environmental Monitoring Program
OU = Operable Unit
SFCDR = South Fork Coeur d'Alene River

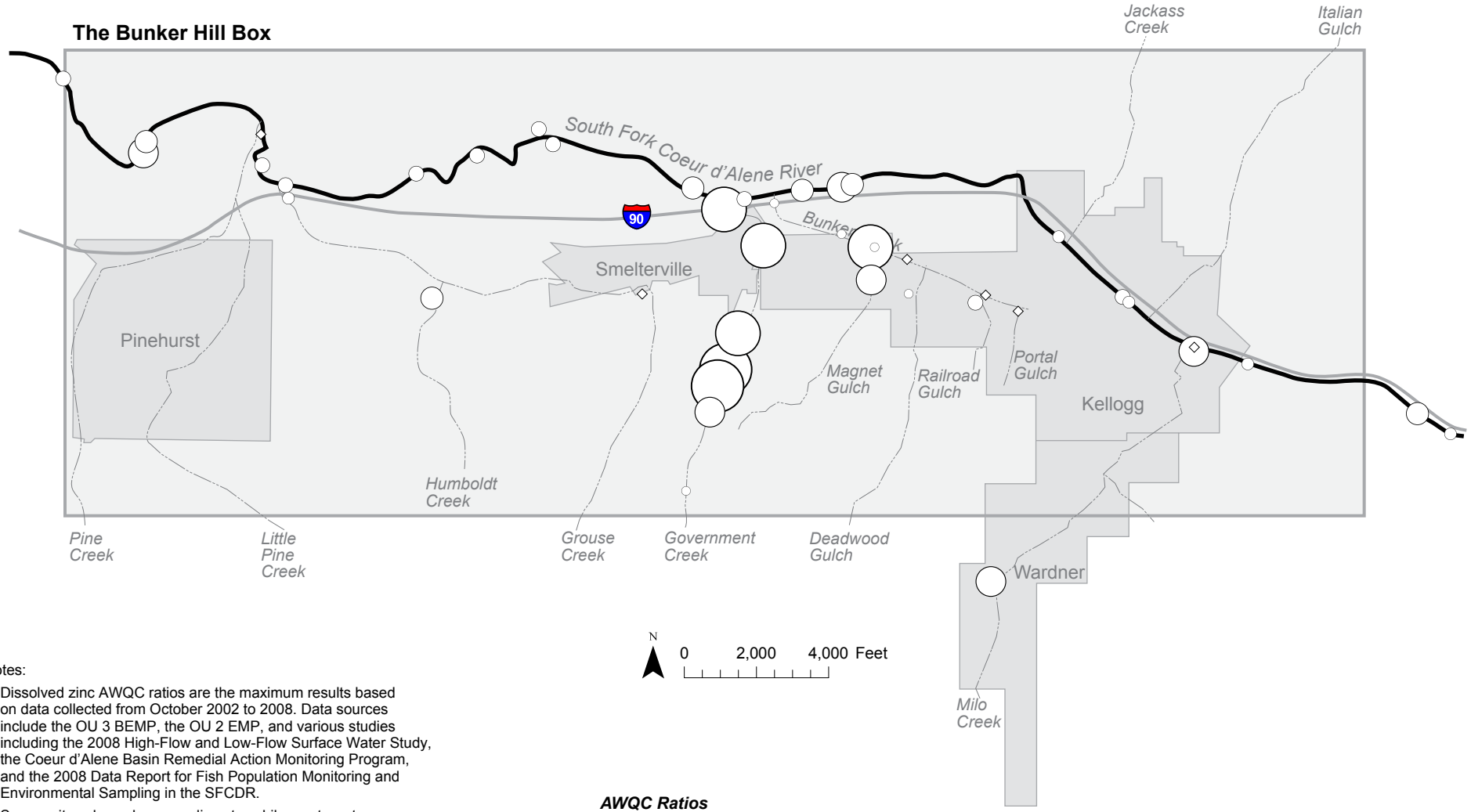
• Source Site

N

0 1 2 4 Miles

Figure 2-4
Maximum Zinc AWQC Ratios in Upper Basin Surface Water, 2002 to 2008
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

EPA



Notes:

1. Dissolved zinc AWQC ratios are the maximum results based on data collected from October 2002 to 2008. Data sources include the OU 3 BEMP, the OU 2 EMP, and various studies including the 2008 High-Flow and Low-Flow Surface Water Study, the Coeur d'Alene Basin Remedial Action Monitoring Program, and the 2008 Data Report for Fish Population Monitoring and Environmental Sampling in the SFCDR.
2. Source sites shown here are discrete, while most waste mass is distributed more broadly, such as along streams and the SFCDR, and below communities and infrastructure.

AWQC = Ambient Water Quality Criteria
BEMP = Basin Environmental Monitoring Program
EMP = Environmental Monitoring Program
OU = Operable Unit
SFCDR = South Fork Coeur d'Alene River

Figure 2-5
Maximum Zinc AWQC Ratios in Bunker Hill Box Surface Water, 2002 to 2008
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

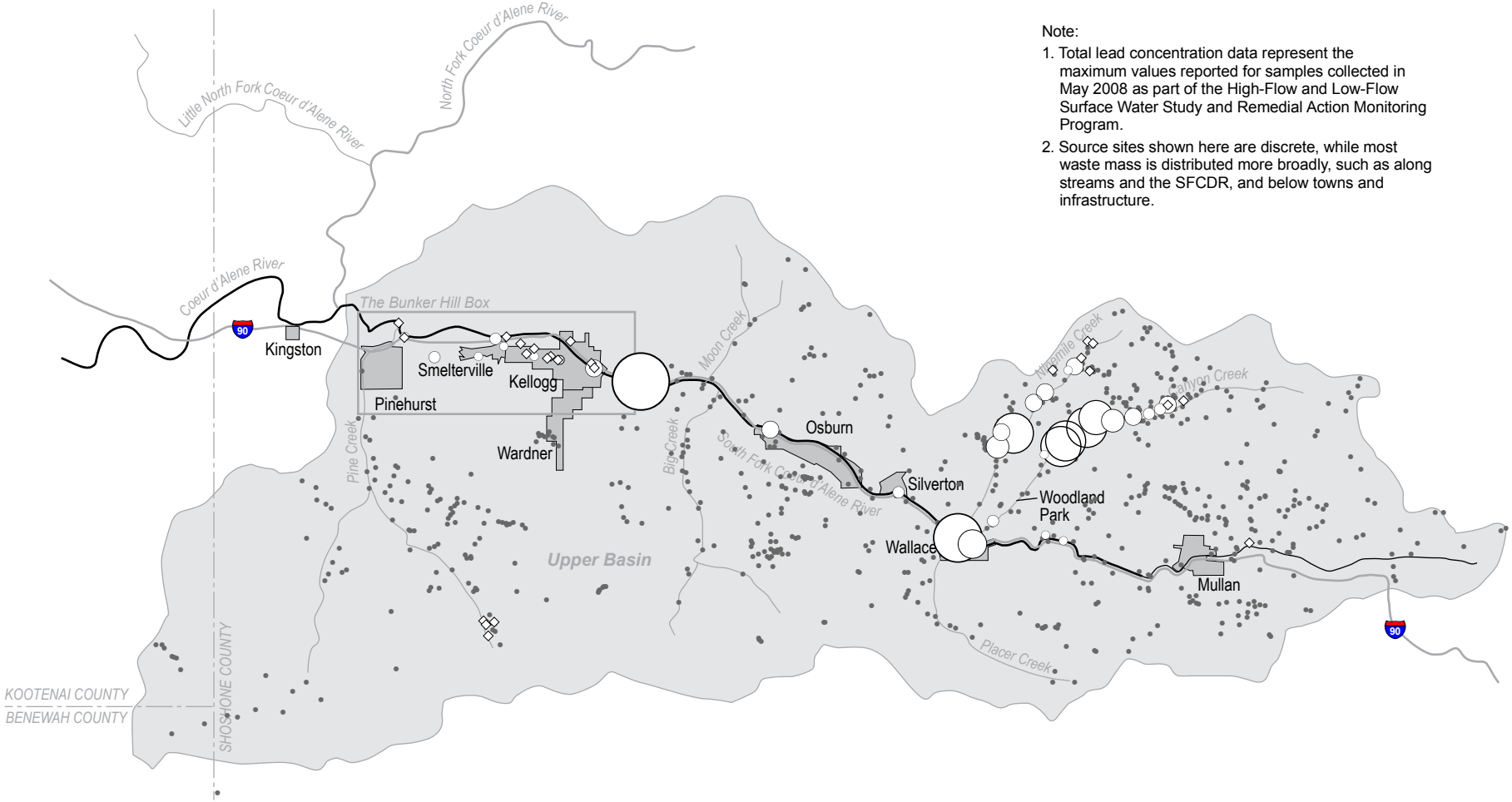


Figure 2-6
Total Lead Concentrations in Upper Basin Surface Water, May 2008
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

