FINAL

RESTORATION PLAN

AND

ENVIRONMENTAL ASSESSMENT

RICHARDSON FLAT TAILINGS SITE

PARK CITY, SUMMIT COUNTY, UTAH

February 8, 2013

Prepared for:

U.S. Department of the Interior
U.S. Fish and Wildlife Service
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FINDING OF NO SIGNIFICANT IMPACT

Restoration Plan and Environmental Assessment for the Richardson Flat Tailings Site, Park City, Summit County, Utah

The U.S. Fish and Wildlife Service (Service) has determined no additional response and restoration activities are necessary at the Richardson Flat Tailings Site (Site). The Service anticipates that on-Site resources will recover over time through enhanced habitat availability due to restoration projects and natural attenuation activities already completed. Biological and chemical characteristics of the site will continue to be monitored and reported to the Service to ensure habitat resources recover at the rate and to the degree anticipated.

The Service issued a scoping notice for public comment on November 6, 2012, and issued a draft EA for 30-day public review on the web at http://www.fws.gov/utahfieldoffice/ and http://www.fws.gov/mountain-prairie/ and in two Utah newspapers, the Salt Lake Tribune and Park Record. A final EA was issued by the Service on February 8, 2013. The final EA responds to the public comments we received on the draft. The final EA is available by request from the Utah Ecological Services Field Office by contacting Larry Crist at 801-975-3330.

The EA analyzed No Action (i.e., the preferred action) and two action alternatives:

- On-Site wetland enhancement and construction of additional wetlands that would restore, enhance, or create valuable natural resources, including perennial and seasonal wetlands. The purpose of this alternative is to increase the quantity and quality of on-Site habitats, primarily wetland habitats and services.
- Wetland enhancement and construction of public recreational facilities at the Site that would enhance pre-existing wetland services and increase public recreational activities, respectively.

The No Action proposal was selected over the other alternatives because a habitat equivalency analysis conducted by the Service for Richardson Flat Tailings Site determined that no additional restoration projects are necessary to restore, rehabilitate, replace, and/or acquire the equivalent of the injured natural resources (DOI 2012). Restoration activities completed previously by United Park City Mines Company with oversight from EPA and natural recovery are expected to return services at the Site to levels above their assumed baseline values (i.e., the natural conditions prior to tailings contamination).

Implementation of the agency's proposal will have no significant environmental, social, and economic impacts since it is the "No Action" alternative.

The proposal is not expected to have any significant adverse effects on wetlands and floodplains, pursuant to Executive Orders 11990 and 11988, or the human environment because no additional

response and restoration activities are being proposed beyond those completed previously on-Site through other regulatory oversight.

The proposal has been coordinated with all interested and/or affected parties. Parties contacted include:

- Utah State Historical Preservation Office
- Confederated Tribes of the Goshute Reservation
- Skull Valley Band of Goshute Indians
- Northwestern Band of Shoshoni Nation of Utah
- Uintah and Ouray Tribes
- United Park City Mines Company

Therefore, it is my determination that the proposal does not constitute a major Federal action significantly affecting the quality of the human environment under the meaning of section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). As such, an environmental impact statement is not required. An environmental assessment has been prepared in support of this finding and is available upon request to the Service facility identified in the Environmental Assessment.

References:

RMC, Inc. 2013. Final Restoration Plan and Environmental Assessment for the Richardson Flat Tailings Site, Park City, Summit County, Utah. Prepared for U.S. Department of Interior – U.S. Fish and Wildlife Service.

U.S. Department of Interior (DOI). 2012. Habitat Equivalency Analysis, Richardson Flat Tailings Site.

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Authorized Official, U.S. Fish and Wildlife Service Date

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LIST OF ACRONYMS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DSAY	Discounted Service Acre-Years
DOI	U.S. Department of the Interior
DWR	Utah Department of Wildlife Resources
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FCP	Field Construction Plan
FONSI	Finding of No Significant Impact
HEA	Habitat Equivalency Analysis
MBTA	Migratory Bird Treaty Act
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NRDAR	Natural Resource Damage Assessment and Restoration
O&M	Operations and Maintenance
PRPs	Potentially Responsible Parties
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RP	Restoration Plan
RP/EA	Restoration Plan and Environmental Assessment
Service	U.S. Fish and Wildlife Service
Site	Richardson Flat Tailings Site
United Park	United Park City Mines Company
USC	United States Code

EXECUTIVE SUMMARY

United Park City Mines Company (United Park) is the owner of the Richardson Flat Tailings Site (the "Site") located near Park City, Utah. As described in greater detail herein, United Park has completed certain activities to restore natural resources that may have been injured as a result of the discharge of hazardous substances at or from the Site. United Park undertook the restoration activities simultaneous with other activities approved by the U.S. Environmental Protection Agency (EPA) to remove and remediate hazardous materials at the Site. The Department of the Interior is now considering whether natural resource restoration required by Natural Resource Damage Assessment and Restoration (NRDAR) has been met, or whether additional restoration is necessary to supplement previously completed restoration projects.

This Restoration Plan and Environmental Assessment (RP/EA) is being prepared in accordance with regulations promulgated by the U.S. Department of the Interior (DOI) concerning natural resource damages and mandating the preparation of a Restoration Plan (43 CFR § 11.81). Although the Restoration Plan (RP) is generally prepared in conjunction with a Resource Compensation and Determination Plan, no discussion regarding compensation is included herein because United Park has agreed to conduct the restoration activities itself. Accordingly, no compensation determination is necessary.

This RP/EA combines the elements of a RP and integrates National Environmental Policy Act (NEPA) Environmental Assessment (EA) requirements by describing the affected environment, describing the purpose and need for action, identifying alternative actions, assessing their applicability and environmental consequences and summarizing opportunities for public participation.

This RP/EA is being prepared as part of a Natural Resource Damage Assessment and Restoration (NRDAR) settlement between United Park, as the Responsible Party, and the U.S. Fish and Wildlife Service (the "Service"), on behalf of DOI, as the applicable Natural Resource Trustees . Although the precise terms of the settlement are still being negotiated, United Park voluntarily conducted restoration activities necessary to restore natural resources at the Site and attempt to satisfy restoration requirements of the NRDAR.

Based on the evaluation of various restoration alternatives contained herein, the proposed restoration alternative (Alternative A, Section 2.3.1) involves no additional restoration actions on-Site. Results from a cooperative natural resource injury assessment and habitat equivalency analysis indicate that the restoration actions completed to date are sufficient to restore the equivalent of the injured natural resources on-Site, and thereby satisfy restoration requirements of the NRDAR.

This EA was prepared by Resource Environmental Management Consultants, Inc. (RMC) on behalf of the Service. The Service has reviewed this draft EA and approved it for distribution and public review.

1.0 INTRODUCTION

1.1 Purpose and Need

This document constitutes the Restoration Plan and Environmental Assessment (RP/EA) on proposed activities associated Natural Resource Assessment and Restoration (NRDAR) for the Richardson Flat Tailing Site (Site), located near Park City, Utah. The U.S. Fish and Wildlife Service (Service) has prepared this RP/EA to address and evaluate restoration alternatives related to natural resource injuries. The purpose of this RP/EA is to address alternatives that would restore, rehabilitate, replace, or acquire natural resources, and the services provided by those resources, that approximate those injured or destroyed as a result of the release of hazardous substances.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, through its Natural Resource Damage Assessment and Restoration (NRDAR) provisions, allows natural resource Trustees to seek compensation for "damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss" caused by releases of hazardous substances into the environment.

The natural resource services for this case are the habitat functions provided by the Site that were impaired due to contamination. Habitat functions, also referred to as services, that are provided by the Site include the following:

- Bird and Mammal Production
- Biotic Habitat
- Abiotic Habitat
- Macroinvertebrate Production and Diversity
- Primary Production
- Water Quality
- Decomposition
- Fish and Amphibian Production
- Food Provision

A Site Location map is presented in Figure 1.

1.2 Authorities and Trustee Responsibilities

Section 107 of CERCLA authorizes Federal agencies who administer natural resources, states, and federally-recognized Indian tribes to be designated as trustees for natural resources under their statutory authorities and responsibilities. These designated natural resource trustees assess and recover damages for natural resource injury. The trustees also have the responsibility to restore, rehabilitate, replace, or acquire the equivalent natural resources.

The Region 6 Regional Director of the Service is designated to act on behalf of DOI's authorized natural resource trustee in the Richardson Flat Tailings Site NRDAR case. As such, the Service is responsible for developing a restoration plan, and for implementing and overseeing activities that will restore the natural resources injured by the release of hazardous substances from Richardson Flat Site.

Under NEPA (42 United States Code [USC] 4321 *et seq*.), the Service, as a federal agency, must also assess environmental impacts that may be associated with this proposal. Therefore, the requirements of a restoration plan and a NEPA environmental analysis are combined in this RP/EA document.

Figure 1. Richardson Flat Tailings Site located in the southwest corner of Summit County, Utah. 2011 National Agriculture Imagery Program imagery.

1.3 Summary of Settlement

United Park is currently negotiating a Consent Decree with DOI.

1.4 Operational History

The information in this section is based on the CERCLA Record of Decision (ROD) prepared by EPA and executed on July 6, 2005 (EPA, 2005).

In 1953, United Park was formed through the consolidation of Silver King Coalition Mines Company and Park Utah Consolidated Mines Company. At that time, the Site was already being used as an impoundment for mine tailings consisting primarily of sand-sized carbonaceous particles and minerals containing lead, zinc, silver and other metals. Additionally, tailings were transported to and placed in several distinct low elevation areas in the southeast portion of the Site just outside of the main impoundment.

In 1970, with renewed mining activity in the area, Park City Ventures (PCV), a joint venture partnership between Anaconda Copper Company (Anaconda) and American Smelting and Refining Company (ASARCO), who were also controlling shareholders of United Park, entered into a lease agreement with United Park. This agreement allowed PCV to deposit additional mine tailings at the Site; however, the Site had to be partially reconstructed. Design, construction and operation specifications at the Site included installation of a large embankment along the western edge of the impoundment and construction of containment dike structures along the southern and eastern borders of the Site for additional tailings storage. PCV also created a diversion ditch system along the higher slopes north of the impoundment and outside of the containment dikes along the east and south perimeters of the impoundment to collect surface runoff. As part of the approval process for the renewed use of the Site, the State of Utah required installation of groundwater monitoring wells near the base of the main embankment.

PCV deposited tailings from a slurry pipeline in one constant area in the center of the impoundment, creating a steep, cone-like structure in the middle of the impoundment. After PCV discontinued their use of the Site in 1982, high winds caused tailings from the cone-shaped feature to become airborne, creating a potentially significant exposure pathway.

From 1980 to 1982, Noranda Mining, Inc. leased the mining and milling operations and placed additional tailings at the Site. Since then no further deposition of surface tailings has occurred on the Site.

United Park began taking actions to improve environmental conditions at the Site soon after operations stopped in 1982. This work included the placement of soil cover over exposed

tailings and continued intermittently through the mid-1990s (EPA, 2005). Since that time, United Park has conducted an extensive investigation of Site risks and negotiated a Consent Decree with EPA to conduct response[1] and restoration[2] (EPA, 2007). Since 2007 United Park has moved over 221,000 cubic yards of mine wastes, restored approximately 12.7 acres of existing year-round wetlands, and created or enhanced an additional 10.4 acres of year-round compensatory wetlands and 25.7 acres of seasonal compensatory wetlands.

1.5 Site Description

The Site is located in a broad valley with undeveloped rangeland, about 6,570 feet above mean sea level, characterized by a cool, dry, semi-arid climate. Meteorological stations located in Park City, Utah and Kamas, Utah estimate an annual precipitation of about 20 inches of water, an average low temperature of about 30°F, and an average high temperature of about 57°F (RMC, 2003). In accordance with the State of Utah, Division of Water Quality, the Weber River from the Stoddard diversion to its headwaters (including Silver Creek) is classified as a cold water fishery and is protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in the food chain. The Site also provides habitat for fish, aquatic invertebrates, terrestrial plants, terrestrial invertebrates, mammals, birds, reptiles and amphibians.

Impoundment and Containment Dikes

The majority of the tailings at the Site are contained in the impoundment basin, with a large earth embankment in place along the northwestern edge of the Site. The "main embankment" is covered with six minus riprap and is approximately 40 feet wide at the top, 800 feet long, and has a maximum height of 25 feet. A series of dikes contain the tailings along the southern and eastern perimeter of the impoundment. The northern edge of the impoundment is naturally higher than the perimeter dikes.

Off-Impoundment Tailings

Additional tailings materials are present outside and to the south of the current impoundment area. During historic operations of the tailings pond, tailings accumulated in three naturally low-

[1] "Response" means remove, removal, remedy, or remedial actions as those phrases are defined in sections 101(23) and 101(24) of CERCLA. [43 CFR 11.14 (z)(jj)]

[2] "Restoration" or rehabilitation means actions undertaken to return an injured resource to its baseline condition, as measured in terms of the injured resource's physical, chemical, or biological properties or the services it previously provided, when such actions are in addition to response actions completed or anticipated, and when such actions exceed the level of response actions determined appropriate to the site pursuant to the National Contingency Plan. [43 CFR 11.14 (z)(ll)]

lying areas adjacent to the impoundment. Starting in 1983, UPCM covered these off-impoundment tailings with a low-permeability, vegetated soil cover. In addition to these off-impoundment tailings deposits, prevailing winds from the southeast carried tailings from the main impoundment and deposited them in the surrounding areas.

Diversion Ditches and Drainages

A diversion ditch system borders the north, south, and east sides of the impoundment to prevent surface water runoff from the surrounding land from entering the impoundment. Precipitation falling on the impoundment area creates a limited volume of seasonal surface water. The north diversion ditch collects snowmelt and storm-water runoff from the upslope, undisturbed areas north of the impoundment and carries it east, toward the origin of the south diversion ditch. An unnamed ephemeral drainage southeast of the impoundment also enters the south diversion ditch at this point. Additional water from spring snowmelt and storm-water runoff enters the south diversion ditch from other areas south of the impoundment at a point near the southeast corner of the diversion ditch structure.

Site Wetlands and Pond

Water in the south diversion ditch flows from east to west and ultimately empties into Silver Creek near the north border of the Site. Before its confluence with Silver Creek, water from the south diversion ditch flows through a series of ponds, one at the terminus of the diversion ditch, and the others in the wetland at the toe of the main embankment. These ponds were created and/or restored during the 2010 and 2011 construction seasons. Near the northwestern corner of the combined pond and wetland pond area water exiting the ponds flows in a discrete channel where it mixes with flow from Silver Creek. The combined flow exits the Site via a concrete box culvert under State Highway 248.

Silver Creek

Silver Creek flows approximately 500 feet from the main embankment along the west edge of the Site. The headwaters of Silver Creek include three major drainages in the Upper Silver Creek Watershed: Ontario Canyon, Empire Canyon and Deer Valley. Flows from Ontario and Empire Canyons occur in late spring to early summer months in response to snowmelt and rainfall, while Deer Valley flows appear to be perennial and originate from snowmelt and springs. Other sources of water (and potential metal loads) are the Judge Tunnel and Prospector Drain. Historically, the Judge Tunnel has made up the majority of flow in Empire Canyon and Silver Creek during particular times of year. Prospector Drain has been identified as a major metal loading contributor in the Middle Reach of Silver Creek. The major influence on water flow in Silver Creek near the Site is the Pace-Homer (Dority Springs) Ditch, which derives most of its

flow from groundwater. The outflow from the Pace-Homer Ditch enters Silver Creek at several locations downstream of the Prospector Square area. Significant riparian zones and wetlands exist near the Site in areas that historically contained of accumulated tailings piles.

1.6 Onsite Response and Restoration

This Section summarizes Site response and restoration activities. Response and associated restoration at the Site are being conducted in accordance with the EPA-approved Remedial Design/Remedial Action Work Plan (RD/RA, RMC 2007a) for Richardson Flat. The RD/RA outlines a series of tasks based on areas located throughout the Site. Response and associated restoration at the Site is based on annual construction phases consisting of multiple tasks. Each annual phase is based on a Field Construction Plan (FCP) approved by EPA prior to the start of work. Results of the FCP are summarized in an annual Task Completion Report (TCR) and approved by EPA. Remedial areas and tasks are depicted in Figure 2.