EPA

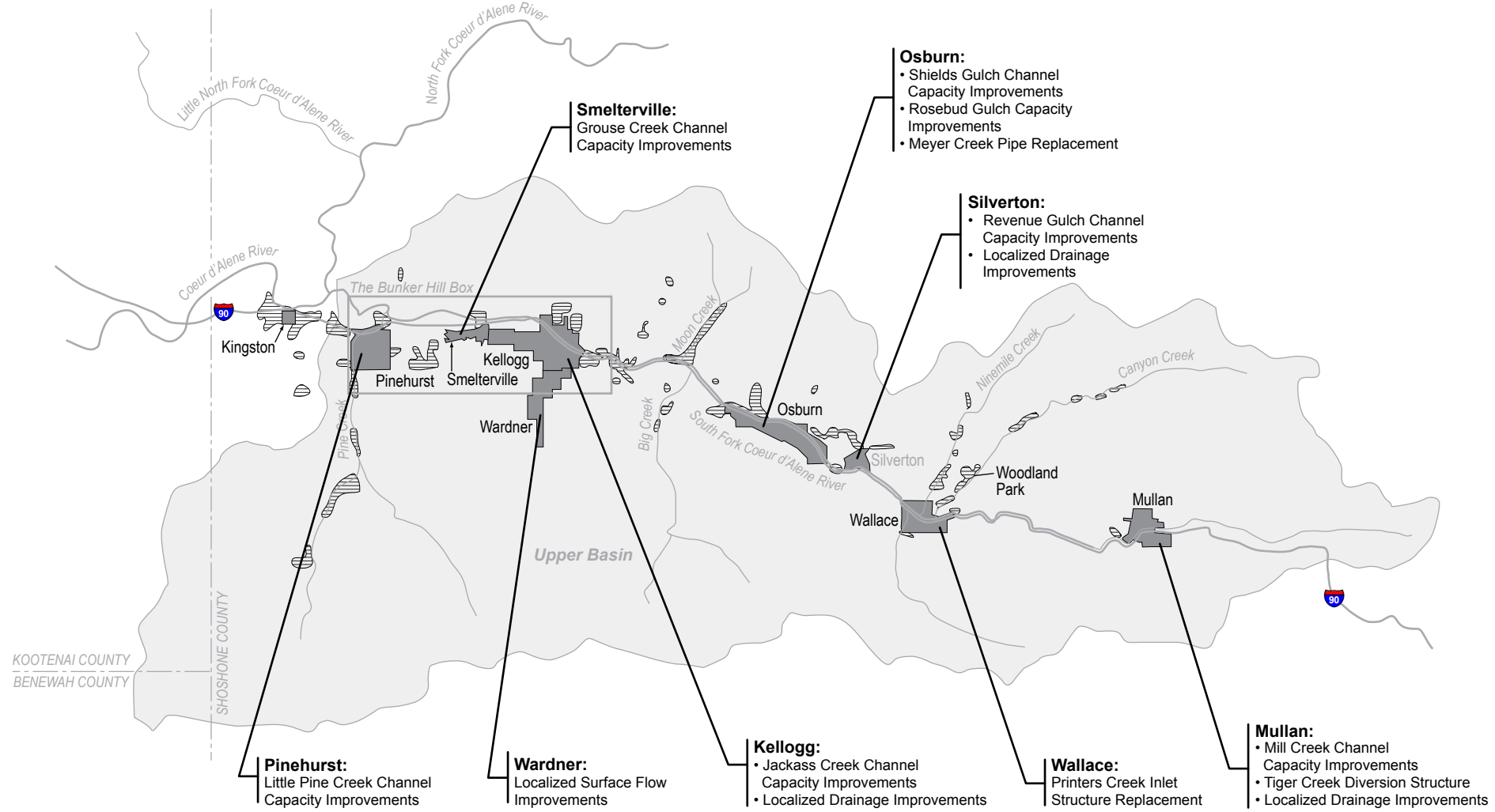


Figure 3-1
Remedy Protection Actions
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

ES070912114527SEA . IP_GR_SelRemedyProtActions . 10-24-12

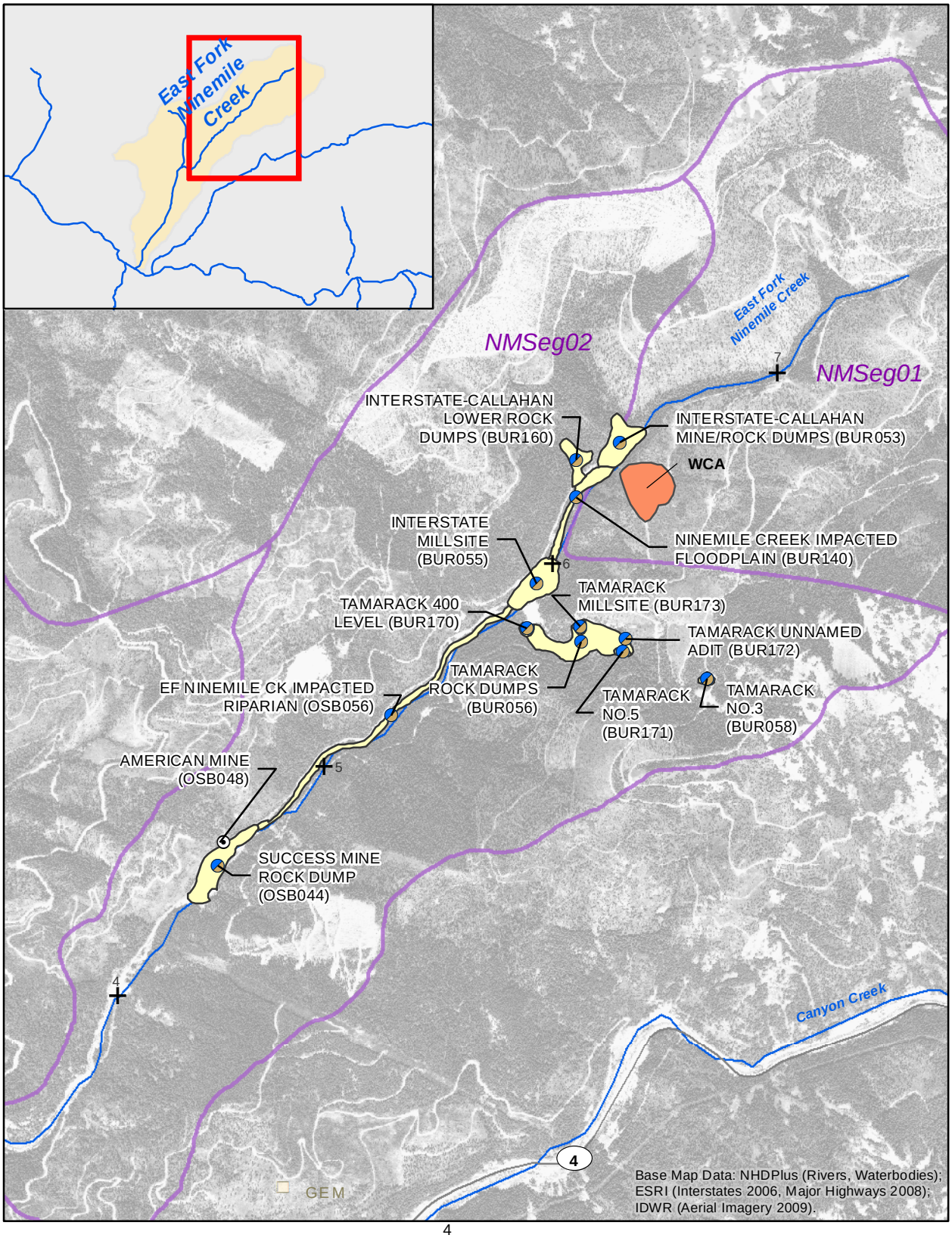
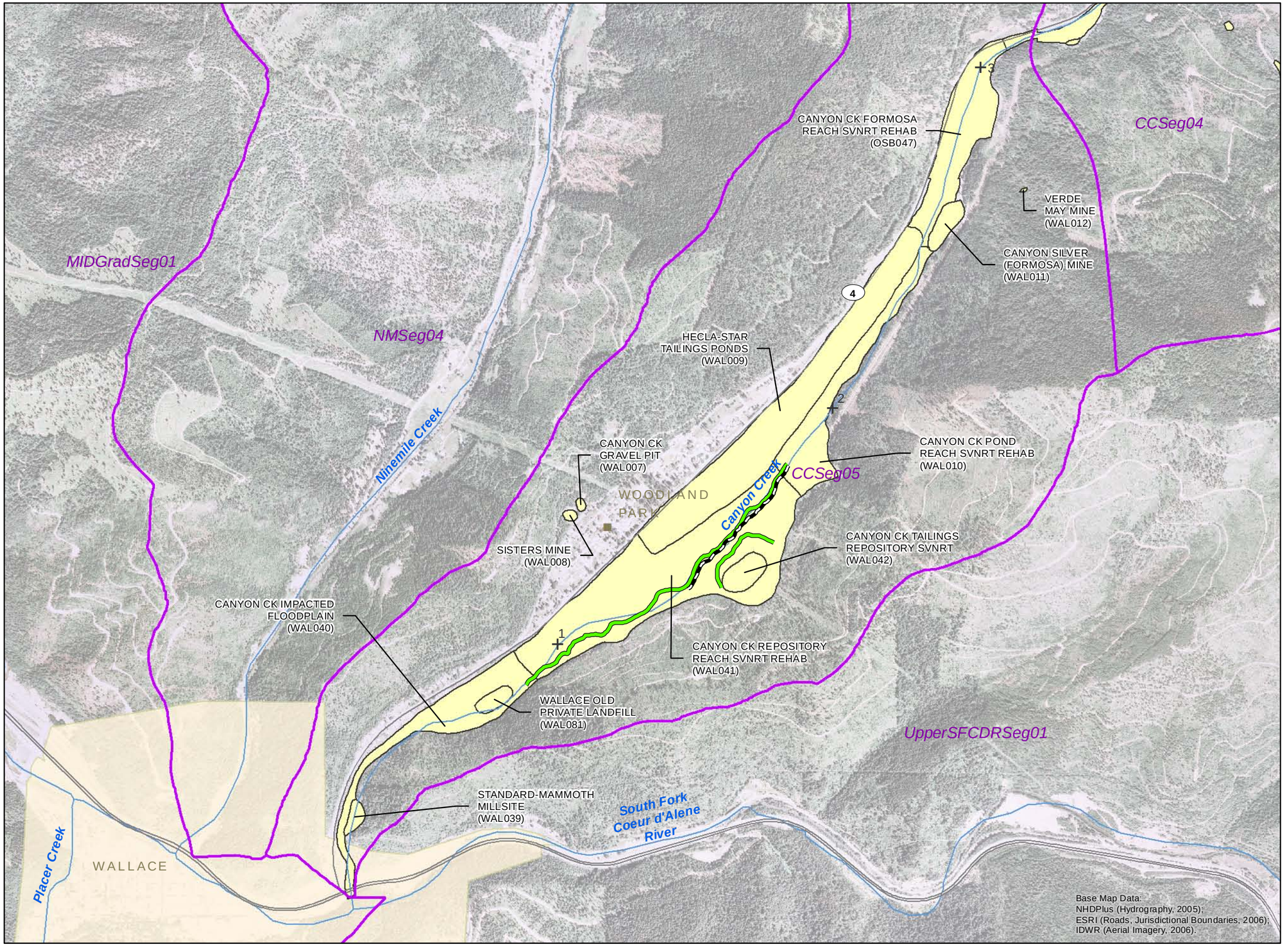
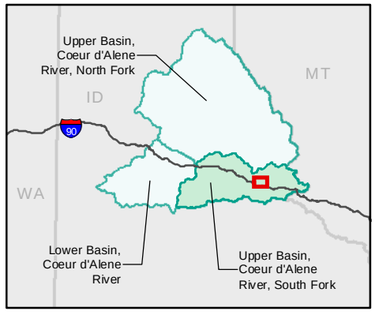


Figure 3-2
Prioritized Remedial Actions, East Fork Ninemile Creek Watershed
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site





+4 River Mile

River/Creek

Ground Water Interception Drain

Stream Liner

WAL010 (Site ID)
CANYON CK POND REACH SVNRT REHAB (Site Name[1])

Watershed Segment

City Limit

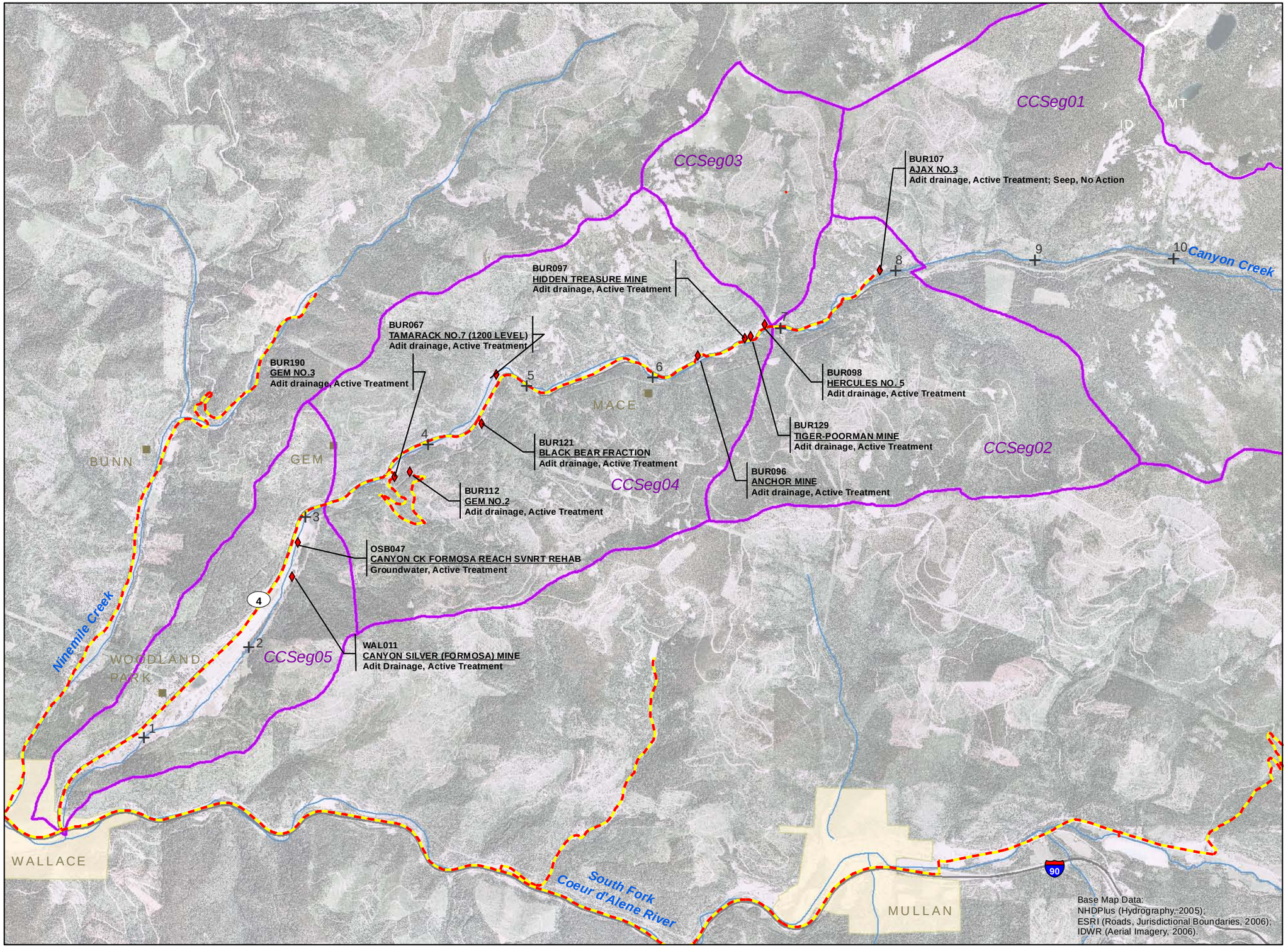
Mine and Mill Site Boundary

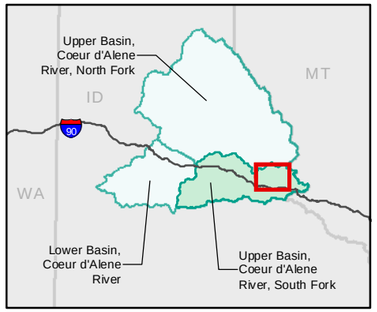
Notes:
1. The source IDs and names are based on the inventory of source sites conducted by the Bureau of Land Management (BLM) in 1999 in support of the Remedial Investigation/Feasibility Study (RI/FS) for the Coeur d'Alene Basin (U.S. Environmental Protection Agency [USEPA], 2001a, 2001b)