1.6.1 Response Activities

The remedy selected by EPA addresses mill tailings located in several areas of Richardson Flat, including the main impoundment, an area south of the diversion ditch, and wetlands west of the embankment (EPA 2005). Sediments and surface water located at Richardson Flat are also addressed in EPA's selected remedy. The selected remedy contains the following elements (EPA 2005; RMC 2007a):

- Removal of contaminated materials in selected areas south of the South Diversion Ditch (SDD);
- Removal of contaminated materials in the wetland west of the main embankment.
- Placing excavated materials in the impoundment;
- Placement of a minimum twelve-inch thick low permeability soil cover on areas where tailings are left in-place including the impoundment. The final surface cover will be a minimum of eighteen inches, incorporating a six-inch topsoil cover. The final surface will be graded to control surface stormwater runoff and drainage;
- Removal of contaminated sediments in the SDD, including the pond located near the terminus of the ditch;
- Installation of a rock wedge buttress along the over steepened portion of the embankment;
- Regrading and revegetation of areas affected by response activities at the Site; and
- Monitoring site conditions, including vegetation, surface water quality, and erosion, on a quarterly basis for two years following completion of the remedy.

As described in the RD/RA (RMC 2007a), Site construction activities were divided into twelve work tasks which are based on geographic areas. Construction tasks were grouped into five construction phases according to anticipated annual workloads (Table 1).

Table 1. Richardson Flat response construction phases from 2007 to 2011 and response tasks completed during each phase.

Construction Phase	Year Completed	RD/RA Remedial Tasks Completed*	RD/RA Task Areas Remediated	Task Notes
1	2007	1	Wedge Buttress	Construction of Wedge Buttress
			F-1	Cover placement, grading, confirmation sampling, erosion control structure placement, and revegetation
			F-7	
2	2008	2	B-2-E	Source removal, grading, confirmation sampling, topsoil placement, channel reconstruction and revegetation
		3	B-3-E	Source removal, grading, confirmation sampling, topsoil placement, channel reconstruction and revegetation
		4	East Diversion Ditch	Sediment removal in the SDD and channel reconstruction
		9	F-8	Cover placement, grading, confirmation sampling, erosion control structure placement, and revegetation
3	2009	5	B-1-W	Source removal and topsoil placement
		6	West Diversion Ditch	Sediment removal in the SDD and channel reconstruction
4	2010	7	SDD Pond	Sediment removal in the SDD Pond and Pond reconstruction
		12	F-2	Temporary cover placed on new Bevill-exempt[3] material in the impoundment.
			F-3	
5	2011	8	Embankment Wetland	Sediment removal in the wetlands below the Embankment and wetland reconstruction
		12	F-2	Temporary cover placed on new Bevill-exempt material in the impoundment.
			F-3	

* Tasks 10 and 11 are not completed. Source: RMC 2012b

[3] In October, 1980, RCRA was amended by adding section 3001(b)(3)(A)(ii), known as the Bevill exclusion, to exclude "solid waste from the extraction, beneficiation, and processing of ores and minerals" from regulation as hazardous waste under Subtitle C of RCRA.

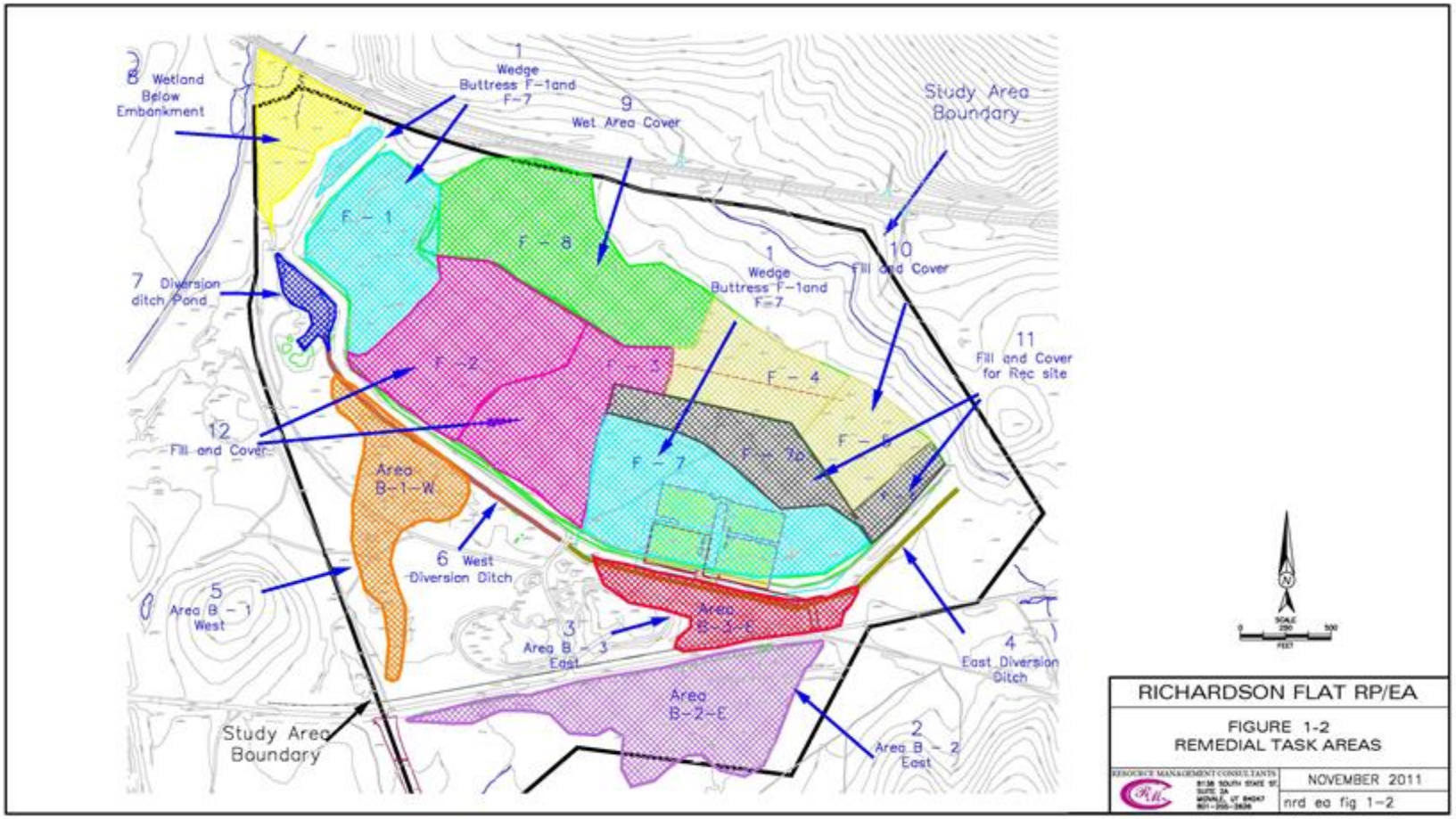

Figure 2. Richardson Flat Tailings Site remedial task areas. Source: RMC, 2011.

Site response activities are designed to meet Remedial Action Objectives (RAOs) as developed by EPA and presented in the ROD (EPA, 2005) as follows:

1. Reduce risks to wildlife receptors in the wetland area and south diversion ditch such that hazard indices for lead are less than or equal to one;
2. Ensure that recreational users, including children, continue to have no more than a 5% chance of exceeding a blood lead level of 10 micrograms per deciliter from exposure to lead in soils;
3. Ensure that recreational users, including children, continue to have no more than 1×10^{-4} chance of contracting cancer from exposure to arsenic in soils;
4. Eliminate the risk of catastrophic failure of the tailings impoundment;
5. Ensure that surface water discharged from the Site meets applicable Utah water quality standards (Utah Administrative Code R317-2);
6. Eliminate the possibility of future ground water use and withdrawal at the Site;
7. Allow for a variety of future recreational uses;
8. Allow for future disposal of mine tailings from the Park City area within the tailings impoundment until the remedy is complete; and
9. Minimize post-cleanup disturbance of tailings and contaminated soil. Provide controls that ensure any necessary disturbance at the Site follows prescribed methods.

The response activities described previously include restoration that has been incorporated into response area construction plans. The restoration discussed in this EA is in addition to remediation required to complete the Remedial Action and is intended to further create and enhance habitat on-Site. All restoration at the Site was planned to meet the goals of the Site RAOs.

1.6.2 Restoration Goals and Incorporation of Natural Resource Values into Response Activities

The purpose of the NRDAR procedure is to compensate the public for its loss of natural resource services caused by the release of hazardous materials at the Site. Services in this case are the habitat functions provided by the Site that were impaired due to contamination. Habitat functions, also referred to as services, that are provided by the Site include but are not limited to the following:

- Bird and Mammal Production
- Biotic Habitat
- Abiotic Habitat
- Macroinvertebrate Production and Diversity
- Primary Production

- Water Quality
- Decomposition
- Fish and Amphibian Production
- Food Provision

The goals of restoration include the following:

- Offset lost services due to contamination;
- Increase the quality of aquatic habitat at the Site as compared to the baseline condition; and
- Increase the quantity of seasonal and year-round wetlands at the Site at a level sufficient to meet the restoration requirements of the NRDAR.

Conducting restoration concurrently with remedial activities allows for the incorporation of natural resource values within the framework of response. Response has been conducted in a manner to maximize the natural resource values at the Site including but not limited to:

- Increasing the quality and quantity of wetland and upland habitat;
- Increasing the quality and function of upland habitat to support the adjacent wetland habitat; and
- Creation of integrated, diverse ecological communities.

Site restoration consists of the following components: 1) Planning, 2) Construction, 3) Assessment of Performance, 4) Management, and 5) Dissemination of the Results.

In addition to the selected remedy specified by EPA (EPA 2005), United Park incorporated restoration actions into FCPs such that restoration could be completed concurrently with implementation of the remedy. Primary methodologies that were incorporated to improve natural resource values concurrently with response include:

- Removal of contaminated material;
- Isolation and consolidation of contaminated material (e.g. covering) where removal is not feasible or where contact with groundwater is not occurring;
- Construction of wetlands in conjunction with source contaminant removal activities;
- Grading of restored wetland areas to maximize passive groundwater recharge;
- Grading of Site topography to maximize Site resources. One example includes placing islands in pond areas at a sufficient distance from shore to protect nesting birds from upland predators;
- The use of native seed mixtures and plant stock;

- Site monitoring during response and restoration activities to ensure that wildlife is not being adversely impacted (e.g. avoidance of nesting areas); and
- Long-term monitoring for a minimum of five years to document the success of restoration activities.

1.6.3 Completed Actions

Five phases of response and associated restoration have been completed and approved by EPA (Table 1). Restoration associated with response includes revegetation and construction or enhancement of wetland and upland areas. Completed response and restoration areas are depicted in Figure 3.

Completed activities within seven response and restoration areas include:

- Impoundment - Placement of soil cover and construction of year-round and seasonal wetlands;
- SDD - Removal of contaminated sediments and construction of year-round wetlands;
- B3E - Removal of contaminated sediments and construction of seasonal wetlands;
- B1W- Removal of contaminated sediments and construction of seasonal wetlands;
- B2E (Cottonwood and South Pond) - Removal of contaminated sediments and construction of year-round and seasonal wetlands;
- SDD Terminus Pond - Removal of contaminated sediments and construction of year-round wetlands; and
- Embankment Wetland - Removal of contaminated sediments and construction of year-round wetlands.

1.6.4 Planned Response and Restoration

Planned response includes placement of material and covering with clean soil in repository areas in accordance with the ROD (EPA, 2005) and RD/RA (RMC 2007a). Upland repository areas will be restored to complement wetland features.

Planned restoration activities include Operations and Maintenance (O&M) and monitoring of completed wetland features. No additional wetland creation is anticipated to occur at Richardson Flat.

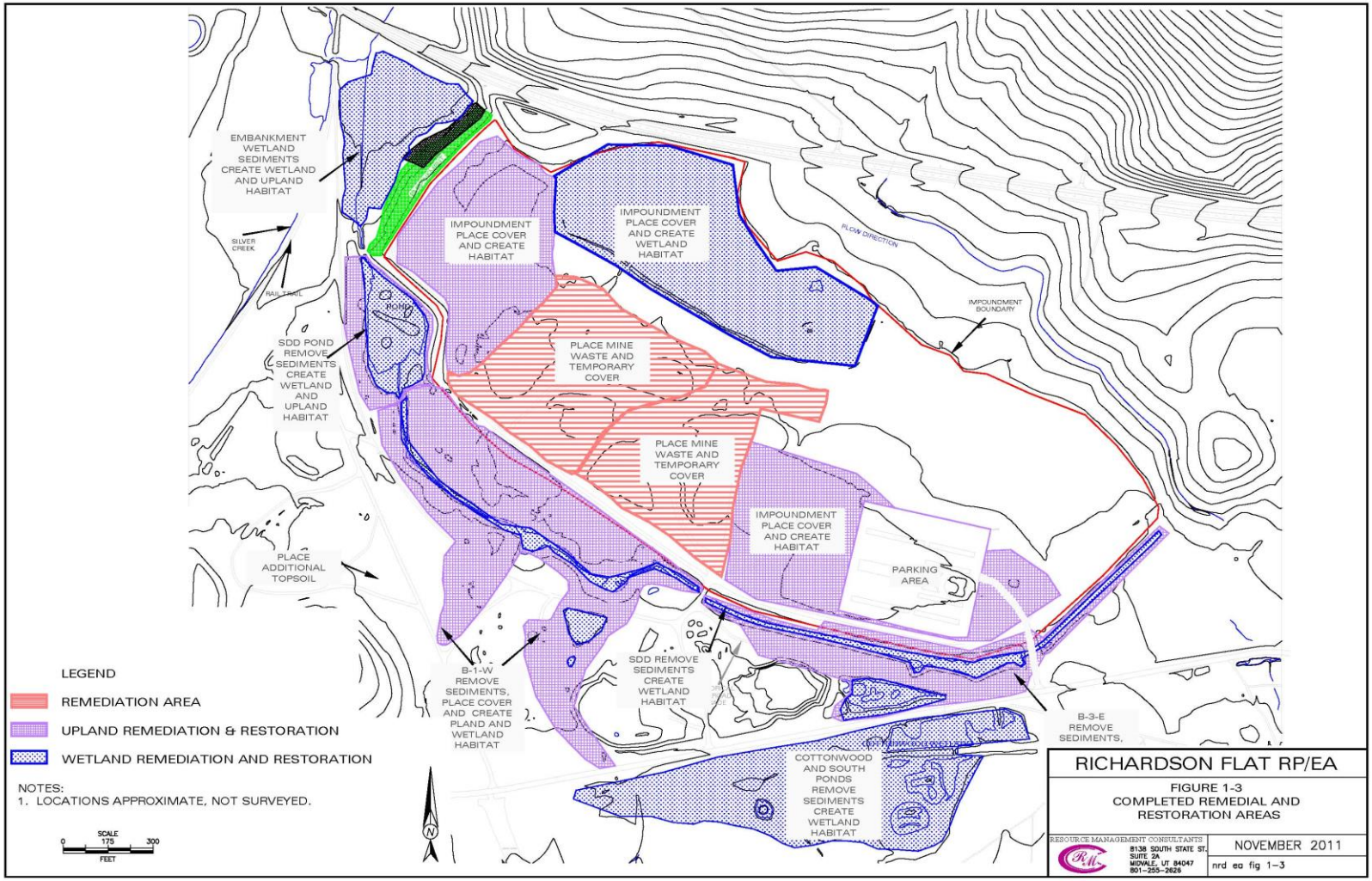

Figure 3. Richardson Flat Tailing Site completed remedial and restoration areas. Source: RMC, 2012b.

1.7 Summary of Injury to Trust Resources

Summary of injury[4] to trust resources was addressed by a Habitat Equivalency Analysis (HEA) that was prepared by DOI (DOI, 2012). The HEA evaluated the interim losses and the expected service benefits of proposed restoration projects. An assessment of lost and/or diminished recreational uses or other human uses that may have resulted from the release of hazardous substances was not performed. DOI and United Park, using best professional judgment, determined that recreational and other human uses have been minimal historically at the Site.

The HEA draws on the injury and restoration information provided by Region 6 Service field staff in conjunction with information from United Park on their property at the Site. Information was obtained by a combination of aerial photography review and onsite analysis.