N

0 500 1,000 2,000 Feet

Figure 3-3
Woodland Park Groundwater Collection and Treatment Actions, Canyon Creek Watershed
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site





+4 River Mile

River/Creek

Gravity Pipeline to CTP

Selected Remedy Water Treatment Action

Active Treatment

BUR185 (Site ID)
WEST MAMMOTH MINE (Site Name[1])
Adit drainage, No Action (Water Source Type, Water Treatment Typical Conceptual Design [TCD])

Watershed Segment

City Limit

State Boundary

CTP = Central Treatment Plant in Kellogg, Idaho

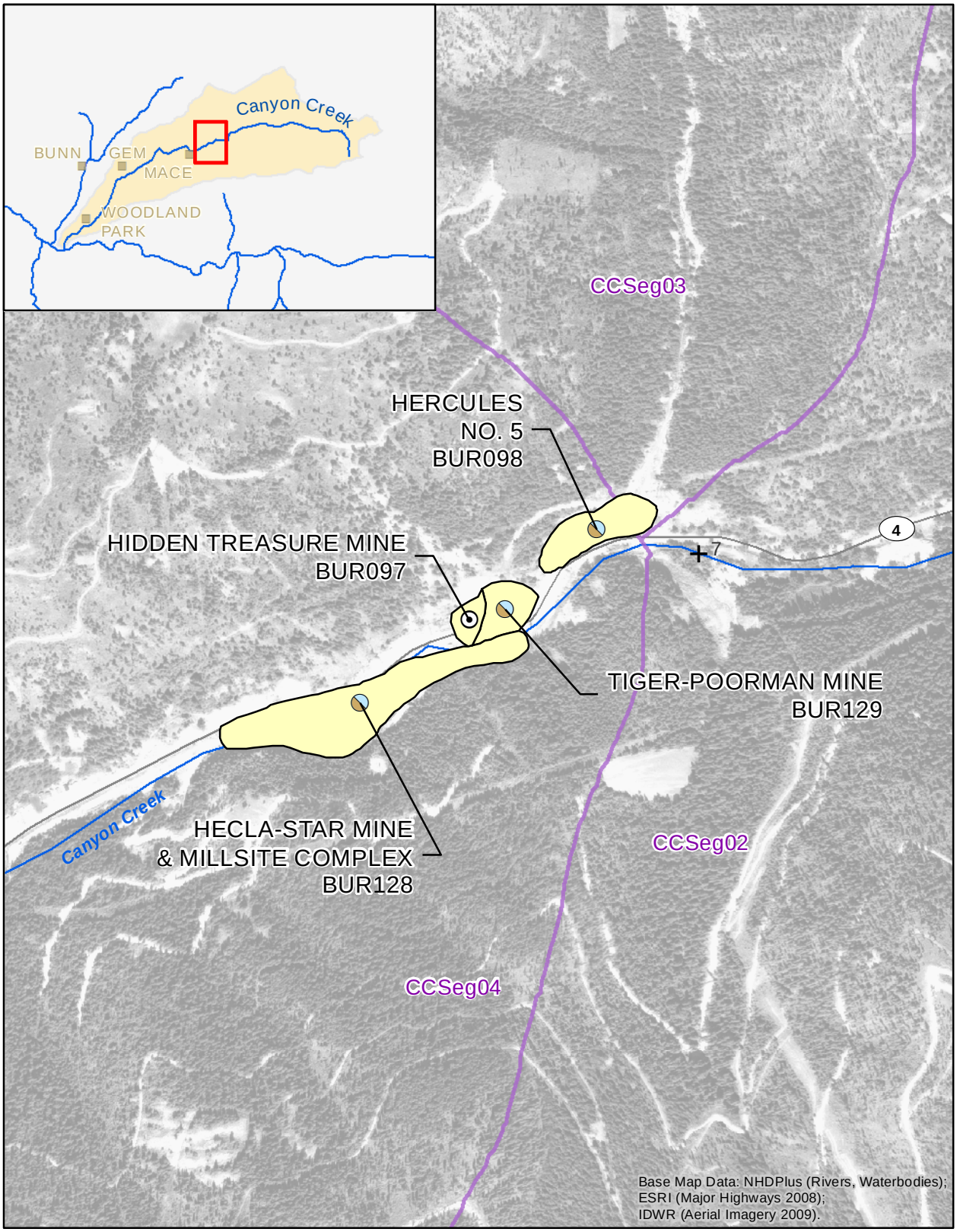
N

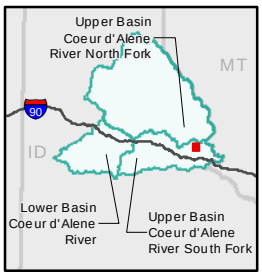
0 1,500 3,000 6,000 Feet

Base Map Data:
NHDPlus (Hydrography, 2005);
ESRI (Roads, Jurisdictional Boundaries, 2006);
IDWR (Aerial Imagery, 2006).

Figure 3-4
Adit Drainage Water Collection and Treatment Actions, Canyon Creek Watershed
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

EPA





Remedial Action Type

- Excavation/Local Repository
- Regrade/Consolidate/Revegetate

HIDDEN TREASURE MINE (Site Name)
BUR097 (Site ID)

- 7 River Mile
- River/Creek
- Watershed Segment
- Mine and Mill Site Boundary

0 500 1,000 Feet

N

Figure 3-5
Source Control Actions at Hecla-Star Complex and Adjacent Sites, Canyon Creek Watershed
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

EPA

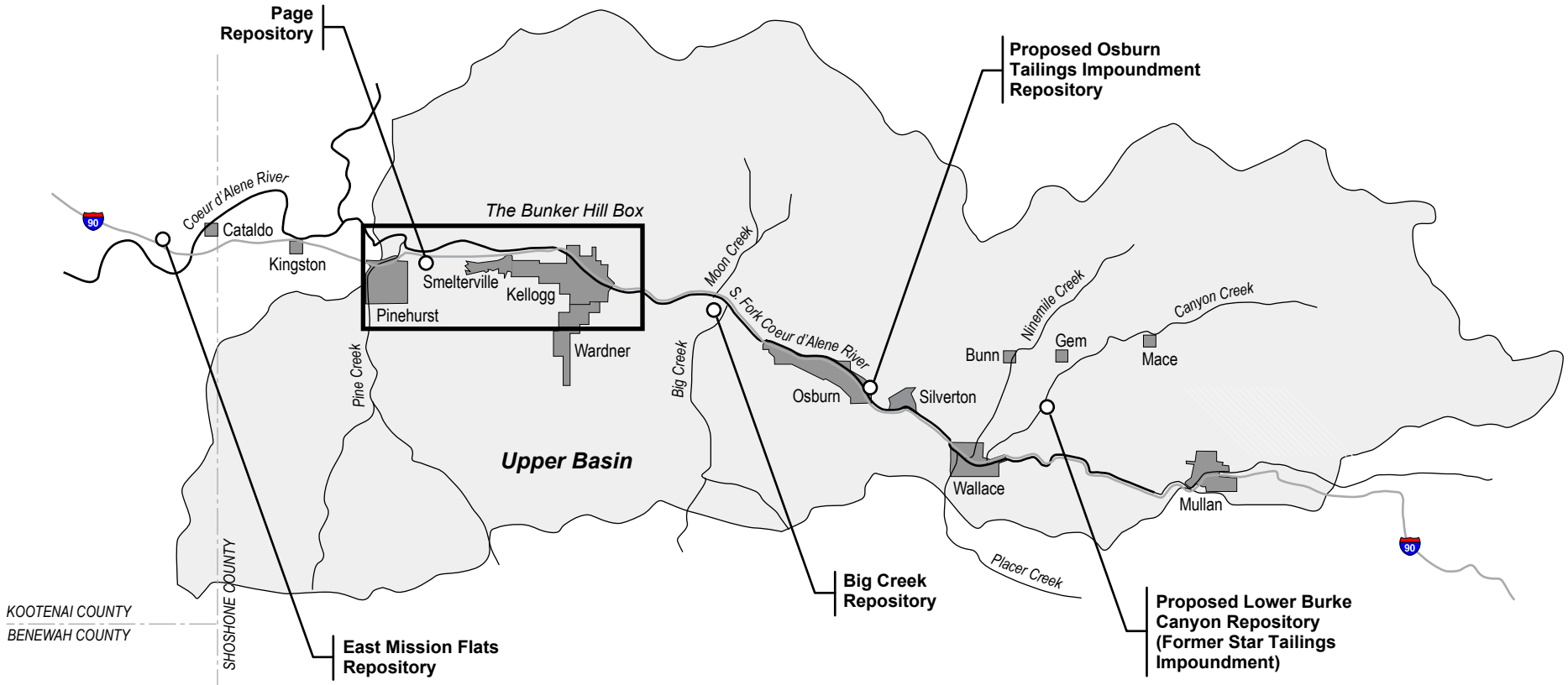


Figure 3-6
Current and Proposed Repository Locations
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