HEA is a service-to-service or resource-to-resource approach to natural resource valuation that can account for changes in baseline[5] services while estimating interim losses of services (Unsworth and Bishop 1994; Jones and Pease 1997). Baseline service losses include the loss of resources as compared to their baseline condition (i.e., the condition they would be in now had no contamination occurred). Interim losses include the losses over the time when resources are in an impaired condition and less available to the public. Primary restoration projects (including acquisition) are used to bring resources to baseline condition, while compensatory restoration projects are used to offset the interim loss. The fundamental concept in HEA is that compensation for lost ecological services can be provided by restoration projects that provide comparable services. HEA responds to the question, "What, but for the release, would have happened to the injured area?"

With HEA, the replacement services are quantified in physical units of measure such as acre-years. The selected projects are scaled so that the quantity of replacement services equals the quantity of lost services in present value terms. In the end, responsible parties usually implement (or pay for) restoration projects that are sufficient to cover the public's interim losses. HEA involves three basic steps (Table 2):

1. Assess the present value (PV) of lost services (% service losses over time) relative to baseline. This "debit" is measured in acre-years.

[4] "Injury" means a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a discharge of oil or release of a hazardous substance, or exposure to a product of reactions resulting from the discharge of oil or release of a hazardous substance. As used in this part, injury encompasses the phrases "injury," "destruction," and "loss." [43 CFR 11.14 (v)]

[5] "Baseline" means the condition or conditions that would have existed at the assessment area had the discharge of oil or release of the hazardous substance under investigation not occurred. [43 CFR 11.14 (e)]

2. Select appropriate compensatory restoration projects (% restored services). The "relative productivity" of a proposed restoration project compared to what was injured is measured in the number of acre-years restored for every acre included in the project.
3. Identify the size of the project (scaling) that will equate the total discounted quantity of lost services to the total discounted quantity of replacement services to compensate the public's losses.

Restoration activities and natural recovery are expected to return services at the Richardson Flat to levels above their assumed baseline values, resulting in an overall credit of 1,868 discounted service acre-years (DSAYs). A summary of debits and credits related to primary and compensatory restoration activities is provided below in Table 3.

Table 2. Schematic Presentation of Restoration Project Scaling

Category	***Description***	**Unit**
Debit (Lost Services)	*Affected acres × % lost services, tallied over time, and converted to present value*	Discounted service acre-years (DSAYs)
Relative Productivity	*Services restored by an acre of the compensatory project, tallied over time, and converted to present value*	DSAYs per acre
Credit (Debit ÷ Relative Productivity)	*Total acres of compensatory project required to offset debit*	Acres

Table 3. Summary HEA Results

Primary Restoration Debit (DSAYs)[a]	-155
Past Losses	*61*
Future Losses	*-216*
Compensatory Restoration Credits (DSAYs)[a]	1,713
Past Gains	*669*
Future Gains	*1,044*
Total DSAYs	1,868

[a] Debits and credits are measured in discounted service acre-years (DSAYs). A negative debit indicates an increase in services above baseline levels as a result of restoration at the Site.

1.8 Compliance with Other Authorities and Regulations

This Section summarizes compliance with applicable authorities and regulations. This RP/EA was prepared in accordance with applicable DOI and CERCLA NRDA regulations. In addition the actions anticipated under this plan are also subject to other federal environmental regulations detailed in the following subsections.

1.8.1 NEPA

The NEPA establishes a national policy for the protection of the environment. Any restoration of natural resources under CERCLA must comply with NEPA (42 U.S.C. § 4321 *et seq.*). Under NEPA, the Federal Natural Resource Trustees must also assess the potential environmental impacts associated with each of the proposed restoration actions.

This RP/EA provides analysis of restoration alternatives that were considered and the environmental consequences of each. In addition, the EA will also serve as the basis for determining whether implementation of the proposed action would constitute a major Federal action significantly affecting the quality of the human environment. If a positive finding is made, an Environmental Impact Statement is required.

1.8.2 CERCLA

CERCLA provides a comprehensive set of authorities focused on the goal of addressing a release, or threatened released, of hazardous substances, pollutants, or contaminants that could endanger human health and/or the environment. Response provisions of CERCLA focus on the protection of human health and the environment, while other provisions in the statute provide authority for assessment and restoration of natural resources[6] that have been injured by a release of a hazardous substance[7] or response to the release. The procedures for assessing natural resource damages are listed in the NRDAR regulations, 43 CFR 11. The NRDAR regulations require that the Natural Resource Trustees develop an RP (43 CFR § 11.81). The NRDAR regulations also require that the RP be made available for public review for a period of no less than 30 calendar days. This Draft RP/EA is being made available to the public for comment in accordance with NRDAR regulations.

[6] "Natural resources" or "resources" means land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States, any State or local government, any foreign government, any Indian tribe, or, if such resources are subject to a trust restriction on alienation, any member of an Indian tribe. These natural resources have been categorized into the following five groups: Surface water resources, ground water resources, air resources, geologic resources, and biological resources. [43 CFR 11.14 (z)]

[7] "Hazardous substance" means a hazardous substance as defined in section 101(14) of CERCLA. [43 CFR 11.14 (u)]

1.8.3 Threatened and Endangered Species

The Endangered Species Act (ESA), 16 USC § 1531, *et seq.*, 50 CFR Parts 17, 222 & 224, directs all federal agencies to conserve endangered and threatened species and their habitats and encourages such agencies to utilize their authority to further these purposes. Section 7 of the ESA requires federal agencies to consult with the Service to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. Lists of federally-listed and proposed threatened and endangered and candidate species prepared by the Service and the State of Utah DWR were obtained to assess the possibility of adverse impacts to threatened and endangered and candidate species at the Site.

1.8.4 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA), 16 USC § 668-668d, prohibits anyone, without a permit issued by the Secretary of DOI, from "taking" bald eagles, including their parts, nests, or eggs. The BGEPA, at 16 USC § 668(a), provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof." According to 16 USC § 668(c), the BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

The Service has defined the term "disturb" to mean: “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." (50 CFR § 22.3).

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

1.8.5 Clean Water Act

The Clean Water Act (CWA), 33 USC § 1251, *et seq.*, is the principal law governing pollution control and water quality of the nation's waterways. Section 404 of the CWA is the permit program that allows for the disposal of dredged or fill material into navigable waters. However,

under Section 121(e)(1) of CERCLA, remedial and removal actions conducted pursuant to CERCLA are exempt from federal, state, or local permitting requirements for activities that occur "entirely onsite" but must comply with the substantive provisions of the Applicable or Relevant and Appropriate Requirements (ARARs). Accordingly, CERCLA § 121(e) effectively exempts parties conducting CERCLA-compliant removal actions from obtaining CWA permits for removal activities taking place at or near navigable waters, including wetlands, so long as the removal activities occur within "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action." This exemption does not have any impact on activities occurring outside the site boundaries and the party conducting the removal action will be required to comply with any additional CWA permitting requirements for all off-site activities.

1.8.6 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), 16 USC § 715, *et seq.*, provides for the protection of migratory birds. The MBTA does not specifically protect the habitat of migratory birds but may be used to consider time of year restrictions for remedial activities on sites where it is likely migratory birds may be nesting and to stipulate maintenance schedules that would avoid the nesting seasons of migratory birds.

1.8.7 State Regulations

Federal law (40 CFR § 300.605) states that state trustees may act on behalf of the public for "natural resources, including their supporting ecosystems, within the boundary of a state or belonging to, managed by, controlled by, or appertaining to such state"

Natural resources at the Site are administered by the State of Utah Department of Natural Resources.

1.8.8 American Indian Tribes

Federal law (40 CFR § 300.610) states that American Indian tribes may act as trustees for "natural resources, including their supporting ecosystems, belonging to, managed by, controlled by, or appertaining to such Indian tribe." The Site is not located on lands owned, managed or controlled by American Indian tribes. Local American Indian tribes will be contacted during the public review period.

1.8.9 Cultural and Historic Resources

The Service's Cultural Resources Policy Manual 614 FW 1.6 requires that all Environmental Action Statements be reviewed and signed by the appropriate Regional Historic Preservation

Officer. Section 106 of the National Historic Preservation Act requires every federal agency to "take into account" how its projects and expenditures will affect historic properties, which includes prehistoric and historic sites. The State of Utah Historic Preservation Office will be contacted during the public review process.

1.8.10 Environmental Justice

NEPA addresses Environmental Justice via Executive Order 12898 (CEQ, 1997). The general directive in Executive Order 12898 that each agency identify and address, as appropriate, "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." There are no low income or minority populations living on or adjacent to the Site.

1.8.11 OSHA – Occupational Safety

All Site work is being conducted in compliance with 29 CFR § 1910.120 (Hazardous Waste Operations and Emergency Response).

1.9 Human Health and Worker Protection

Site work is being conducted in accordance with the Site-Specific Health and Safety Policy (HASP; RMC, 2007b) and the Hazardous Waste Operations and Emergency Response regulation as described in Section 1.8.11.

1.10 Coordination with the Public

This Section summarizes coordination with the public.

1.10.1 Public Notice

Under the CERCLA NRDA regulations (43 CFR Part 11) and NEPA, the natural resource trustees shall notify the public and any federal, state, and local government agencies that may have an interest in the activities analyzed in the RP/EA. A notice of the availability of this draft RP/EA will be published in the following local newspapers:

Park Record
P.O. Box 3688
Park City, UT 84060
435-649-9014

Salt Lake Tribune
90 S. 400 West, Suite 700
Salt Lake City, UT 84101
801-257-8742

Copies of this draft RP/EA will be made available at the following locations:

U.S. Fish and Wildlife Service
Ecological Services
Utah Field Office
2369 W. Orton Circle, Suite 50
West Valley City, UT 84119

An electronic version of this draft RP/EA is posted on the FWS Ecological Services, Utah Field Office's website at http://www.fws.gov/utahfieldoffice/

The public comment period will be for 30 days. Parties to whom comments may be sent, and the due date for receipt of comments, will be published in the notice of availability of the draft RP/EA.

1.10.2 Involvement of Potentially Responsible Parties

The on-Site response and restoration work is being conducted by United Park.

1.10.3 Administrative Record

The administrative record contains the official documents pertaining to the Richardson Flat Site NRDAR case. The administrative record for this case is housed at the U.S. Fish and Wildlife Service Ecological Services, Utah Field Office, 2369 W. Orton Circle, Suite 50, West Valley City, UT 84119.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

The purpose of this section is to describe the alternatives, identify the proposed alternative, and describe the environmental effects of each alternative.

2.1 Strategy and Goals of Restoration

The goal of restoration is to compensate for impacts to the environment for injuries to natural resources and their associated services resulting from the release of hazardous substances, specifically metals-impacted mine waste. The general concept of restoration activities occurring

at the Site includes improving a resource at the completion of an EPA-approved Remedial Action.

United Park contemplated conducting restoration concurrently with the EPA-approved Remedial Action and ultimately determined that this approach would increase the cost effectiveness of the project and minimize construction impacts to the environment. This coordinated approach would also result in earlier restoration of potentially injured natural resources and the services they provide than if response and restoration had been conducted sequentially. Restoration actions that have been completed and additional actions that may be performed in the future will increase the net wetland habitat at the Site for a positive gain of ecosystem services.

2.2 Criteria for Identifying and Selection of the Proposed Alternative

Drawing upon the factors within the DOI NRDA regulations and DOI policy for selecting a restoration alternative, a preferred restoration alternative was selected based on relevant considerations, including general consideration of the following factors:

- Technical feasibility (*i.e.*, the technology and management skills necessary to implement the alternative are well known and each element of the plan has a reasonable chance of successful completion in an acceptable period of time);
- The relationship between the expected costs associated with the alternative and the alternative's expected benefits;
- Cost-effectiveness of the alternative;
- Potential for additional injury to the injured resources or other resources;
- The natural recovery period;
- Ability of the natural resources to recover with or without alternative actions;
- Potential effects of the alternative on human health and safety; and
- Consistency with applicable laws, regulations and policies.

The alternatives are summarized in Section 2.3. A Proposed alternative for restoration of natural resources was selected based on an evaluation of the guidelines described above. Environmental consequences for each alternative are described in Section 3.0.

2.3 Summary and Selection of Alternatives

The following alternatives are evaluated:

2.3.1 Alternative A: No Action

A No Action alternative is addressed to fulfill regulatory requirements of NEPA. Under this alternative, no response and restoration activities beyond what have been presented in the EPA-approved RD/RA (RMC, 2007a; see Section 1.5) will be conducted at the Site. The underlying assumption of this alternative is that the resource will recover over time through enhanced habitat availability that has resulted from implemented restoration projects and natural attenuation. As discussed in Section 1.7, a HEA conducted for Richardson Flat Tailings Site (DOI 2012) determined that no additional restoration projects are necessary to restore, rehabilitate, replace, and/or acquire the equivalent of the injured natural resources. The HEA determined that an excess number of wetland restoration credits exist at the Site. This alternative meets the Purpose and Need as described in Section 1.1. This alternative has no cost.

This alternative was selected as the Proposed Alternative.

2.3.2 Alternative B: On-Site Wetland Enhancement and Construction of Additional Wetlands

In addition to the restoration completed as described in Section 1.6, this alternative would involve the restoration, enhancement and creation of valuable natural resources on-Site, including perennial and seasonal wetlands. The purpose of this alternative is to increase the quantity and quality of on-Site habitats, primarily wetland habitats and services. This alternative includes the following elements:

- Construction of additional wetlands;
- Enhancement and/or enlargement of existing wetlands;
- Enhancement of Site surface water flow features to direct water to wetlands in a more effective manner; and
- Construction of new surface water flow features to direct water to new wetlands.

The work proposed in this element is above and beyond the remediation specified in the remedy as described in the EPA-approved RD/RA. The location of the Site provides unique opportunities to restore and enhance wetlands; therefore, onsite wetland restoration would provide wetland services sufficient to compensate for potential natural resource injuries at the Site.

2.3.3 Alternative C: Wetland Enhancement and Construction of Public Recreational Facilities at the Site

This alternative was included on the basis that a local municipality has a lease for a portion of the Site for parking and recreational purposes as part of a development agreement for another property located in the Silver Creek watershed. In addition to the restoration completed as described in Section 1.6, this alternative would involve enhancing wetlands created during the EPA-approved Remedial Action and construction of public use recreational facilities. This alternative would include a combination of the following elements:

- Potential enhancement of wetland features restored as part of the EPA-approved RD/RA for the Site. The purpose would be to increase the services of on-Site wetland habitats without increasing their footprint into areas that may be used for recreational purposes; and
- Construction of public-use recreational facilities at the Site. The purpose would be to increase public use of the Site.

2.4 Proposed Restoration Actions

This section details the proposed restoration actions under Alternatives B and C that would be implemented to restore, replace, or enhance natural resources.

2.4.1 Wetland Restoration Actions

Wetland restoration, where applicable, would include the following additional activities for Alternatives B and C:

- Implementation of management practices that may improve wetland functions;
- Regrading to optimize habitat functions and services; and/or
- Implementation of revegetation practices that may enhance completed restoration projects.

2.4.2 Surface Water Hydrology Restoration Actions

Surface water hydrology restoration, where applicable, would include the following additional activities for Alternatives B and C:

- Grading of surface water features to optimize flow into wetland features and surface water features including passive recharge by shallow groundwater; and
- Addition of velocity dissipation features to control erosion.

2.4.3 Terrestrial Restoration Actions

Terrestrial (e.g. upland) restoration, where applicable, would include the following additional on-Site activities for Alternatives B and C:

- Removal of contaminated materials;
- Covering/capping of contaminated materials;
- Regrading to optimize habitat functions and services;
- Erosion control; and
- Revegetation using a native seed mix or locally derived plant stock.

In addition, terrestrial restoration areas on the Site would provide quality habitat in the vicinity of wetland areas restored already and provide important transitional habitat. Improved terrestrial habitat would improve the overall service levels of the Site as a whole, including reducing the potential for erosion and sedimentation into newly restored wetland areas.

2.5 Implementation and Long-Term Management

On-site restoration actions and long-term management under Alternatives B and C will be implemented by United Park, the owner of the Site.

2.6 Restoration Schedule

Restoration actions implemented under Alternatives B and C would likely be conducted in annual phases. Where construction is required, restoration projects would be implemented in the late spring and finalized prior to the end of the construction season, which typically occurs in November.

3.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS OF THE ALTERNATIVES

This Section evaluates the affected environment and environmental consequences of the three alternatives described in Section 2.3. Natural resources were evaluated for existing conditions and potential impacts caused by the proposed project.