ACTIVITY/LOCATION	ACTIONS	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Protection of Human Health in Communities											
Basin Property Remediation Program (OUs 1, 2, and 3)	Bunker Hill Box BPRP					Completed					
	Upper and Lower Basins BPRP										
Roadway Surface Remediation (OUs 1, 2, and 3)	Bunker Hill Box Roads										
	Upper and Lower Basin Roads										
Remedy Protection (OUs 1, 2, and 3)	Remedy Protection Actions in Communities										
	Remedy Protection Actions in Side Gulches										
Protection of Human Health and the Environment Outside Communities											
Ninemile Creek Watershed Remedy Implementation (OU 3)	Interstate-Callahan Waste Consolidation Area Design										
	Ninemile Creek Infrastructure Improvements										
	Interstate-Callahan Rock Dumps Removal										
	East Fork Ninemile Creek Actions										
Bunker Hill Box Remedy Implementation (OU 2)	CTP Upgrades for OU 2 Waters and New Discharge Pipeline										
	CIA Groundwater Interceptor Drain Installation										
	CTP Sludge Storage Facility (for OU 2/3 Waters and Bunker Hill Mine)										
	Government Gulch Groundwater Diversion/Interception Project				No Work Currently Planned During This Timeframe						
	Reed/Russell Adit Flow Management				No Work Currently Planned During This Timeframe						
Canyon Creek Watershed Remedy Implementation (OU 3)	Woodland Park Water Collection and Treatment Actions										
	Adit Drainage Collection and Treatment										
	Pipeline from CTP to Canyon Creek										
	CTP Upgrades for Treatment of Groundwater and Adit Drainage										
	Remediation of Hecla-Star Complex and Adjacent Sites										
Lower Basin Remedy Implementation (OU 3)	Pilot Projects and Remedial Actions										
Additional Supporting Activities[1]											
Repository Development and Management (OUs 1, 2, and 3)	Big Creek Repository Use										
	East Mission Flats Repository Use (Assuming Expansion)										
	Page Repository Use (Assuming Expansion)										
	Design/Construction/Use Lower Burke Canyon Repository										
	Design/Construction/Use Osburn Tailings Impoundment Repository										

Notes:

BPRP = Basin Property Remediation Program
CIA = Central Impoundment Area
CTP = Central Treatment Plant
OU = Operable Unit
= Action expected to continue beyond 10 years

	More Certain	Less Certain
Design		
Construction/ Remedial Action		
Use		

Note: "More Certain" and "Less Certain" designations are included to help show that uncertainty surrounding the time-frame for most actions may be on the order of a year or more.

IMPORTANT NOTES REGARDING INTERPRETATION OF THIS FIGURE

1. The timeframes shown on this figure are approximate and subject to change based on many factors including implementation logistics and funding considerations.
2. The effectiveness of the remedial actions, as determined through monitoring, is also somewhat uncertain, but will become better understood over time. The effectiveness of the remedial actions will impact overall remedial implementation.
3. Actions planned for the next few years are more certain than actions planned towards the end of the 10-year period.

[1] Environmental monitoring is an additional supporting action for the Site. This includes site-specific monitoring and the Basin Environmental Monitoring Program (BEMP), which are ongoing activities that will continue to be conducted at the Site over the next 10 years.

Figure 3-7
Anticipated Remedial Implementation Timeframe
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

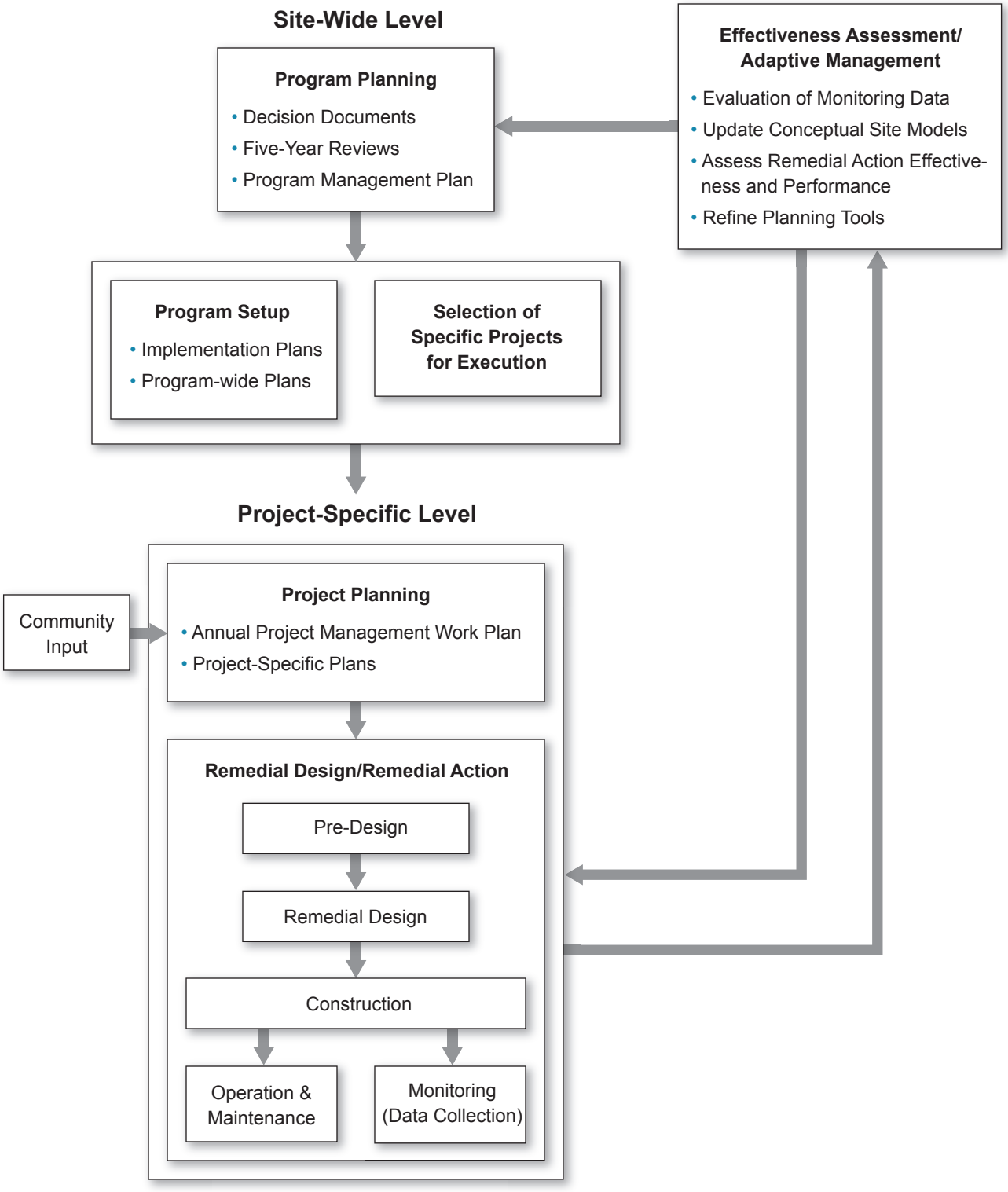
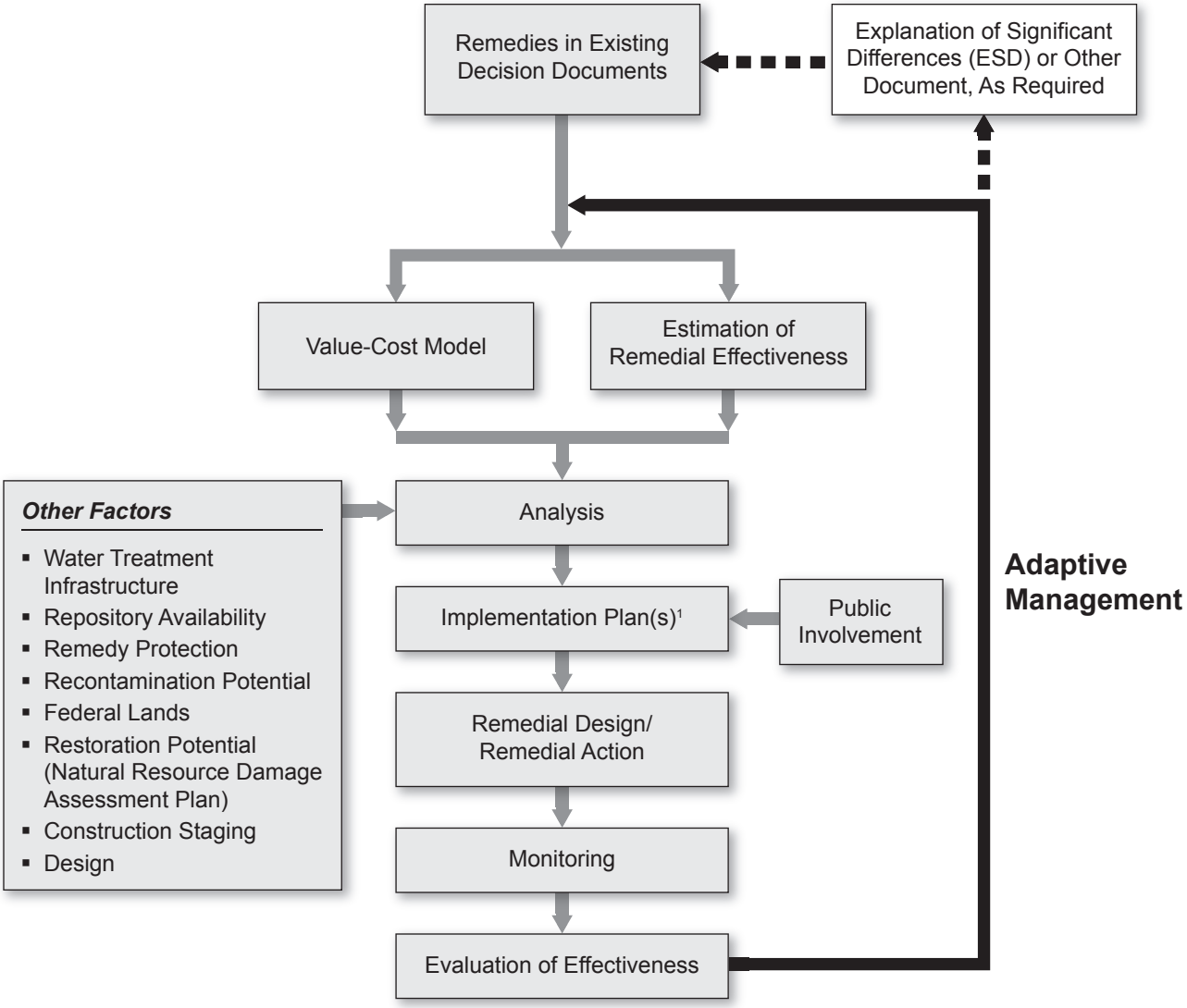