3.1 General Environmental Setting

The Site is located 1.5 miles northeast of Park City, Utah, and is part of an approximately 650-acre property owned by United Park. The Site is approximately 258 acres and includes a tailings impoundment that covers 160 acres located in the northwest corner of the property. The tailings impoundment is a geometrically closed basin, bound by Highway 248 to the north, a main embankment to the west, and diversion ditches to the south and the northeast. Silver Creek can

be found on the northwest border of the Site, separated from the Site by a small stretch of wetlands and riparian vegetation. Thirty acres of the Site, located within the impoundment, are subject to a long-term lease with Park City Municipal Corporation (Park City) pursuant to a pre-existing agreement concerning development of other United Park properties (Development Agreement). Pursuant to the Development Agreement, a parking lot was constructed on part of the leased acreage, and the lease allows Park City to build ball fields or similar recreational spaces on the remaining leased acreage.

3.2 Surface Water Resources

Site surface water features have been shaped by the historic use of the site as a tailings impoundment and consist of a series of diversion ditches, a pond and associated wetlands (see Section 1.5). Restoration has been implemented on and in the vicinity of the tailings impoundment and any additional restoration may occur in the same vicinity.

3.2.1 Surface Water Quality

Site water quality has been monitored since 2001. Data collected in 2011 and 2012 indicate that water discharging from the Site meets applicable water quality standards for zinc and cadmium, the constituents of the Lower Silver Creek Total Maximum Daily Load prepared for the State of Utah and approved by EPA (Michael Baker Inc. and Psomas, 2004).

3.2.2 Surface Water Quantity

The water quantity of surface water flow in Richardson Flat is not currently being measured. Surface water quantities typically follow seasonal flow patterns similar to sites located throughout the intermountain west. Alternatives A through C are not expected to have significant effects of the quantity of surface water at the Site.

3.2.3 Potential Impacts to Surface Water Resources

This Section discusses the potential consequences for water resources for each of the alternatives presented in Section 2.3.

3.2.3.1 Alternative A

Alternative A, No Action, would not have adverse consequences on Site surface water quality beyond what are occurring already. The existing use of a portion of the Site for a parking lot has the potential to impact surface water quality at the Site. As discussed above, the Site is currently meeting surface water quality standards (RMC, 2012b).

3.2.3.2 Alternative B

Alternative B, On-Site Wetland Enhancement and Construction of Additional Wetlands, would not have adverse long-term consequences on Site surface water quality. The existing use of a portion of the Site for a parking lot has the potential to impact surface water quality at the Site; however, as discussed above, the Site is currently meeting surface water quality standards (RMC, 2012b). Wetland construction and/or enhancement of additional wetlands would not adversely impact long-term Site surface water quality. Short-term surface water quality may be temporally impacted during wetland construction; however this can be mitigated with the use of best management practices.

3.2.3.3 Alternative C

Alternative C, Wetland Enhancement and Construction of Public Recreational Facilities at the Site, may have a potential long-term adverse effect on Site surface water quality. The use of a portion of the Site for recreational facilities, including parking facilities, has the potential to impact surface water quality at the Site. Impacts may include but may not be limited to stormwater runoff from parking facilities, trash deposition into nearby Site water feature, and transport of chemical residues used to maintain the recreational facilities.

3.3 Groundwater

Groundwater at the Site consists of shallow and deep systems. Based on hydrogeologic studies conducted during the Focused Remedial Investigation for the Site (RMC, 2004), there appears to be no hydraulic connection between the groundwater found in the impounded Site tailings and in the underlying shallow aquifers or within the Silver Creek alluvial aquifer. Groundwater quality data indicate that the alluvial aquifer underlying Silver Creek is not chemically similar to groundwater encountered in the tailings, or to surface water collected from the South Diversion Ditch. The hydrologic studies referenced above also indicate that there is no direct hydraulic communication between the shallow alluvial and deeper aquifer systems. There is no groundwater withdrawal at the Site.

3.3.1 Potential Impacts to Groundwater

3.3.1.1 Alternative A

Alternative A, No Action, would not have adverse consequences to groundwater.

3.3.1.2 Alternative B

Alternative B, On-Site Wetland Enhancement and Construction of Additional Wetlands, would not have adverse consequences to groundwater.

3.3.1.3 Alternative C

Alternative C, Wetland Enhancement and Construction of Public Recreational Facilities at the Site, would not have adverse consequences to groundwater provided proper precautions are taken to minimize infiltration to shallow groundwater within the impoundment from recreation field irrigation activities.

3.4 Wetlands

Site wetland features have been shaped by the historic use of the site as a tailings impoundment and consist of a series of diversion ditches, a pond and associated wetlands. Restoration has been implemented on and in the vicinity of the tailings impoundment and additional restoration may occur in the same vicinity.

3.4.1 Potential Consequences for Wetlands

This Section describes the potential consequences to wetlands for each alternative.

3.4.1.1 Alternative A

Alternative A, No Action, would not have adverse consequences on Site wetlands. As stated in Section 2.3.1, a HEA conducted for Richardson Flat Tailings Site (DOI 2012) determined that no additional restoration projects are necessary to restore, rehabilitate, replace, and/or acquire the equivalent of the injured natural resources. There will be no activities associated with this alternative.

3.4.1.1 Alternative B

Alternative B, On-Site Wetland Enhancement and Construction of Additional Wetlands, would have the potential for temporary adverse impacts to wetlands during construction activities. Construction activities would involve construction of new wetland features and enhancement of existing wetlands. However, as described in Section 1.6, United Park has completed more restoration than was required to restore, rehabilitate, replace, and/or acquire the equivalent of the injured natural resources.

3.4.1.3 Alternative C

Alternative C, Wetland Enhancement and Construction of Public Recreational Facilities at the Site, would have the following potentially adverse impacts:

- Construction of recreational facilities would require placing fill material in 5.5 acres of wetlands within the Site, resulting in a permanent loss of ecological services.
- Impacts to wetlands during construction activities. Construction activities would involve construction of new wetland features and enhancement of existing wetlands.
- Long-term impacts to wetlands due to increased human use of facilities in the vicinity of Site wetlands. The impacts may include but are not limited to an increase in wildlife disturbance due to increased human presence and noise and lighting.

3.5 Wildlife

Site and adjacent habitats receive significant use from several groups of wildlife species. Wildlife species occurring at the Site may be protected under one or more Federal and state laws. Species with the greatest degree of protection are those that are listed under the United States Endangered Species Act (ESA, U.S. Code Title 16, Chapter 35) administered by the Service; and Utah Wildlife Species of Concern (State of Utah Administrative Rule R657-48), administered by the Utah Department of Natural Resources Division of Wildlife Resources (UDWR). The latter category also includes species that are the subject of Conservation Agreements between the Service and UDWR, which outline conservation strategies that will be implemented by the State to preclude listing species under the ESA. Table 4 summarizes the special status species that have been observed at the Site, or which may have the potential to occur based on habitat suitability. In addition to the special status species listed in Table 4, many other wildlife species have been observed at the Site due in part to its relatively large area, habitats, and the presence of aquatic features on the Site. A species list can be found in Appendix A.

Table 4. Wildlife species of federal and state conservation concern occurring or potentially occurring at the Richardson Flat Tailings Site, Park City, Utah.

Species Common Name	Species Scientific Name	Residence Status (*comments)*	Conservation Status
Bald Eagle	*Haliaeetus leucocephalus*	Transient/Wintering	U-SPC
Bobolink	*Dolichonyx oryzivorus*	Not documented at Site	U-SPC
Bonneville Cutthroat Trout	*Oncorhynchus clarki utah*	Not documented at Site	U-CS U-SPC
Canada Lynx	*Lynx Canadensis*	Not documented at Site	ESA-T
Columbia Spotted Frog	*Rana luteiventris*	Not documented at Site	U-CS U-SPC
Desert Mountain Snail	*Oreohelix peripherica*	Not documented at Site	U-SPC
Ferruginous Hawk	*Buteo regalis*	Not documented at Site but records for nearby	U-SPC
Greater Sage Grouse	*Centrocercus urophasianus*	Documented at Site during non-breeding season	ESA-C
Lewis's Woodpecker	*Melanerpes lewis*	Not documented at Site	U-SPC
Long-billed Curlew	*Numenius americanus*	Documented at Site	U-SPC
Northern Goshawk	*Accipiter gentilis*	Not documented at Site	U-CS
Smooth Greensnake	*Opheodrys vernalis*	Not documented at Site	U-SPC
Three-toed Woodpecker	*Picoides tridactylus*	Not documented at Site	U-SPC
Western Pearlshell	*Margaritefera falcate*	Not documented at Site	U-SPC
Western (Boreal) Toad	*Bufo boreas*	Not documented at Site	U-SPC
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	Not documented at Site	ESA-C

KEY:

ESA - Listed as threatened (T), endangered (E) or candidate (C) species under the Endangered Species Act

U-CS - Conservation Agreement species - species for which a Conservation Agreement (between Utah Division of Wildlife Resources and the U.S. Fish and Wildlife Service) has been signed, which outlines management strategies that will be implemented to preclude listing of the species under the ESA.

U-SPC-Wildlife species of concern - "those species for which there is credible scientific evidence to substantiate a threat to continued population viability." (Utah Division of Wildlife Resources Administrative Rule R657-48)

3.5.1 Threatened and Endangered Species

As noted in Table 4, greater sage grouse (*Centrocercus urophasianus*), is the only species that has been documented to occur on the Site and has been awarded federal protection under the Endangered Species Act. Greater sage grouse is a candidate species that occurs on the Site during the non-breeding season. Sage grouse have not been observed in restoration work areas of the Site.

3.5.2 State Sensitive Species

According the species list for the Site (Appendix A), which is a compilation of species records from 2008 to 2011, only one state sensitive species has been documented on the Site. Long-billed curlew is a migratory shorebird species that uses open, sparse grassland habitats and nests primarily in short-grass or mixed-prairie habitat. The species has been observed at the Site during spring migration, however occurrences are uncommon.

There is potential for Ferruginous hawk to occur in nearby habitats of the Site. The species prefers flat or rolling terrain in grassland or shrubsteppe regions and can be locally abundant at interfaces between pinyon-juniper and shrubsteppe habitats. Nest site records exist for this species in Summit County and occurrence of the species has been documented in the Silver Creek corridor.

3.5.3 Other Wildlife

Mammals that occur frequently on the Site include deer, fox, coyote, beaver, muskrat, badger and a variety of rodents. Larger mammals (particularly deer) use this corridor to migrate between habitats in the Provo River drainage and in the Weber River drainage. A large number of bird species associated with sagebrush, mountain valley grasslands and wetlands occur on the Site, including raptors (e.g., red-tail hawk, American kestrel, northern harrier), upland shorebirds (e.g., sandhill crane, long-billed curlew, snipe), waterfowl (e.g., mallard, blue-winged teal, cinnamon teal, American coot), and a variety of migratory songbirds, particularly those associated with wetland and sagebrush habitats (e.g., redwing blackbird, western meadowlark, horned lark, Brewer's sparrow, sage thrasher).

3.5.4 Potential Consequences for Wildlife

3.5.4.1 Alternative A

Alternative A, No Action, would not have adverse consequences on wildlife. There will be no activities associated with Alternative A.

3.5.4.2 Alternative B

Alternative B, On-Site Wetland Enhancement and Construction of Additional Wetlands, would not have adverse long-term consequences on wildlife. Construction of additional wetlands will provide habitat to aquatic or semi-aquatic wildlife species. In contrast, additional Site wetlands would reduce habitat for terrestrial habitat-dependent wildlife. Short-term and minor impacts to migratory birds and other wildlife during the construction season are possible. All work areas will be inspected to ensure that migratory birds are not nesting in active work areas. The following guidelines will be used to ensure ground-disturbing activities do not result in the "take" of an active nest or migratory bird protected under the Migratory Bird Treaty Act:

a. Any ground-disturbing activities or vegetation treatments will be performed before migratory birds begin nesting or after all young have fledged to avoid incidental take;

b. If activities must be scheduled to start during the migratory bird breeding season, appropriate steps will be taken to prevent migratory birds from establishing nests in the potential impact area. These steps could include covering equipment and structures and use of various excluders (e.g., noise).

c. A site-specific survey for nesting birds will be performed starting at least two weeks prior to groundbreaking activities or vegetation treatments if activities need to be scheduled during the migratory bird breeding season.

d. If nesting birds are found during the survey, appropriate spatial buffers will be established around nests. Vegetation treatments or ground-disturbing activities within the buffer areas will be postponed until the birds have left the nest. Confirmation that all young have fledged will be made by a qualified biologist.

Raptor surveys and mitigation measures, as described by Romin and Muck (2002), will be implemented to ensure that construction avoids adverse impacts to raptors. Locations of existing raptor nests will be identified by a qualified biologist prior to the initiation of construction activities. Appropriate spatial buffer zones of inactivity will be established during crucial breeding and nesting periods relative to raptor nest sites or territories. Transitory golden eagles have been observed flying over the Site; however, there are no known historic golden eagle nests or roosting sites on or adjacent to the Site. Therefore, adverse effects to eagles are not anticipated.

3.5.4.3 Alternative C

Alternative C, Wetland Enhancement and Construction of Public Recreational Facilities at the Site, would have the following potentially adverse impacts to wildlife:

- Construction of recreational facilities would require placing fill material in 5.5 acres of wetlands within the Site, resulting in a permanent loss of habitat for aquatic or semi-aquatic migratory birds and other wildlife.
- Impacts to wildlife during construction activities. Construction activities would involve construction of new features and restoration of existing wetlands.
- Impacts to wildlife due to increased human use of facilities in the vicinity of Site habitats. The impacts may include but are not limited to wildlife disturbance due to increased human presence and lighting and a loss of wildlife productivity on the Site.

Similar mitigation measures as described in Section 3.5.4.2 would be implemented during the construction season to avoid or minimize impacts to wildlife.

3.6 Noxious Weed Control

All restoration areas are seeded with a weed-free seed mix. Noxious weed control will be conducted via the Site Operations and Maintenance Plan for Richardson Flat (RMC, 2012a, under preparation), which employs best management practices to minimize the spread of noxious weeds. Implementation of best management practices will be consistent for all alternatives.

3.6.1 Potential Consequences for Noxious Weed Control

3.6.1.1 Alternative A

Alternative A, No Action, would include noxious and invasive weed control measures identified in the Site Operations and Maintenance Plan for Richardson Flat (RMC, 2012a, under preparation).

3.6.1.2 Alternative B

Alternative B, On-Site Wetland Enhancement and Construction of Additional Wetlands, would include noxious and invasive weed control measures identified in the Site Operations and Maintenance Plan for Richardson Flat (RMC, 2012a, under preparation).

3.6.1.3 Alternative C

Alternative C, Wetland Enhancement and Construction of Public Recreational Facilities at the Site, would include noxious and invasive weed control measures identified in the Site Operations and Maintenance Plan for Richardson Flat (RMC, 2012a, under preparation).

3.7 Air Quality

Air Quality impacts at the Site are limited to fugitive dust during construction activities. Results of air monitoring (RMC, 2012b), conducted during remedial and restoration activities at the Site were below the following standards:

- National Ambient Air Quality Standards (NAAQS) as set forth by EPA; and
- Permissible Exposure Limits (PELs) as set forth by the Occupational Safety and Health Administration (OSHA).

3.7.1 Potential Consequences for Air Quality

3.7.1.1 Alternative A

Alternative A, No Action, would not have consequences for air quality.

3.7.1.2 Alternative B

Alternative B, On-Site Wetland Enhancement and Construction of Additional Wetlands, would have no adverse impacts to air quality. Previous monitoring supports this determination (RMC, 2012b).

3.7.1.3 Alternative C

Alternative C, Wetland Enhancement and Construction of Public Recreational Facilities at the Site, would have no adverse impacts to air quality. Previous monitoring supports this determination (RMC, 2012b).

3.8 Cultural Resources

Pursuant to §106 and §110(f) of the National Historic Preservation Act, as amended, CERCLA remedial actions, such as those that have been performed at the Site, are required to take into account the effects of remedial activities on any cultural resources. Cultural resources were

reviewed as part of the EPA-approved Remedial Feasibility Study (RMC, 2004). The review was conducted as part of the assessment of Applicable or Relevant and Appropriate Requirements. No cultural resources were identified within the study area of the Site.

Historic Sites, Buildings and Antiquities Act
16 U.S.C. § 461-67, requiring protection of landmarks listed on the National Registry, is applicable. Because there are no National Registry landmarks located within the boundary of the Site, none of the alternatives will adversely affect listed landmarks.

National Historic Preservation Act
16 U.S.C. § 470, requiring protection of certain historically significant districts, sites, buildings, structures and objects, is applicable. Because no historically significant districts, sites, buildings, structures and objects are located within the Site boundary, none of the alternatives will adversely affect any such districts, sites, buildings, structures and objects.

Archeological and Historic Preservation Act
16 U.S.C. § 469, requiring protection of significant historical and archeological data, is applicable. Because the Site does not contain any significant historical or archeological data, none of the alternatives will adversely affect any such data.

3.8.1 Potential Consequences for Cultural Resources

3.8.1.1 Alternative A

Alternative A, No Action, would not have consequences for cultural resources.

3.8.1.2 Alternative B

Alternative B, On-Site Wetland Enhancement and Construction of Additional Wetlands, would have no impacts to cultural resources due to the absence of cultural resources and the previously disturbed nature of the Site.

3.8.1.3 Alternative C

Alternative C, Wetland Enhancement and Construction of Public Recreational Facilities at the Site, would have no impacts to cultural resources due to the absence of cultural resources and the previously disturbed nature of the Site.

3.9 Traffic

Traffic in the vicinity of the Site is limited to a County Road that passes through a portion of the Site and State Route 248 which is located adjacent to the Site. Site ingress/egress is through the County Road.

3.9.1 Potential Consequences for Traffic

3.9.1.1 Alternative A

Alternative A, No Action, would not have consequences for traffic.

3.9.1.2 Alternative B

Alternative B, On-Site Wetland Enhancement and Construction of Additional Wetlands, would not adversely impact traffic patterns on the State Route 248 which has no direct ingress/egress to the Site. Site use is not anticipated to increase and thus there would be no adverse traffic impact to the County Road.

3.9.1.3 Alternative C

Alternative C, Wetland Enhancement and Construction of Public Recreational Facilities at the Site, would not adversely impact traffic patterns on the State Route 248 which has no direct ingress/egress to the Site. There is the potential to effect (i.e. increase) traffic on the County Road during times when the proposed recreational facilities are in construction or in use.

3.10 Noise

The primary sources of noise in the vicinity of the Site include motor vehicles, construction equipment, and other human activities. Recreationalists, motorists, and wildlife are the primary receptors of noise.

3.10.1 Potential Consequences for Noise

3.10.1.1 Alternative A

Alternative A, No Action, would not have consequences for noise.

3.10.1.2 Alternative B

Alternative B, On-Site Wetland Enhancement and Construction of Additional Wetlands, would result in a temporary and minimal increase in noise during construction.

3.10.1.3 Alternative C

Alternative C, Wetland Enhancement and Construction of Public Recreational Facilities at the Site, would result in a temporary and minimal increase in noise as a result of wetland and recreational facility construction. Minimal increase in noise associated with human use of the proposed recreations facilities is also anticipated.

4.0 COMPARISON AND SELECTION OF ALTERNATIVES

This Section compares the three alternatives described in Section 2.3.

4.1 Alternative A: No Action (Proposed Action)

Alternative A, No Action, is addressed to fulfill regulatory requirements of NEPA. Under this alternative, no additional response or restoration activities beyond what have already occurred will be conducted at the Site. No impacts to natural, cultural, or historic resources are anticipated as a result of this alternative.

4.2 Alternative B: On-Site Wetland Enhancement and Construction of Additional Wetlands

Alternative B, consisting of on-Site wetland enhancement and the construction of additional wetlands at the Site, would increase the quantity and quality of on-Site wetland habitats and services and provide a net gain of trust resources thereby meeting the Service's objectives. Restoration would be conducted concurrently with any remaining remedial activities. This would provide a cost-effective remedy, enhance the recovery time period, result in fewer disturbances to existing terrestrial and aquatic biota, and would minimize Site disturbance. Completion of previous restoration work at the Site is indicative that this alternative would be successful.

This alternative will have an overall positive effect by increasing fish and wildlife habitat acreage at the Richardson Flat Site. However, as described in Section 1.6, United Park has completed more restoration than was required to restore, rehabilitate, replace, and/or acquire the equivalent of the injured natural resources. Therefore, this alternative was not chosen as the Proposed Alternative.

4.3 Alternative C: Wetland Enhancement and Construction of Public Recreational Facilities at the Site

Alternative C would involve enhancing wetlands created during the EPA-approved Remedial Action and construction of public use recreational facilities in upland areas, including the contemplated construction of recreational facilities on the thirty acres under lease to Park City. This alternative would increase the service level of Site wetlands without increasing the overall acreage. Upland areas in the vicinity of the Site wetlands would be used to construct public recreational facilities such as soccer and baseball fields, golf courses, equestrian and/or other public recreational facilities. Construction of recreational facilities would require placing fill material in 5.5 acres of wetlands within the lease area, resulting in a permanent loss of ecological services. Placement of fill was accounted for and described in the ROD (EPA, 2005). Use of a portion of the Site for development and use of recreational facilities may decrease the quality of habitat by increasing human impacts (e.g., noise disturbance) that may affect migratory birds, other desirable wildlife, and the habitats that support them.

This alternative was included on the basis that the Development Agreement and lease include these uses as options for future development at the Site. However, recreational facilities would decrease habitat, create potential disturbance to wildlife, including the ESA candidate greater sage-grouse and upland migratory birds, and would result in a net decrease in services as compared to Alternatives A and B. Completion of previous restoration work at the Site associated with response is indicative that this alternative would be successful but limited to areas within the footprint of existing wetland features. No net increase in habitat acreage would occur and potential increases in habitat services would occur through enhancement of existing wetlands only. The value of restoring trust resources may be decreased by the construction of recreational facilities. Recreational use, including lighted facilities, may stress or deter wildlife from using restored wetlands.

This alternative may have a positive effect by enhancing fish and wildlife habitat at the Richardson Flat Site but does not provide for maximum increase in trust resources for a given net input. It is also not necessary because no additional restoration projects are necessary to restore, rehabilitate, replace, and/or acquire the equivalent of the injured natural resources. Therefore, this alternative was not chosen as the Proposed Alternative.

4.4 Cumulative Impacts

The proposed restoration action will not result in a cumulative negative impact to the natural and physical attributes of the Site.

4.5 Summary Comparison of Restoration Alternatives

The following table summarizes the impacts of restoration alternatives A B, and C:

Table 5. Summary of impacts to restoration alternatives A B, and C

Alternative	Opportunity to Increase Habitat	Cost Effectiveness (Includes Implementation and Maintenance)	Amount of Natural Resource Services Gained[1]
A (Proposed))	None	Not Applicable	Not Applicable
B	High	High (Most Cost effective)	High
C	Low	Medium	Low

[1] This table assumes that the Site has a positive amount of restoration credits as described in Section 1.7. The amount gained is in addition to the already existing positive number of restoration credits.

5.0 MONITORING PROGRAM AND PERFORMANCE CRITERIA

A monitoring program is currently in development to evaluate the long-term success of the restoration projects that have been implemented already (RMC, 2012a, under preparation). Provisions for restoration monitoring include performance standards and criteria for each restoration action, guidelines for implementing corrective actions, and a schedule for frequency and duration of monitoring.

6.0 BUDGET AND TIMETABLE

This Section presents budgetary and scheduling information for restoration activities at Richardson Flat. A final budget has not been determined at this time. United Park is responsible for developing response and restoration cost estimates.

Any additional on-Site restoration work will be conducted concurrently with response. Monitoring will be conducted in accordance with the schedule presented in the O&M Plan (RMC, 2011, under preparation).

7.0 PREPARERS AND REVIEWERS

- Todd Leeds, Jim Fricke, Resource Management Consultants (primary authors)
- Douglas Reagan, PhD (responsible party consultant)

- John Isanhart, PhD, USFWS Utah Ecological Services Field Office
- John Hughes, U.S. Department of Interior Restoration Support Unit
- Christian Crowley, U.S. Department of Interior Office of Policy Analysis
- John Wegrzyn, USFWS Region 6 – Regional Office

8.0 AGENCIES, ORGANIZATIONS AND PARTIES CONTACTED FOR INFORMATION

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9.0 PUBLIC COMMENTS AND TRUSTEE RESPONSES

In accordance with NEPA, this RP/EA has been prepared to analyze the impacts of the alternatives considered, select a proposed alternative, and determine whether the proposed alternative is expected to have a significant effect on the quality of the environment. If a significant effect is expected, an environmental impact statement must be prepared. If no significant effects are expected from the proposed alternative, the NEPA process concludes with the EA and issuance of a finding of no significant impact.

In analyzing the potential significance of a proposed project, federal agencies must consider: (1) the nature of the impacts and whether they are beneficial or detrimental; (2) impacts on public health and safety; (3) unique characteristics of the geographic area of the project; (4) whether the project is likely to generate controversy; (5) whether the project involves uncertain impacts or unknown risks; (6) the type of precedent created by implementing the project; (7) cumulative impacts of the proposed action with known other future actions; (8) impacts on nationally significant cultural, scientific, or historic resources; (9) impacts on threatened or endangered species or their habitats; and (10) potential violations of federal, state, or local environmental protection laws.

The trustees welcome input from the public in evaluating the likely success of the proposed action in making the environment and the public whole for potential losses suffered from the Richardson Flat Tailings Site hazardous substance releases. Information currently available suggests that the proposed alternative will not have a significant effect on the quality of the human environment. If no new substantive information is received during the public comment period that would prompt a change in the evaluation of the restoration alternatives and the selection of the proposed alternative, then the NEPA process will conclude with a finding of no significant impact.

The RP/EA will be available for public review and comment for 30 days from the date of publication of the notice of availability.

9.1 Public Comments

Organization	Date Received	Comment #	Section	Comment
Chapman and Cutler LLP	December 6, 2012	1	N/A	A parking lot was completed on the Site in 200 pursuant to a pre-existing development agreement with Park City Municipal Corporation ("Park City"), Alternatives A and B do not acknowledge existence of the parking lot. Alternative C is the only alternative that takes into account the parking lot. The parking lot was constructed early on in the remediation/restoration process, before the Habitat Equivalency Analysis ("HEA") was prepared and finalized by the U,S. Fish and Wildlife Service (the "Service"). Figure 3 in the HEA recognizes the location of the parking lot in Task Area F-7 and the. HEA does not calculate any discounted service acre years ("DSAYs") in conjunction with the parking lot land. Since the parking lot has already been constructed and the HEA has not calculated any excess DSAYs in conjunction with that land, it would be appropriate to recognize the parking lot in the RP/EA' s analysis of Alternatives A and B as well, particularly where Alternative A is based on all activities already completed. The RP/EA likewise should not consider impacts that may result from construction of the parking lot when construction has already been completed and is not part of the proposed action.

Chapman and Cutler LLP	December 6, 2012	2	3.4.1.3 3.5.4.3 4.3	Park City has a ground lease with United Park for 30 acres of the Site. The lease has a 99-year term, with an option to renew for 99 years. Permitted uses under the lease include the existing parking lot and future ball fields or similar recreational spaces. Section 3.3 of the ground lease requires that "United Park shall not perform any act or omission in relation to the Premises that is materially inconsistent with or which will materially impair (Park City's) actual utilization of the permitted uses under this Lease," Both the Record of Decision (prepared by EPA and executed on July 6,2005) ("ROD") and the Remedial Design/Remedial Action Plan, Richardson Flat, Site 1D Number: lJT9R0952840 (the "RD/RA Work Plan") contemplate use of the ground lease property for recreational purposes, Consistent with the pre-existing lease, the HEA notes the presence of a "Rec Site" in Table 4 and Figure 3. Appendix 2 to the HEA also notes the permanent loss of al1 estimated 16 acres of compensatory restoration areas at the Site "to fill and cover" in areas that include portions of the Site identified as the location of the "Rec Site," Accordingly, the calculation of DSAY s identified in the HEA already reflects lost. Services and/or habitat associated with fill and cover placed on the leased acres. It would be appropriate in the RP/EA to recognize that placement of fill and cover at the leased acres has already been calculated in Alternative C’s analysis of the potential losses of

				ecological services (Sections 3.4.1.3 and 4.3) and habitat (Sections 3.5.4.3 and 4.3).
Chapman and Cutler LLP	December 6, 2012	3	1.1 3.1	The RD/RA Consent Decree (tiled in U.S. v. United Park City Mines Company, Case No. 2:07-cv-00642 on October 4,2007 in the U,S. District Court for the District of Utah) (the "RD/RA CD") explains that the Site is part of an approximately 650 acre property owned by United Park and that the Site includes a 160 acre tailings impoundment, diversion ditches, wetlands, and other features. The RD/RA CD also contains a map and a legal description of the Site in Appendices B and F. The map and the legal description identify a 258 acre property that constitutes the Site. Descriptions of and references to the Site in the RP/EA (Sections 1.1 and 3.1) should more clearly describe the property that constitutes the Site, and Figure 1 should delineate the boundaries of the Site to make clear that the Site is approximately 258 acres and includes the 160 acre tailings impoundment as well as other features.
Chapman and Cutler LLP	December 6, 2012	4	1.4	The first sentence in the third paragraph currently reads as follows: "'In 1970, with renewed mining activity in the area. Park City Ventures (PCV), a joint venture partnership between Anaconda Copper Company (Anaconda) and American Smelting Company (ASARCO), entered into a lease agreement with United Park." United Park recommends that sentence be replaced with the: following: “In 1970, with renewed mining activity in

				the area, Park City Ventures (PCV), a joint venture between Anaconda Copper Company (Anaconda) and American Smelting and Refining Company (ASARCO), who were also controlling shareholders of United Park, entered into a lease agreement with United Park."
Chapman and Cutler LLP	December 6, 2012	5	1.6.1	The last sentence of the first paragraph of Section 1.6.1 cites the Remedial Design/Remedial Action Plan, Richardson Flat, Site ID Number: UT980952840 (the "RD/RA Work Plan "). Since the selected remedy was initially identified in the Record of Decision (prepared by EPA and executed on July 6, 2005) ("ROD") and because the RD/RA Work Plan is based on the ROD in describing the selected remedy, the RP/EA should also cite the ROD in the parenthetical at the end of the first paragraph of Section 1.6.1. United Park recommends that this sentence be revised as follows: "The selected remedy contains the following elements (EPA 2005, RMC 2007a)."
Chapman and Cutler LLP	December 6, 2012	6	1.6.1	The fifth bullet point in Section 1.6.1 identifies "placement of twelve-inches of clean gravel over contaminated sediments in the SDD, including the pond located near the terminus of the ditch" as one of the elements of the remedy selected by EPA for the Site. While this task was initially contemplated in both the ROD and the RD/RA Work Plan, the remedy was later revised to facilitate removal of contaminated materials/sediments in the SDD and

				the pond located near the terminus of the SOD. The revision was documented by the Minor Modification of the June 28. 2005 Record of Decision, Richardson Flat Tailings Site, Park City Utah issued by the EPA on June 1, 2006. United Park recommends that this bullet point be revised to reflect what actually occurred at the Site: "Removal of contaminated sediments in the SDD, including the pond located near the terminus of the: ditch,"
Chapman and Cutler LLP	December 6, 2012	7	1.8.1	The first sentence of the second paragraph under this heading currently states: "This RP/EA provides analysis of restoration alternatives that we considered, and the environmental consequences of each." United Park recommends that this sentence be revised to read as follows: "This RP/EA provides analysis of restoration alternatives that were considered and the environmental consequences of each."
Chapman and Cutler LLP	December 6, 2012	8	3.1	The fifth sentence in Section 3.1 currently reads as follows: 'Thirty acres of the Site, located north of the South Diversion Ditch, are subject to a long-term lease with Park City Municipal Corporation (Park City) pursuant to a prior agreement concerning development of other United Park properties in the Silver Creek Watershed (Development Agreement)" United Park recommends that this sentence be replaced with the following: "Thirty acres of the Site, located within the impoundment, are subject to a long-term lease with Park City Municipal

				Corporation (Park City) pursuant to a pre-existing agreement concerning development of other United Park properties (Development Agreement).
Chapman and Cutler LLP	December 6, 2012	9	3.3.1.3	Section 3.3.1.3 states that "Alternative C… would not have adverse consequences to groundwater." United Park recommends that this sentence be revised to read as follows: ;"Alternative C, Wetland Enhancement and Construction of Public Recreational Facilities at the Site, would not have adverse consequences to groundwater provided proper precautions are taken to minimize infiltration to shallow groundwater within the impoundment from recreation field irrigation activities."