Figure 4-1
Generalized Implementation Process
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site



[1]The Implementation Plan will be routinely updated in collaboration with the Basin Commission Project Focus Teams (PFTs) and other stakeholders.

Note:

The adaptive management process will primarily be used for remedial actions that focus on protection of human health and the environment outside communities.

Figure 7-1
Adaptive Management Process
Superfund Cleanup Implementation Plan, 2012-2022
Bunker Hill Superfund Site

Tables

TABLE 2-1

Lower Basin Remedial Actions Included in the 2002 Record of Decision for Operable Unit 3

Superfund Cleanup Implementation Plan, 2012-2022, Bunker Hill Superfund Site

Segment ID	Trait Description (Waste Types)	TCD Description	Quantity	Units
Lane Marsh (South of UPRR)	Wetland Pond	Excavation	48,000	CY
	Wetland Pond	Haul 10 Miles One Way	48,000	CY
	Wetland Pond	Regional Repository	48,000	CY
	Wetland Sediments	Hydraulic Controls	3	EA
	General	Construct New Levee	14,000	LF
	Wetland Sediments	Place Sand Cap	340,000	CY
Medicine Lake	Wetland Pond	Excavation	32,000	CY
	Wetland Pond	Haul 10 Miles One Way	32,000	CY
	Wetland Pond	Regional Repository	32,000	CY
	Wetland Sediments	Hydraulic Controls	3	EA
	General	Construct New Levee	9,000	LF
	Wetland Sediments	Place Sand Cap	320,000	CY
	Lake Sediments	Dredge and Pipeline	110,000	CY
	Lake Sediments	Regional Repository	110,000	CY
Cave Lake	Wetland Pond	Excavation	32,000	CY
	Wetland Pond	Haul 10 Miles One Way	32,000	CY
	Wetland Pond	Regional Repository	32,000	CY
	Wetland Sediments	Hydraulic Controls	3	EA
	General	Construct New Levee	14,000	LF
	Wetland Sediments	Place Sand Cap	310,000	CY
	Lake Sediments	Dredge and Pipeline	180,000	CY
	Lake Sediments	Regional Repository	180,000	CY
Bare Marsh	Wetland Pond	Excavation	32,000	CY
	Wetland Pond	Haul 10 Miles One Way	32,000	CY
	Wetland Pond	Regional Repository	32,000	CY
	Wetland Sediments	Hydraulic Controls	3	EA
	General	Construct New Levee	8,000	LF
	Wetland Sediments	Place Sand Cap	270,000	CY
Thompson Lake	Wetland Pond	Excavation	48,000	CY
	Wetland Pond	Haul 10 Miles One Way	48,000	CY
	Wetland Pond	Regional Repository	48,000	CY
	Wetland Sediments	Hydraulic Controls	3	EA

TABLE 2-1

Lower Basin Remedial Actions Included in the 2002 Record of Decision for Operable Unit 3

Superfund Cleanup Implementation Plan, 2012-2022, Bunker Hill Superfund Site

Segment ID	Trait Description (Waste Types)	TCD Description	Quantity	Units
	General	Construct New Levee	8,000	LF
	Wetland Sediments	Place Sand Cap	480,000	CY
	Lake Sediments	Dredge and Pipeline	61,000	CY
	Lake Sediments	Regional Repository	61,000	CY
Thompson Marsh	Wetland Pond	Excavation	16,000	CY
	Wetland Pond	Haul 10 Miles One Way	16,000	CY
	Wetland Pond	Regional Repository	16,000	CY
	Wetland Sediments	Hydraulic Controls	3	EA
	General	Construct New Levee	11,000	LF
	Wetland Sediments	Place Sand Cap	95,000	CY
	Lake Sediments	Dredge and Pipeline	29,000	CY
	Lake Sediments	Regional Repository	29,000	CY
Anderson Lake	Wetland Pond	Excavation	16,000	CY
	Wetland Pond	Haul 10 Miles One Way	16,000	CY
	Wetland Pond	Regional Repository	16,000	CY
	Wetland Sediments	Hydraulic Controls	3	EA
	General	Construct New Levee	16,000	LF
	Wetland Sediments	Place Sand Cap	71,000	CY
	Lake Sediments	Dredge and Pipeline	120,000	CY
	Lake Sediments	Regional Repository	120,000	CY
Other (Agricultural Lands)	Wetland Sediments	Allowance for cleanup	6	LS
Lower Coeur d'Alene River	Bank Wedge	Excavate River Banks	405,681	CY
	Bank Wedge	Haul 10 Miles One Way	405,681	CY
	Bank Wedge	Regional Repository	405,681	CY
	Bank Wedge	Vegetative Bank Stabilization	89,383	LF
	Bank Wedge	Bank Stabilization via Revetments	87,000	LF
	Bank Wedge	Floodplain/Riparian Replanting	5,362,980	SF
	Floodplain Sediments	Sediment Trap	4	EA
	Floodplain Sediments	Dredge & Pipeline	100,000	CY
	Floodplain Sediments	Regional Repository	100,000	CY
Lower Coeur d'Alene River near Dudley	Sediment Bed Load	Dredge & Pipeline	1,300,000	CY
	Sediment Bed Load	Regional Repository	1,300,000	CY

TABLE 2-1

Lower Basin Remedial Actions Included in the 2002 Record of Decision for Operable Unit 3

Superfund Cleanup Implementation Plan, 2012-2022, Bunker Hill Superfund Site

Segment ID	Trait Description (Waste Types)	TCD Description	Quantity	Units

Notes:

CY = cubic yards

EA = each

LF = lineal feet

LS = lump sum

SF = square feet

TCD = typical conceptual design

UPRR = Union Pacific Railroad

It is important to note that TCDs are only conceptual designs, and the constructed remedies at specific source sites may differ from the TCDs based on future site- and waste-specific characterization assessments and other pre-design activities.