9.2 Responses to Public Comments

Comment #	Section	Response
1	N/A	The following text was added to Alternative A and B under Section 3.2.3.1: "the existing use of a portion of the Site for a parking lot has the potential to impact surface water quality at the Site."
2	3.4.1.3 3.5.4.3 4.3	Potential losses of ecological services and habitat from placement of fill and cover at the leased acres have been addressed by the HEA (Appendix B).
3	3.1	Text was added to Section 3.1 to clarify the description of the Site.
4	1.4	The text was changed to reflect the recommendation.
5	1.6.1	The text was changed to reflect the recommendation.
6	1.6.1	The text was changed to reflect the recommendation.
7	1.8.1	The text was changed to reflect the recommendation.
8	3.1	The text was changed to reflect the recommendation.
9	3.3.1.3	The text was changed to reflect the recommendation.

10.0 REFERENCES

Council on Environmental Quality (CEQ), 1997, Environmental Justice, Guidance Under the National Environmental Policy Act

Jones, CA and KA Pease. 1997. "Restoration-based compensation measures in natural resource liability statutes," Contemporary Economic Policy 15, 4, October, pp. 111-123.

Michael Baker Inc. and Psomas. 2004. Silver Creek total maximum daily load for dissolved zinc and cadmium. Prepared for Utah Division of Water Quality. 114 pp.

Resource Management Consultants, Inc. (RMC). 2003. Sampling and Analysis Plan for Determination of the Nature and Effects of Heavy Metals within the Wetland and Pond Areas at Richardson Flat (BioSap).

Resource Management Consultants, Inc (RMC), 2004, Focused Feasibility Study Report (FS) for Richardson Flat, Site ID Number: UT980952840

RMC. 2007a. Remedial Design/Remedial Action Plan (RD/RA), Richardson Flat, Site ID Number: UT980952840, With Attached Work Plan.

RMC. 2007b. Health and Safety Policy, Remedial Investigation, Richardson Flat, Site ID Number: UT980952840.

RMC. 2011. Task Area Map.

RMC. 2012a. Operations and Maintenance and Monitoring Plan, Richardson Flat, Site ID Number: UT980952840 (currently under preparation)

RMC. 2012b. OU1 Completion Report, Richardson Flat, Site ID Number: UT980952840 (currently under preparation)

Romin LA and JA Muck. 2002. Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. U.S. Fish and Wildlife Service.

United States Environmental Protection Agency (EPA). 2005. Record of Decision, Richardson Flat Tailings Site, Park City, Utah

United States Fish and Wildlife Service (USFWS). 2008. NEPA Documentation Requirements: CX versus EA versus EIS.

Department of Interior (DOI). 2012. Habitat Equivalency Analysis, Richardson Flat Tailings Site.

Unsworth, R. and R. Bishop. 1994. Assessing natural resource damages using environmental annuities. Ecological Economics (11): 35-41.

APPENDIX A

RICHARDSON FLAT TAILINGS SITE SPECIES LIST

Richardson Flat Species List

Note: Species lists were compiled during multiple visits for several seasons.

Trees:

Boxelder	*Acer negundo*
Crack willow	*Salix fragilis*
Gambel oak	*Quercus gambelii*
Lanceleaf cottonwood	*Populus acuminata*
Narrowleaf cottonwood	*Populus angustifolia*
Quaking aspen	*Populus tremuloides*
Rocky Mountain juniper	*Juniperus scopulorum*
Sub-alpine fir	*Abies lasiocarpa*
Water birch	*Betula occidentalis*

Shrubs:

Alder-leaf serviceberry	*Amelanchier alnifolia*
Bebb willow	*Salix bebbiana*
Bitterbrush	*Purshia tridentate*
Blue elderberry	*Sambucus caerulea*
Booth's willow	*Salix boothii*
Chokecherry	*Prunus virginiana melanocarpa*
Curl-leaf mountain mahogany	*Cercarpus ledifolius*
Few flowered sagebrush	*Artemisia tridentata pauciflora*
Geyer's willow	*Salix geyeriana*
Golden currant	*Ribes aureum*
Green rabbitbrush	*Chrysothamnus viscidiflorus*
Mountain lover	*Pachystima myrsinoides*
Narrowleaf willow	*Salix exigua*
Oregon grape	*Berberis repens*
Rocky Mountain juniper	*Juniperus scopulorum*
Rubber rabbitbrush	*Chrysothamnus nauseosus*
Sandbar willow	*Salix exigua*
Silver sagebrush	*Artemisia cana*
Snowberry	*Symphorocarpos oreophilus*
Vasey's Big sagebrush	*Artemisia tridentata vaseyana*
Wax currant	*Ribes cereum*
Whiplash willow	*Salix lasiandra*
Woods' rose	*Rosa woodsii*

SPECIES LIST (continued)

Forbs:

Alkali buttercup	*Ranunculus cymbalaria*
Alpine paintbrush	*Castilleja rhexifolia*
Alyssum	*Alyssum alyssoides*
Autumn willowherb	*Epilobium brachycarpum*
Avens	*Geum macrophyllum*
Bindweed	*Convolvulus arvensis*
Buckbean	*Menyanthes trifoliate*
Buckwheat	*Eriogonum sp.*
Burdock	*Arctium minus*
Canada goldenrod	*Solidago canadensis*
Canada thistle	*Cirsium arvense*
Cinquefoil	*Potentilla gracilis*
Common evening primrose	*Oenothera biennis*
Curly dock	*Rumex crispus*
Curly gumweed	*Grindelia squarrosa*
Curly pondweed	*Potamogeton crispus*
Dalmation toadflax	*Linaria dalmatica*
Death camas	*Zygadenus spp*
Deer's ear	*Frasera speciosa*
Duckweed	*Lemna spp*
Elevator plant	*Cymopterus longipes*
Elk thistle	*Cirsium scariosa*
False lupine	*Thermopsis montanum*
Field mint	*Mentha arvensis*
Field pennycress	*Thlapsi arvense*
Fireweed	*Epilobium angustifolia*
Gauge plant	*Senecio integerrimus*
Glacier Lily	*Erythronium grandifloruma*
Hound's tongue	*Cynoglossum officinale*
Indian paintbrush	*Castilleja lineariifolia*
Indian potato	*Orogenia linearifolia*
Lanszwert's sweetpea	*Lathyrus lanszwertii*
Largeleaf avens	*Geum macrophyllum*
Low larkspur	*Delphinium nutallianum*
Meadow thistle	*Cirsium scariosum*
Milfoil	*Myriophyllum heterophyllum*
Mullein	*Verbascum Thapsus*
Musk thistle	*Carduus nutans*
Peppergrass	*Lepidium sp.*
Pleated gentian	*Gentiana affinis affinis*
Poison hemlock	*Conium maculatum*
Poverty weed	*Iva axillaris*
Prickly pear cactus	*Opuntia polyacantha*

SPECIES LIST (continued)

Russian thistle	*Salsola kali*
Sage buttercup	*Ranunculus jovis*
Seep monkeyflower	*Mimulus guttatus*
Showy milkweed	*Asclepias speciosa*
Silver lupine	*Lupinus argenteus*
Skunkweed	*Polemonium caeruleum*
Slender cinquefoil	*Potentilla gracilis*
Sowthistle	*Sonchus arvense*
Spotted water hemlock	*Cicuta maculata*
Stinging nettle	*Urtica dioica*
Stock's bill	*Erodium cicutarium*
Wasatch penstemon	*Penstemon cyananthus*
Water ragwort	*Senecio hydrophilus*
Whitetop	*Cardaria sp.*
White checkerbloom	*Sidalcea candida*
White marsh marigold	*Caltha leptosepala*
Whorled buckwheat	*Eriogonum heracleum*
Wild onion	*Allium sp.*
Wormwood	*Artemisia ludoviciana*
Yarrow	*Achillea millifolium*

Graminoids:

American mannagrass	*Glyceria grandis*
Aquatic sedge	*Carex aquatilis*
Arrowgrass	*Triglochin maritima*
Arctic rush	*Juncus arcticus*
Analogue sedge	*Carex simulata*
Baltic rush	*Juncus balticus*
Beaked sedge	*Carex rostrata*
Bluegrass	*Poa sp.*
Brookgrass	*Catabrosa aquatic*
Bulrush	*Scirpus sp.*
Cattail	*Typha latifolia*
Cheatgrass	*Bromus tectorum*
Common spikerush	*Eleocharis palustris*
Common reedgrass	*Phragmites communis*
Common three-square	*Scirpus pungens*
Creeping bentgrass	*Agrostis stolonifera*
Crested wheatgrass	*Agropyron cristatum*
Duckweed	*Lemna spp*
Foxtail barley	*Hordeum jubatum*
Fowl bluegrass	*Poa palustris*

SPECIES LIST (continued)

Geyer's sedge	*Carex geyerii*
Great basin wildrye	L*ymus cinereus*
Indian ricegrass	*Oryzopsis hymenoides*
Intermediate wheatgrass	*Agropyron intermedium*
Kentucky bluegrass	*Poa pratensis*
Mare's tail	*Hippuris vulgaris*
Maritime arrowgrass	*Triglochin maritime*
Nebraska sedge	*Carex nebrascensis*
Reed canary grass	*Phalaris arundinacea*
Scouring rush	*Equisetum hymale*
Sierra rush	*Juncus nevadensis*
Slender wheatgrass	*Agropyron trachycaulum*
Slimstem reedgrass	*Calamagrostis neglecta*
Smallwing sedge	*Carex microptera*
Smooth brome	*Bromus inermis*
Spike rush	*Eleocharis pauciflora*
Water whorlgrass	*Catabrosia aquatica*

Mammals:

American beaver	*Castor anadensis*
American mink	*Mustela vison*
Chipmunk	*Tamias sp.*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Elk	*Cervus Canadensis*
Ermine	*Mustela ermine*
Northern pocket gopher	*Thomomys talpoides*
Meadow vole	*Microtus pennsylvanicus*
Moose	*Alces alces*
Muskrat	*Ondatra zibethicus*
Mule deer	*Odocoileus hemionus*
North American porcupine	*Erethizon dorsatum*
Nuttal's cottontail	*Sylvilagus nuttallii*
Red fox	*Vulpes vulpes*
Shrew	*Sorex sp.*
Uintah ground squirrel	*Spermophilus armatus*
White-tailed deer	*Odocoileus virginianus*
White-tailed jackrabbit	*Lepus townsendii*

SPECIES LIST (continued)

Birds:

American coot	*Fulica americana*
American goldfinch	*Carduelis tristis*
American kestrel	*Falco sparverius*
American pipit	*Antus rubescens*
American robin	*Turdus migratorius*
American white pelican	*Pelecanus erythrorhynchos*
American wigeon	*Anas Americana*
Bald eagle	*Haliaeetus leucocephalus*
Barn swallow	*Hirundo rustica*
Belted kingfisher	*Megaceryle alcyon*
Black-bellied plover	*Pluvialis squatarola*
Black-billed magpie	*Pica hudsonia*
Black-capped chickadee	*Parus atricapillus*
Black-chinned hummingbird	*Archilochus alexandri*
Black-crowned night heron	*Nycticorax nycticorax*
Black-headed grosbeak	*Pheucticus melanocephalus*
Black-necked stilt	*Himantopus mexicanus*
Black tern	*Chlidonias niger*
Blue-winged teal	*Anas discors*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
Broad-tailed hummingbird	*Selasphorus platycercus*
Brown-headed cowbird	*Molothrus ater*
California gull	*Larus californicus*
Canada goose	*Branta canadensis*
Caspian tern	*Hydroprogne caspia*
Cinnamon teal	*Anas cyanoptera*
Clark's grebe	*Aechmophorus clarkia*
Cliff swallow	*Petrochelidon pyrrhonota*
Common merganser	*Mergus merganser*
Common nighthawk	*Chordeiles minor*
Common raven	*Corvus corax*
Common yellowthroat	*Geothlypis trichas*
Dark-eyed junco	*Junco hyemalis*
Eared grebe	*Podiceps nigricollis*
European starling	*Sturnus vulgaris*
Flycatcher	unknown
Fox sparrow	*Passerella iliaca*
Gadwall	*Anas strepera*
Great sage grouse	*Centrocercus urophasianus*
Golden eagle	*Aquila chrysaetos*
Gray catbird	*Dumetella carolinensis*

SPECIES LIST (continued)

Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Greater yellowlegs	*Tringa melanoleuca*
Green-tailed towhee	*Piplio chlorurus*
Green-winged teal	*Anas carolinensis*
Horned lark	*Eremophila alpestris*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
House wren	*Troglodytes aedon*
Killdeer	*Charadrius vociferus*
Lesser yellowlegs	*Totanus flavipes*
Lincoln's Sparrow	*Melospiza lincolnii*
Long-billed curlew	*Numenius americanus*
Long-billed dowitcher	*Limnodromus scolopaceus*
MacGillivray's warbler	*Oporornis tolmiei*
Mallard	*Anas platyrhynchos*
Marsh wren	*Cistothorus palustris*
Mountain bluebird	*Sialia currucoides*
Mountain chickadee	*Poecile gambeli*
Mourning dove	*Zenaida macroura*
Northern flicker	*Colaptes auratus*
Northern pintail	*Anas acuta*
Northern shoveler	*Anas clypeata*
Osprey	*Pandion haliaetus*
Pied-billed grebe	*Podilymbus podiceps*
Redhead	*Aythya americana*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-necked duck	*Aythya collaris*
Rough-winged swallow	*Stelgidopteryx serripennis*
Rufous hummingbird	*Selasphorus rufus*
Sage thrasher	*Oreoscoptes montanus*
Sandhill crane	*Grus Canadensis*
Savannah sparrow	*Passerculus sandwichensis*
Scrub jay	*Aphelocoma coerulescens*
Short-eared owl	*Asio flammeus*
Song sparrow	*Melospiza melodia*
Spotted sandpiper	*Actitis macularia*
Spotted towhee	*Pipilo maculatus*
Tree swallow	*Tachycineta bicolor*
Turkey vulture	*Cathartes aura*
Vesper sparrow	*Pooecetes gramineus*
Violet-green swallow	*Tachycineta thalassina*

SPECIES LIST (continued)

Western grebe	*Aechmophorus occidentalis*
Western kingbird	*Tyrannus verticalis*
Western meadowlark	*Sturnella neglecta*
Western wood-pewee	*Contopus sordidulus*
White-crowned sparrow	*Zonotrichia leucophrys*
White-faced ibis	*Plegadis chihi*
Wilson's snipe	*Gallinago gallinago*
Willet	*Tringa semipalmata*
Wilson's phalarope	*Phalaropus tricolor*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Yellow warbler	*Dendroica patechia*
Yellow-rumped warbler	*Dendroica coronata*

Amphibians:

Leopard frog	*Rana pipiens*
Tiger salamander	*Ambystoma tigrinum*
Western chorus frog	*Pseudacris triseriata*

Reptiles:

Garter snake	*Thamnophis elegans vagrans*

Fish:

Fathead minnow	*Pimephales promelas*
Speckled dace	*Rhinichthys osculus*

SPECIES LIST (continued)

Macroinvertebrates – 2009
Survey was conducted on July 7, 2009.

Class	Order	Family	Genus	Species	Common name	Sensitive/ Intolerant (Y/N)
Insecta	Odonata	Aeshnidae	Aeshna		Hawker dragonflies	Y
Arachnida	Acarina				Water mites	N
Insecta	Diptera	Chironomidae	Tanypus		Midges	N
Insecta	Odonata	Coenagrionidae	Enallagma	civile	Familiar bluet damselfly	N
Insecta	Hemiptera	Corixidae	Corixa		Water boatmen	N
Insecta	Diptera	Culicidae	Culex		Mosquitos	N
Insecta	Coleoptera	Dytiscidae			Predaceous diving beetles	N
Insecta	Ephemeroptera				Mayflies	N
Gastropoda					Snails	N
Malacostraca	Amphipoda	Gammaridae	Gammarus		Shrimp-like crustaceans	N
Insecta	Odonata	Gomphidae	Aphylla		Forcep-tail dragonflies	Y
Insecta	Coleoptera	Gyrinidae	Gyrinus		Whirligig beetles	N
Hirudinea					Leeches	N
Insecta	Coleoptera	Hydrophilidae			Water scavenger beetles	N
Insecta	Hemiptera	Notonectidae	Notonectus		Backswimmers	N

Total Taxa Richness: 15 taxa identified

% EPT: 7

% Intolerant: 13

APPENDIX B

HABITAT EQUIVALENCY ANALYSIS FOR RICHARDSON FLAT TAILINGS SITE, PARK CITY, UTAH

Habitat Equivalency Analysis for Richardson Flat Tailings Site, Park City, Utah

1 Summary

This habitat equivalency analysis (HEA) draws on the injury and restoration information provided by field staff in the U.S. Fish and Wildlife Service (FWS), Region 6 in conjunction with information from United Park City Mines (UPCM) on their property at Richardson Flat (Site) in Summit County, near Park City, Utah.

The Site is about 258 acres in size, and is located in Summit County in north-central Utah, approximately 40 miles east of Salt Lake City and about 1.5 miles northeast of Park City. The U.S. Environmental Protection Agency (EPA) reported hazardous substances at the Site, including heavy metals such as arsenic, cadmium, copper, lead, mercury, silver, and zinc. Historic aerial photos show that a tailings pile existed at the Site as early as 1953. The Site is located adjacent to Silver Creek, which is classified by the State of Utah as a cold-water fishery. Surface water coming from a diversion ditch surrounding the Site was contaminated with heavy metals prior to remediation. This ditch empties into wetlands below a tailings dam and flows into Silver Creek.

The impacted area includes approximately 17 acres of aquatic habitat subject to natural resource injuries. This total includes approximately 12.7 acres of perennial (year-round) wetlands, and about 4.3 acres of seasonal wetlands. Seasonal wetlands at the Site typically have water available only during spring and summer months, whereas perennial wetlands typically have water available all year (though they are subject to freezing in winter). As birds and other vertebrates use wetlands primarily during spring and summer months, the two types of wetland are assumed to provide identical services at the Site.

Restoration activities and natural recovery are expected to return services at the site to levels above their assumed baseline values, resulting in an overall **credit** of 1,868 discounted service acre-years (DSAYs). A summary of debits and credits related to primary and compensatory restoration activities is provided below in Table .

Table 1. Summary HEA Results

Primary Restoration Debit (DSAYs)[a]	-155
Past Losses	*61*
Future Losses	*-216*
Compensatory Restoration Credits (DSAYs)[a]	1,713
Past Gains	*669*
Future Gains	*1,044*
Total DSAYs	1,868

[a] Debits and credits are measured in discounted service acre-years (DSAYs). A negative debit indicates an increase in services above baseline levels as a result of restoration at the Site.

Remediation activities at the Site are being conducted by UPCM. With guidance by the U.S. Fish and Wildlife Service (FWS), UPCM has conducted natural resource restoration and enhancement activities concurrent with cleanup and remediation at the Site, with the understanding that any excess restoration credits at Richardson Flat may be used to address potential natural resource injuries at other sites impacted by historical Park City mining operations. Other stakeholders, including representatives from Federal, State, and local agencies, local elected officials, and the community have been working together since the late 1990s to address the environmental contamination in the Silver Creek watershed left behind from historical mining activities.

2 Natural Resource Damage Assessment (Background)

A natural resource damage assessment (CERCLA; 43 CFR Part 11) determines whether a release of hazardous substances injured any natural resources. If an injury is determined to have occurred, the assessment determines what actions or funds, if any, are needed to "restore, rehabilitate, replace, and/or acquire" the equivalent of the injured resources. There are two potential types of loss associated with an injury:

- Loss of baseline condition, which is the loss of resources as compared to their baseline condition (i.e., the condition they would be in now had no contamination occurred); and
- Interim losses ("compensable value"), which are the losses over the time when resources are in an impaired condition and less available to the public.[8]

Primary restoration projects (including acquisition) are used to bring resources to baseline condition. Compensatory restoration projects are used to offset the interim loss. In general, the more primary restoration conducted early on, the lower the damages claim for interim losses. If no primary restoration is pursued, then the entire claim is for interim losses (accounting for any natural recovery that may occur).

Habitat equivalency analysis (HEA) is used to evaluate the interim losses and the expected service benefits of proposed restoration projects. HEA offers the ability to account for differences in ecosystem services, the potential improvements from any EPA remedial actions or other projects to restore baseline, the different benefits of compensatory restoration projects, and the time it takes to restore to baseline. The final results are restoration-based estimates for projects to restore services to the public, which are summarized below.

3 Habitat Equivalency Analysis Methodology

CERCLA regulations (43 CFR Part 11) provide a variety of economic tools to estimate damages, including HEA. HEA is a service-to-service or resource-to-resource approach to natural resource valuation that

[8] The term "lost services" refers to the interim loss of the physical and biological functions performed by natural resources, including human use, between the time hazardous substances are released and the time injured natural resources and services are returned fully to their baseline conditions.

can account for changes in baseline while estimating interim losses (Unsworth and Bishop 1994; Jones and Pease 1997). The fundamental concept in HEA is that compensation for lost ecological services can be provided by restoration projects that provide comparable services (compensatory restoration). HEA responds to the question, "What, but for the release, would have happened to the injured area?"

With HEA, the replacement services are quantified in physical units of measure such as acre-years. The selected projects are scaled so that the quantity of replacement services equals the quantity of lost services in present value terms. In the end, responsible parties usually implement (or pay for) restoration projects that are sufficient to cover the public's interim losses.

HEA involves three basic steps:

1. Assess the present value (PV) of lost services (% service losses over time) relative to baseline. This "debit" is measured in acre-years.

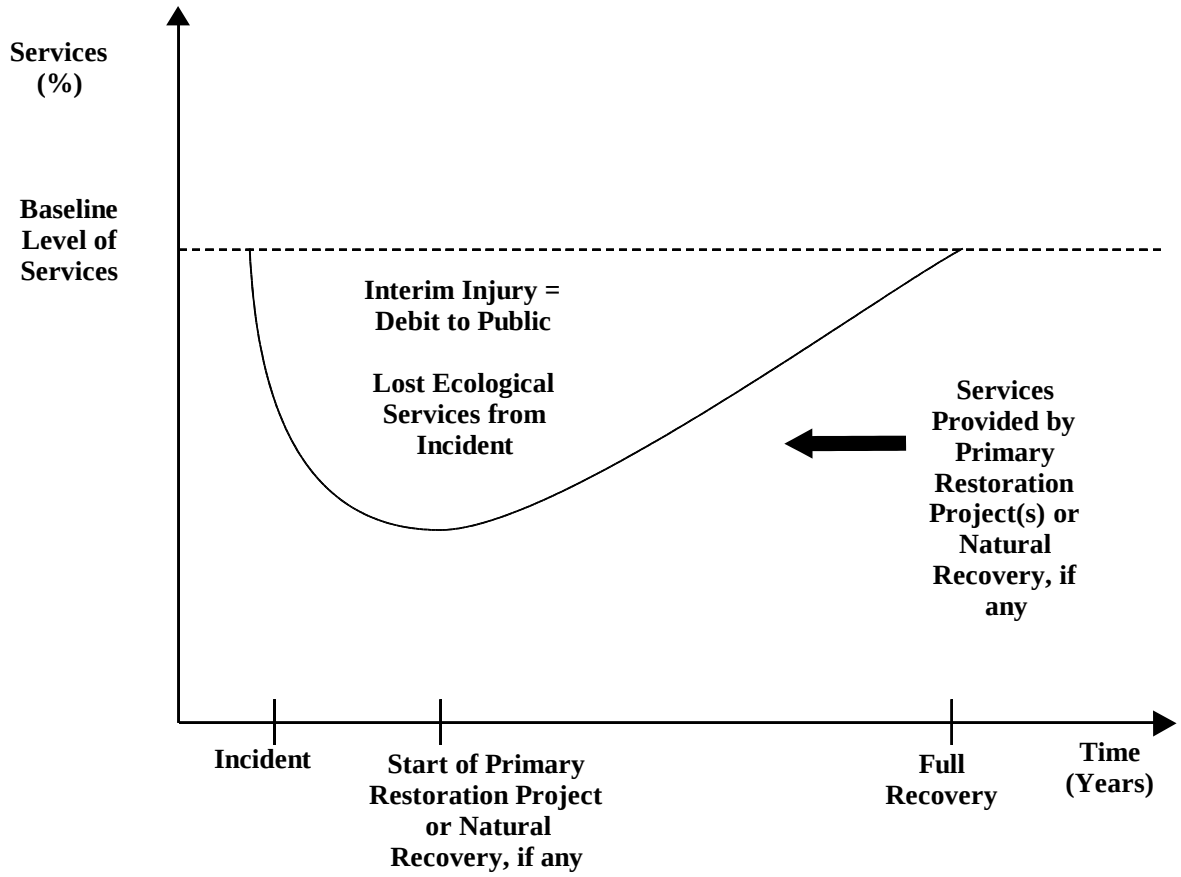

Figure 1. Services over Time: Baseline, Injury, and Primary Restoration

2. Select appropriate compensatory restoration projects (% restored services). The "relative productivity" of a proposed restoration project compared to what was injured is measured in the number of acre-years restored for every acre included in the project.

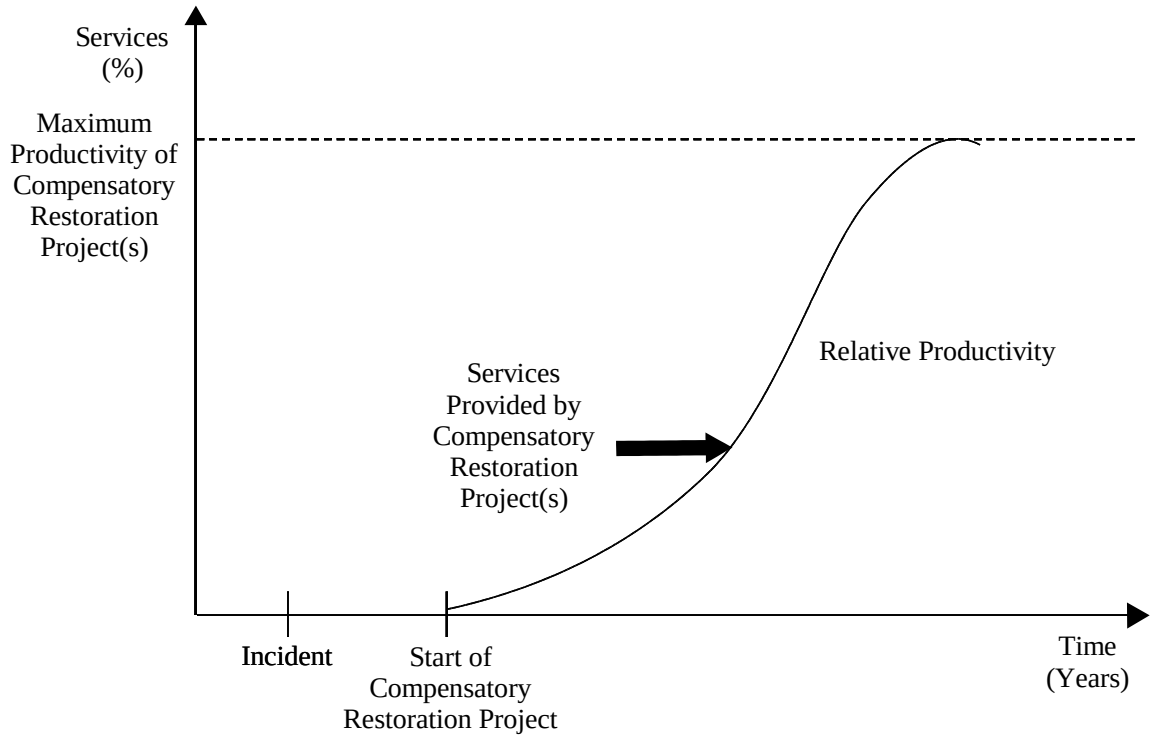

Figure 2. Services over Time: Compensatory Restoration

Identify the size of the project (scaling) that will equate the total discounted quantity of lost services to the total discounted quantity of replacement services to compensate the public's losses. The scaling procedure is presented in schematic form in

3. Table below.

Table 2. Schematic Presentation of Restoration Project Scaling

Category	***Description***	**Unit**
Debit (Lost Services)	*Affected acres × % lost services, tallied over time, and converted to present value*	Discounted service acre-years (DSAYs)
Relative Productivity	*Services restored by an acre of the compensatory project, tallied over time, and converted to present value*	DSAYs per acre
Credit (Debit ÷ Relative Productivity)	*Total acres of compensatory project required to offset debit*	Acres

4 Input Assumptions for the Richardson Flat Site

A summary of the inputs for the Richardson Flat Site is given in **Table 3**. Year-round and seasonal wetlands are assumed to be restored over forty years to a level of services 30% above baseline, equivalent to 90% of pristine condition. Seasonal wetlands (wetland areas lacking surface water during the winter) are assumed to be the functional equivalent of year-round wetlands (wetlands with some surface water present throughout the year, though in winter they freeze). This assumption is based in part on the definition and treatment of wetlands by Cowardin *et al.* (1979), which does not distinguish seasonal from year-round wetlands; and the U.S. Army Corps of Engineers wetland delineation manual, as published in the Federal Register (1982), which does not assign a different value for natural resources in "seasonal" wetlands.[9]

Table 3. Summary of HEA Inputs for Richardson Flat Site

Habitat Area	Baseline Acreage	Baseline Services (100% = Pristine)	Initial Service Losses	Years from Injury to Full Services	Residual Service Losses*
Year-round Wetlands, and Seasonal Wetlands	17	60%	17%	40	-30%

*Residual Service Losses are any losses that remain after restoration. A negative number indicates that final services are above baseline.

4.1 Site Description

The Site is located in a broad valley with undeveloped rangeland, about 6,570 feet above mean sea level, characterized by a cool, dry, semi-arid climate. Meteorological stations located in Park City, Utah and Kamas, Utah estimate an annual precipitation of about 20 inches of water, an average low temperature of about 30°F, and an average high temperature of about 57°F (RMC, 2003). In accordance with the State of Utah, Division of Water Quality, the Weber River from the Stoddard diversion to its headwaters (including Silver Creek) is classified as a cold water fishery (3A) and is protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in the food chain. The Site also provides habitat for fish, aquatic invertebrates, terrestrial plants, terrestrial invertebrates, mammals, birds, reptiles and amphibians.

United Park City Mines' Remedial Design/Remedial Action Plan (2009) delineated various task areas at the Site, as summarized in

[9] From the Army Corps manual: "*Seasonal wetlands*. In many regions (especially in western states), depressional areas occur that have wetland indicators of all three parameters [*i.e.*, ground/surface water, hydrophytic vegetation, and "normal" soil/hydrological conditions] during the wetter portion of the growing season, but normally lack wetland indicators of hydrology and/or vegetation during the drier portion of the growing season." This definition does not appear to apply to the "seasonal" wetlands at the Site, which have vegetation, hydric soils and water for the majority of the growing season.

Table 4 and Figure 3. The remediation and restoration construction work in Tasks 1 through 9 has been completed. Tailings have been remediated in these areas by removal or capped in place in accordance with the Record of Decision and Remedial Design/Remedial Action Plan. The restoration has been completed and these areas are in an operation and maintenance phase for both the remediation construction and restoration construction.