Source: Tables 12.2-7 and 12.2-8 in the Record of Decision for Operable Unit 3 (U.S. Environmental Protection Agency, 2002).

TABLE 3-1
Prioritized Remedial Actions: East Fork Ninemile Creek Watershed
Superfund Cleanup Implementation Plan, 2012-2022, Bunker Hill Superfund Site

Segment ID	Source Type Description	Source ID	Source Name	Trait Description (Waste Types)	TCD	TCD Description	Quantity	Units
NMSeg01	Mine and Mill Sites	BUR053	INTERSTATE-CALLAHAN MINE/ROCK DUMPS	Upland Waste Rock (Erosion Potential)	C01	Excavation	111,500	CY
					C07	Waste Consolidation Area Above Flood Level	111,500	CY
					HAUL-2	Haul To Repository	151,201	CY-MI
		BUR140	NINEMILE CREEK IMPACTED FLOODPLAIN	Floodplain Sediments	C01b	Excavation (60% dry/40% wet)	10,000	CY
					C07	Waste Consolidation Area Above Flood Level	10,000	CY
					HAUL-2	Haul To Repository	11,648	CY-MI
		BUR160	INTERSTATE-CALLAHAN LOWER ROCK DUMPS	Upland Waste Rock (Erosion Potential)	C01	Excavation	74,100	CY
					C07	Waste Consolidation Area Above Flood Level	74,100	CY
					HAUL-2	Haul To Repository	92,695	CY-MI
	Stream and Riparian Stabilization Actions	NM01-1	Headwaters of East Fork Ninemile Creek to Interstate Mill site	BioReach General Characteristics	BSBR-AVG	Bank Stabilization via Revetments - Average Cost	4,011	LF
					CD-AVG	Current Deflector - Average Cost	48.00	EA
					CD-SED	Current Deflector, Sediment Traps	5.00	EA
					FP/RP-AVG	Floodplain and Riparian Zone Replanting - Average Cost	200,531	SF
					VBS-AVG	Vegetative Bank Stabilization - Average Cost	4,011	LF
NMSeg02	Mine and Mill Sites	BUR055	INTERSTATE MILLSITE	Floodplain Sediments	C01b	Excavation (60% dry/40% wet)	30,700	CY
					C07	Waste Consolidation Area Above Flood Level	30,700	CY
					HAUL-2	Haul To Repository	26,746	CY-MI
				Upland Tailings	C01	Excavation	78,200	CY
					C07	Waste Consolidation Area Above Flood Level	78,200	CY
					HAUL-2	Haul To Repository	68,129	CY-MI
		BUR056	TAMARACK ROCK DUMPS	Upland Waste Rock (Potential Intermixed Tailings)	C01	Excavation	253,600	CY
					C07	Waste Consolidation Area Above Flood Level	253,600	CY
					HAUL-2	Haul To Repository	85,494	CY-MI
		BUR058	TAMARACK NO. 3	Upland Waste Rock	C01	Excavation	13,500	CY
					C07	Waste Consolidation Area Above Flood Level	13,500	CY
					HAUL-2	Haul To Repository	32,881	CY-MI
				Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT02	Onsite Semi-Passive Treatment Using Lime Addition	89.8	GPM
		BUR170	TAMARACK 400 LEVEL	Upland Waste Rock (Potential Intermixed Tailings)	C01	Excavation	17,700	CY
					C07	Waste Consolidation Area Above Flood Level	17,700	CY
					HAUL-2	Haul To Repository	2,749	CY-MI
				Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT02	Onsite Semi-Passive Treatment Using Lime Addition	74.5	GPM
		BUR171	TAMARACK NO. 5	Upland Waste Rock (Potential Intermixed Tailings)	C01	Excavation	6,500	CY
					C07	Waste Consolidation Area Above Flood Level	6,500	CY
					HAUL-2	Haul to Repository	2,831	CY-MI
				Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT02	Onsite Semi-Passive Treatment Using Lime Addition	27.4	GPM
		BUR172	TAMARACK UNNAMED ADIT	Upland Waste Rock	C01	Excavation	4,300	CY
					C07	Waste Consolidation Area Above Flood Level	4,300	CY
					HAUL-2	Haul to Repository	2,052	CY-MI
		BUR173	TAMARACK MILLSITE	Upland Tailings	C01	Excavation	5,200	CY
					C07	Waste Consolidation Area Above Flood Level	5,200	CY
					HAUL-2	Haul to Repository	2,117	CY-MI

TABLE 3-1
Prioritized Remedial Actions: East Fork Ninemile Creek Watershed
Superfund Cleanup Implementation Plan, 2012-2022, Bunker Hill Superfund Site

Segment ID	Source Type Description	Source ID	Source Name	Trait Description (Waste Types)	TCD	TCD Description	Quantity	Units
NMSeg02	Mine and Mill Sites	OSB044	SUCCESS MINE ROCK DUMP	Upland Tailings (Jig Tailings)	C01	Excavation	155,100	CY
					C07	Waste Consolidation Area Above Flood Level	155,100	CY
					HAUL-2	Haul to Repository	86,950	CY-MI
				Upland Waste Rock	C01	Excavation	7,300	CY
					C07	Waste Consolidation Area Above Flood Level	7,300	CY
					HAUL-2	Haul to Repository	4,092	CY-MI
				Floodplain Sediments	C01b	Excavation (60% dry/40% wet)	4,300	CY
					C07	Waste Consolidation Area Above Flood Level	4,300	CY
					HAUL-2	Haul to Repository	2,411	CY-MI
		OSB048	AMERICAN MINE	Upland Waste Rock	C02a	Regrade/Consolidate/Revegetate	0.15	AC
		OSB056	EF NINEMILE CK IMPACTED RIPARIAN	Floodplain Sediments	C01b	Excavation (60% dry/40% wet)	1,600	CY
					C07	Waste Consolidation Area Above Flood Level	1,600	CY
					HAUL-2	Haul to Repository	1,342	CY-MI
	Stream and Riparian Stabilization Actions	NM02-1	Interstate Mill site on East Fork to mainstem Ninemile Creek	BioReach General Characteristics	BSBR-AVG	Bank Stabilization via Revetments - Average Cost	7,553	LF
					CD-AVG	Current Deflector - Average Cost	90	EA
					CD-SED	Current Deflector, Sediment Traps	10	EA
					FP/RP-AVG	Floodplain and Riparian Replanting - Average Cost	377,656	SF
					OFFCH-AVG	Off-Channel Hydrologic Feature - Average Cost	347	SY
					VBS-AVG	Vegetative Bank Stabilization - Average Cost	7,553	LF

Notes:

AC = acres
CY = cubic yards
CY-MI = cubic yards per mile
EA = each
GPM = gallons per minute
LF = lineal feet
LS = lump sum
SF = square feet
SY = square yards
TCD = typical conceptual design

It is important to note that TCDs are only conceptual designs, and the constructed remedies at specific source sites may differ from the TCDs based on future site- and waste-specific characterization assessments and other pre-design activities.

TABLE 3-2

Bunker Hill Box Remedial Actions

Superfund Cleanup Implementation Plan, 2012-2022, Bunker Hill Superfund Site

Action	TCD	TCD Description	Quantity	Units
CIA Groundwater Interception Drain	C15c	French Drain	1,150	LF
	C15d	French Drain	4,225	LF
	Pressure-Pipe-3	Pressurized Pipeline	7,000	LF
	PUMP-4	Pump Station	1	EA
	WT01	Centralized HDS Treatment at CTP	4,399	GPM
CTP Direct Discharge Pipeline	Pressure-Pipe-3	Pressurized Pipeline	2,500	LF
Government Gulch	C11d	Hydraulic Isolation Using Slurry Wall	275	LF
	C14b	Stream Lining	11,000	LF
	Pressure-Pipe-1	Pressurized Pipeline	1,500	LF
Lower Government Gulch	C17c	Extraction Well	5	EA
Reed/Russell Adits Water Collection and Treatment	C10	Adit Drainage Collection	2	LS
	C20	Check Dam	2	LS
	Pressure-Pipe-1	Pressurized Pipeline	2,000	LF
	Pressure-Pipe-4	Pressurized Pipeline	1,000	LF
	PUMP-1	Pump Station	1	EA
Upper Government Gulch	C17b	Extraction Well	2	EA

Notes:

CIA = Central Impoundment Area
CTP = Central Treatment Plant
EA = each
GPM = gallons per minute
HDS = high-density sludge
LF = lineal feet
LS = lump sum
TCD = typical conceptual design

It is important to note that TCDs are only conceptual designs, and the constructed remedies at specific source sites may differ from the TCDs based on future site- and waste-specific characterization assessments and other pre-design activities.

TABLE 3-3
Prioritized Remedial Actions: Water Collection and Treatment Actions, Canyon Creek Watershed
Superfund Cleanup Implementation Plan, 2012-2022, Bunker Hill Superfund Site

Segment ID	Source Type Description	Source ID	Source Name	Trait Description (Waste Types)	TCD	TCD Description	Quantity	Units
CCSeg02	Mine and Mill Site	BUR107	AJAX NO. 3	Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	89.8	GPM
	Water Treatment Pipeline	PIPING_8	BUR107 to Int G	Adit Drainage	PIPE-1	Gravity Pipeline-6"	4,597	LF
CCSeg03	Water Treatment Pipelines	PIPING_10		Adit Drainage	PIPE-1	Gravity Pipeline-6"	227	LF
		PIPING_10.25		Combined Waters	PIPE-1	Gravity Pipeline-6"	1,135	LF
		PIPING_10.5		Combined Waters	PIPE-1	Gravity Pipeline-6"	265	LF
		PIPING_9		Adit Drainage	PIPE-1	Gravity Pipeline-6"	4,599	LF
CCSeg04	Mine and Mill Sites	BUR067	TAMARACK NO. 7 (1200 LEVEL)	Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	1,414	GPM
		BUR096	ANCHOR MINE	Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	7.27	GPM
		BUR097	HIDDEN TREASURE MINE	Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	1,293	GPM
		BUR098	HERCULES NO. 5	Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	1,346	GPM
		BUR112	GEM NO. 2	Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	89.8	GPM
		BUR121	BLACK BEAR FRACTION	Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	1,014	GPM
		BUR129	TIGER-POORMAN MINE	Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	89.8	GPM
		BUR190	GEM NO. 3	Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	449	GPM
	Water Treatment Pipelines	PIPING_11		Adit Drainage	PIPE-3	Gravity Pipeline-24"	137	LF
		PIPING_11.5		Combined Waters	PIPE-3	Gravity Pipeline-24"	717	LF
		PIPING_12.5		Combined Waters	PIPE-3	Gravity Pipeline-24"	236	LF
		PIPING_13.5		Combined Waters	PIPE-3	Gravity Pipeline-24"	753	LF
		PIPING_14.5		Combined Waters	PIPE-3	Gravity Pipeline-24"	1,152	LF
		PIPING_15.5		Combined Waters	PIPE-3	Gravity Pipeline-24"	8,216	LF
		PIPING_16.5		Combined Waters	PIPE-3	Gravity Pipeline-24"	1,731	LF
		PIPING_17		Adit Drainage	PIPE-2	Gravity Pipeline-12"	129	LF
		PIPING_17.5		Combined Waters	PIPE-3	Gravity Pipeline-24"	4,212	LF
		PIPING_18		Adit Drainage	PIPE-1	Gravity Pipeline-6"	7,076	LF
		PIPING_19.25		Combined Waters	PIPE-2	Gravity Pipeline-12"	499	LF
		PIPING_19.5		Combined Waters	PIPE-4	Gravity Pipeline-36"	4,431	LF
CCSeg05	Mine and Mill Sites	WAL011	CANYON SILVER (FORMOSA) MINE	Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	89.8	GPM
		WP-OPTIONC	WOODLAND PARK OPTION C	Floodplain Sediments	C14b	Stream Lining	2,700	LF
					C15b	French Drain	7,800	LF
				Groundwater	WT01	Centralized HDS Treatment at CTP	673	GPM
	Water Treatment Pipelines	PIPING_20.5		Combined Waters	PIPE-4	Gravity Pipeline-36"	4,014	LF
		PIPING_20.6		Combined Waters	PIPE-4	Gravity Pipeline-36"	604	LF
		PIPING_20.7		Combined Waters	PIPE-4	Gravity Pipeline-36"	2,759	LF
		PIPING_20.8		Combined Waters	PIPE-4	Gravity Pipeline-36"	6,719	LF

TABLE 3-3
Prioritized Remedial Actions: Water Collection and Treatment Actions, Canyon Creek Watershed
Superfund Cleanup Implementation Plan, 2012-2022, Bunker Hill Superfund Site

Segment ID	Source Type Description	Source ID	Source Name	Trait Description (Waste Types)	TCD	TCD Description	Quantity	Units

Notes:

CTP = Central Treatment Plant
GPM = gallons per minute
HDS = high-density sludge
LF = lineal feet
LS = lump sum
TCD = typical conceptual design

It is important to note that TCDs are only conceptual designs, and the constructed remedies at specific source sites may differ from the TCDs based on future site- and waste-specific characterization assessments and other pre-design activities.

TABLE 3-4
Prioritized Remedial Actions: Hecla-Star Complex and Adjacent Sites, Canyon Creek Watershed
Superfund Cleanup Implementation Plan, 2012-2022, Bunker Hill Superfund Site

Segment ID	Source Type Description	Source ID	Source Name	Trait Description (Waste Types)	TCD	TCD Description	Quantity	Units
CCSeg04	Mine and Mill Sites	BUR097	HIDDEN TREASURE MINE	Upland Waste Rock	C02a	Regrade/Consolidate/Revegetate	0.87	AC
				Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	1,293	GPM
		BUR098	HERCULES NO. 5	Upland Waste Rock (Potential Intermixed Tailings)	C01	Excavation	55,000	CY
					C07	Waste Consolidation Area Above Flood Level	55,000	CY
				Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	1,346	GPM
		BUR128	HECLA-STAR MINE & MILL SITE COMPLEX	Upland Tailings	C01	Excavation	43,400	CY
					C07	Waste Consolidation Area Above Flood Level	43,400	CY
				Building & Structures	HH-3	Millsite Decontamination	1	EA
		BUR129	TIGER-POORMAN MINE	Upland Tailings	C01	Excavation	5,250	CY
					C07	Waste Consolidation Area Above Flood Level	5,250	CY
				Adit Drainage	C10	Adit Drainage Collection	1	LS
					WT01	Centralized HDS Treatment at CTP	89.8	GPM

Notes:

AC = acres
CTP = Central Treatment Plant
CY = cubic yards
EA = each
GPM = gallons per minute
HDS = high-density sludge
LS = lump sum
TCD = typical conceptual design

It is important to note that TCDs are only conceptual designs, and the constructed remedies at specific source sites may differ from the TCDs based on future site- and waste-specific characterization assessments and other pre-design activities.

TABLE 4-1
Implementation Phases and Typical Documentation
Superfund Cleanup Implementation Plan, 2012-2022, Bunker Hill Superfund Site

Program Planning and Setup	Project Planning	Remedial Design	Remedial Action	Effectiveness Assessment/Adaptive Management
Program Management Plan	**Annual Project Management Work Plan**	**Pre-Design**	**Construction**	**Monitoring Data Evaluation and CSM Updates**
Implementation Plans	**Project-Specific Plans**	Design Work Plan	Bidding Documents	Updated CSM TM
Program-wide Plans	Health and Safety Plan	**Design Phase**	Construction Documents	Update Contaminant Containment Forecast TM
Health and Safety Program Plan	Field Sampling Plan	Preliminary Design Submittal	Post-Construction Documents	Refined Remedial Technologies Summary TM
Field Sampling Program Plan	Quality Assurance Project Plan	Intermediate Design Submittal	**Monitoring**	**Assessment of Remedial Action Effectiveness and Performance**
Quality Assurance Program Plan		Pre-Final and Final Design Submittals	Design Documents	Effectiveness and Performance of Remedial Actions TM
Data Management Program Plan			Pre- and Post-Construction Data Summary and Impacts Assessments	**Refinement of Implementation Planning Tools**
Reporting Program Plan			**Operation and Maintenance (O&M)**	Implementation Tool Update Summary TM
Contractor Procurement Plan			O&M Plans	Evaluation of Repository Needs TM
Community Relations Plan			O&M Reports	Implementation Plan Update TM
Recordkeeping Program Plan				

Notes:

CSM = conceptual site model
RD/RA = remedial design/remedial action
TM = technical memorandum