Table 4. Summary of Task Areas at Richardson Flat

	Task Area Name(s)	Task Area Labels	Wetland Types	Restoration Type
1	Wedge Buttress	F-1; F-7	N/A - upland	N/A
2	Area B-2 East; South Pond	B-2-E	Year-round; seasonal	Compensatory
3	Area B-3 East	B-3-E	Seasonal	Compensatory
4	East Diversion Ditch		Year-round	
5	Area B-1-W	B-1-W	Seasonal	Compensatory
6	West Diversion Ditch		Year-round	
7	Diversion Ditch Pond; South Diversion Ditch Terminus Pond		Year-round	Primary
8	Embankment Wetland		Year-round	Primary
9	Wet Area Cover; Impoundment Area	F-8	Year-round	Compensatory
10	Fill and Cover	F-4; F-5	Seasonal	Compensatory
11	Fill and Cover for Rec Site	F-6; F-7A	N/A - upland	N/A
12	Fill and Cover	F-2; F-3	N/A - upland	N/A
	Other Areas			
	Cottonwood Pond		Year-round	Compensatory
	Impoundment Wetlands	F-4; F-5; F-8	Seasonal	Compensatory
	Impoundment Areas	F-4; F-5; F-6	N/A - upland	N/A
	South Diversion Ditch		Year-round	Compensatory

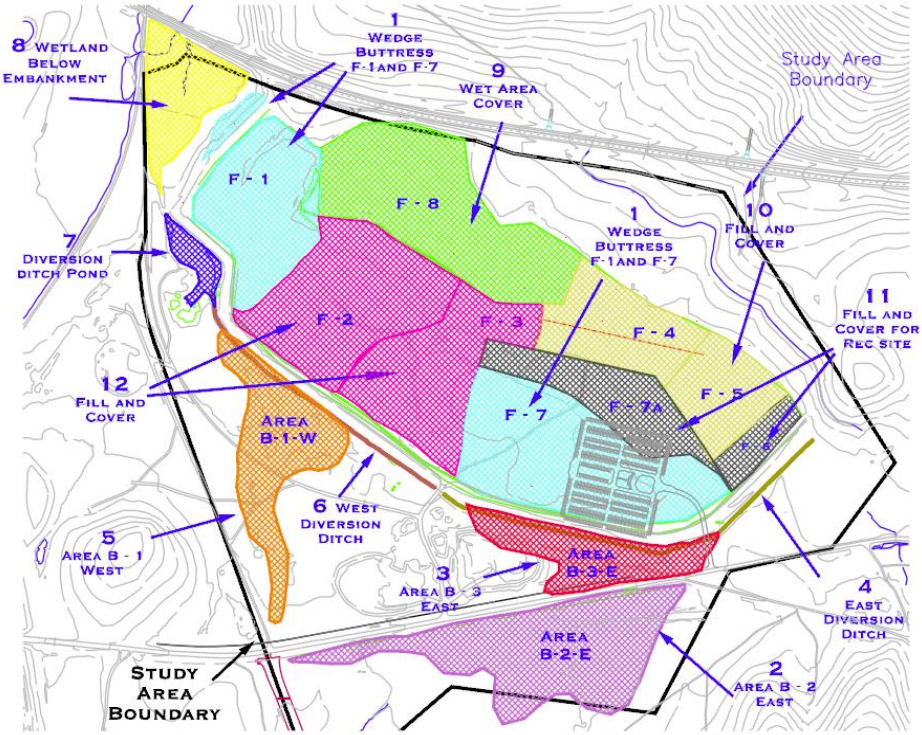

Figure 3. Task Areas at Richarson Flat
Source: UPCM (2009)

4.1.1 Impoundment and Containment Dikes

The majority of the tailings at the Site are contained in the impoundment basin, with a large earth embankment in place along the northwestern edge of the Site. The "main embankment" is vegetated and is approximately 40 feet wide at the top, 800 feet long, and has a maximum height of 25 feet. A series of dikes contain the tailings along the southern and eastern perimeter of the impoundment. The northern edge of the impoundment is naturally higher than the perimeter dikes.

4.1.2 Off-Impoundment Tailings

Additional tailings materials are present outside and to the south of the current impoundment area. During historic operations of the tailings pond, tailings accumulated in three naturally low-lying areas adjacent to the impoundment. Starting in 1983, UPCM covered these off-impoundment tailings with a low-permeability, vegetated soil cover. In addition to these off-impoundment tailings deposits, prevailing winds from the southeast carried tailings from the main impoundment and deposited them in the surrounding areas.

4.1.3 Diversion Ditches and Drainages

A diversion ditch system borders the north, south, and east sides of the impoundment to prevent surface water runoff from the surrounding land from entering the impoundment. Precipitation falling on the impoundment area creates a limited volume of seasonal surface water. The north diversion ditch collects snowmelt and storm-water runoff from the upslope, undisturbed areas north of the impoundment and carries it east, towards the origin of the south diversion ditch. An unnamed ephemeral drainage southeast of the impoundment also enters the south diversion ditch at this point. Additional water from spring snowmelt and storm-water runoff enters the south diversion ditch from other areas south of the impoundment at a point near the southeast corner of the diversion ditch structure.

4.1.4 Site Wetlands and Pond

Water in the south diversion ditch flows from east to west and ultimately empties into Silver Creek near the north border of the Site. Before its confluence with Silver Creek, water from the south diversion ditch flows through a series of ponds, one being at the terminus of the diversion ditch, and the others in the wetland at the toe of the main embankment. These ponds were remediated, created and restored during the 2010 and 2011 construction seasons. Water exiting the ponds flows in a discrete channel where it mixes with flow from Silver Creek in a remediated and restored wetland below the main embankment. Near the northwestern corner of the wetlands area, Silver Creek flows into the wetland beneath the rail-trail bridge. Water flow exits the wetlands area back into Silver Creek via a concrete box culvert under State Highway 248.

4.1.5 Silver Creek

Silver Creek flows approximately 500 feet from the main embankment along the west edge of the Site. The headwaters of Silver Creek include three major drainages in the Upper Silver Creek Watershed: Ontario Canyon, Empire Canyon and Deer Valley. Flows from Ontario and Empire Canyons occur in late

spring to early summer months in response to snowmelt and rainfall, while Deer Valley flows appear to be perennial and originate from snowmelt and springs. Other sources of water and metal loads are the Judge Tunnel and Prospector Drain. Historically, the Judge Tunnel has made up the majority of flow in Empire Canyon and Silver Creek during particular times of year. Prospector Drain has been identified as a major metal loading contributor in the Middle Reach of Silver Creek. The major influence on water flow in Silver Creek near the Site is the Pace-Homer (Dority Springs) Ditch, which derives most of its flow from groundwater. The outflow from the Pace-Homer Ditch enters Silver Creek at several locations across the Prospector Square area. Significant riparian zones and wetlands exist near the Site in areas that historically consisted of accumulated tailings piles.

4.2 Baseline Assumptions

The Site is the former tailings pond for local silver mines, and is currently owned by United Park City Mines (UPCM), a consolidation of Silver King Coalition Mines Company and Park Utah Consolidated Mines Company formed in 1953. From 1975 to 1981, tailings from the milling process were deposited via a slurry pipeline into an impoundment just east of Silver Creek. The area of the impoundment covers about 160 acres of the 258 acre Site. Over the course of operations, approximately 420,000 tons of tailings were disposed of in the impoundment, resulting in a large, high-profile, cone-shaped feature. The presence of the cone-shaped feature allowed for aerial re-deposition by prevailing winds.

Tailings deposition at the Site ended in 1982. Starting in 1983, UPCM began placing soil cover on tailings outside of the impoundment. Between 1985 and 1988, UPCM also placed soil cover around the cone-shaped tailings structure inside the impoundment area to prevent prevailing winds from cutting into the cone-shaped tailings. By 1988, UPCM began a program to cover all exposed tailings. By 1992, soil cover work was completed.

4.2.1 Determining Baseline

Extensive physical disturbance related to permitted mining-related activities resulted in relatively low baseline service values for aquatic and related wetland ecosystems.[10] Although upland terrestrial ecosystems were also impacted, FWS believes that injury to natural resources in upland areas was limited and would be difficult to quantify. Historical site documents do not provide adequate information for an accurate assessment of the nature and extent of potential injuries that could have occurred in upland habitats. As a result, the baseline service levels described here address wetland and other aquatic habitat only. Based on aerial photography from 1980 and pre-remedial vegetation mapping, FWS estimated a baseline of 17 acres of wetlands at the Site: 12.7 acres of year-round wetlands and 4.3 acres of seasonal wetlands.

Baseline indicates the expected state of the resource but for the release. That is, the level of services that could be expected at the Site over time, had the release never occurred. **Table 5** lists ten categories of ecosystem services present at the Site. A proportion of total services is assigned to each category,

[10] Baseline is assumed to be 60% of pristine service levels.

based on the ecology of the Site. The categories and weights were determined cooperatively by FWS and ecologists and biologists under contract to UPCM.

Table 5. Service Category Weights

Service Categories	Proportion of Total Services
Bird and Mammal Production	0.16
Biotic Habitat	0.14
Abiotic Habitat	0.13
Macroinvertebrate Production	0.11
Primary Production	0.11
Water Quality	0.11
Decomposition	0.06
Fish and Amphibian Production	0.06
Food Provision	0.06
Macroinvertebrate Diversity	0.06
Composite Total	**1.00**

Baseline service levels were determined for the service categories listed in **Table 5** based on historical aerial photos of the Site provided by geologists contracted to UPCM, montane wetland ecology, and best professional judgment. Descriptions for the various categories of baseline services are provided below.

- **Bird and Mammal Production** services represent the capacity of a site to support increases in bird and mammal populations (beyond the contributions of other services listed here), including breeding and nesting habitat. Mine-related disturbance of surrounding upland habitat (e.g., tailings management) is assumed to have resulted in reductions to bird and mammal production baseline services beyond reductions to baseline services related to aquatic species. There is insufficient information available at this time to estimate upland injury.

- **Biotic Habitat** services are the ability of the living parts of the environment (plants and organic debris) to provide habitat for other organisms. Biotic habitat services were affected by mining-related activities in the tailings impoundment and adjacent areas. In the early 1980s, there was almost no cover on the tailings impoundment. Deposition of tailings, access roads, covering activities and other permitted activities caused physical habitat disturbance that reduced baseline services from optimal conditions (i.e., pristine habitat). Aerial photography from the 1980s documents this level of surface disturbance. Areas of vegetation cover within the affected area were assumed to have reduced habitat value because of their isolation.

- **Abiotic Habitat** services are the ability of the non-living parts of the environment (rocks and inorganic materials in the substrate) to provide habitat for living organisms. Abiotic habitat services were likely never adversely affected by the presence of tailings at the Site**.**

- **Macroinvertebrate Production** services represent the capacity of a site to support increases in macroinvertebrate populations (beyond the contributions of other services listed here). Macroinvertebrate production services were likely reduced as a result of physical disturbances

from mining-related activities as well as releases of contaminants from site tailings that also reduced water quality.

- **Water Quality** includes the physical and chemical processes that allow water to be used by members of the ecosystem. The water quality in local aquatic habitat was reduced as result of the presence of tailings and other mining-related contaminants from the Site.
- **Macroinvertebrate Diversity** represents the typical abundance of different species occupying various ecological niches in an area. Macroinvertebrate diversity was likely affected to a similar degree as macroinvertebrate production.
- **Primary Production** services represent the capacity of a site to produce organic compounds, providing nutrients to other organisms. Primary production was likely reduced with the conversion of ephemeral streams to altered channels and wetland habitat, a mining-related and permitted physical disturbance that reduced available habitat for primary production.
- **Decomposition** services represent the ability of detritivores in the environment to break down tissues of dead organisms into simpler forms of matter. Decomposition services were likely affected to a similar degree as primary production.
- **Fish and Amphibian Production** services represent the capacity of a site to support increases in fish and amphibian populations (beyond the contributions of other services listed here), including spawning habitat. Fish and amphibian production services were likely reduced as a result of mining-related activities.
- **Food Provision** services represent the capacity of the environment to provide food for various members of the ecosystem: higher trophic levels feed on lower trophic levels; lower trophic levels feed on available detritus and debris. Food provision services were affected by the reduced primary production and macroinvertebrate production, thus an intermediate percentage value was chosen.

Baseline service levels for each service category are presented in the second column of **Table 6** (a service level of 100% indicates pristine condition). The weights from **Table 5** were applied to these baseline service levels to derive a composite baseline service level for use in the HEA. This calculation is shown in **Table 6**: the third column repeats the proportional weights from **Table 5**, and the last column multiplies the category weights by the baseline service levels to derive the weighted service levels for each category of services. These weighted service levels are summed at the bottom of the last column to form a composite baseline service level. The result is an overall level of services equivalent to 60 percent of pristine condition for the Site. This baseline is assumed to be constant over time. That is, it is assumed that were it not for the release, services would have remained at 60 percent of pristine in perpetuity.

Table 6. Deriving the Composite Baseline Service Level

Service Categories	Baseline Service Level	Proportion of Total Services	Weighted Baseline Service Level
Water Quality	90%	0.11	10%
Abiotic Habitat	70%	0.13	9%
Biotic Habitat	60%	0.14	8%
Primary Production	60%	0.11	7%
Macroinvertebrate Production	50%	0.11	6%
Bird and Mammal Production	40%	0.16	6%
Decomposition	60%	0.06	4%
Macroinvertebrate Diversity	60%	0.06	4%
Food	55%	0.06	3%
Fish and Amphibian Production	50%	0.06	3%
Composite Total		**1.00**	**60%**

4.3 Injury Assumptions

The previous section discussed how the ten categories of natural-resource services are assumed to have been functioning at varying levels under baseline conditions. Similarly, the release is assumed to have varying impacts on the different services. Some services are assumed to be relatively resistant to further impairment. It may be that these services are relatively insensitive to contaminants from the release, or that these services were already impaired in their baseline condition (or both). For example, services related to "fish and amphibian production" and "abiotic habitat" are assumed to have experienced little to no reduction from baseline levels due to the release. Other services are assumed to be more sensitive to contaminant stressors. For example, services related to "water quality" and "primary production" are assumed to have been significantly impaired as a result of the release. The injured service levels (and resulting service losses) are reported for each of the ten service categories in **Table 7**. A composite service loss figure is calculated in **Table 8** as a weighted average of these category service losses, using the category weights from **Table 5**. The result is an estimate that services at the Site are, as a composite, 17 percentage points below baseline.

Table 7. Service Losses by Category

Service Categories	Baseline Service Level	Injured Service Level (1981)	Service Loss (Below Baseline)
Water Quality	90%	50%	40%
Abiotic Habitat	70%	70%	0%
Biotic Habitat	60%	46%	14%
Primary Production	60%	30%	30%
Macroinvertebrate Production	50%	27%	23%
Bird and Mammal Production	40%	35%	5%
Decomposition	60%	40%	20%
Macroinvertebrate Diversity	60%	40%	20%
Food	55%	28%	27%
Fish and Amphibian Production	50%	48%	2%

Table 8. Deriving the Composite Service Loss

Service Categories	Service Loss (Below Baseline)	Proportion of Total Services	Weighted Injury
Water Quality	40%	0.11	4%
Abiotic Habitat	0%	0.13	0%
Biotic Habitat	14%	0.14	2%
Primary Production	30%	0.11	3%
Macroinvertebrate Production	23%	0.11	3%
Bird and Mammal Production	5%	0.16	1%
Decomposition	20%	0.06	1%
Macroinvertebrate Diversity	20%	0.06	1%
Food	27%	0.06	2%
Fish and Amphibian Production	2%	0.06	0%
Composite Total		**1.00**	**17%**

4.4 Natural Recovery Assumptions

4.4.1 Year-round Wetland Acreage

Based on aerial photography from 1980 and pre-remedial vegetation mapping, the Site had an estimated 12.7 acres of year-round wetlands until 1987. During this period, the area known as the South Diversion Ditch is assumed to have been 50% wetlands year-round. Between 1987 and 1989, naturally established wetland plants increased the South Diversion Ditch to 100% wetlands, adding 0.9 acres to the stock of year-round wetlands, bringing the total to 13.6 acres by the end of 1989. Changes in acreage and service levels are provided as a table in Appendix 1, and graphically in Appendix 3.

4.4.2 Seasonal Wetland Acreage

Based on aerial photography and pre-remedial vegetation mapping, the Site had an estimated 4.3 acres of seasonal wetlands from 1980 onward.

4.4.3 Wetland Services

Estimates of wetland services and service losses incorporate acreage and conditions for both year-round and seasonal wetlands. Thus a single service metric is reported for the entire Site. Services are assumed to have been 17 percentage points below the 60% baseline through 1980 (that is, 43% of pristine condition). Establishment of wetland plants in the year-round wetlands reduced losses to 7% below baseline by the end of 1991.

4.5 Primary Restoration Assumptions

As noted in Section 0, baseline wetland acreage is estimated at a total of 17 acres: 12.7 acres of year-round wetlands, and 4.3 acres of seasonal wetlands. These wetlands existed on the Site in 1980, and have been undergoing remediation. Services and service losses related to these wetlands are considered part of primary restoration.

Additional permanent and seasonal wetlands have developed in remediated areas since 1980, some as part of site remediation and restoration. Services and service losses related to these wetlands are considered part of compensatory restoration.

Varying levels of natural resource services are provided by wetlands at different stages of recovery; yearly service-loss metrics for the Site represent an estimated average over several areas, including the South Diversion Ditch, South Diversion Ditch Terminus Pond, and Embankment Wetland. Changes in acreage and service levels are provided as a table in Appendix 1, and graphically in Appendix 3.

4.5.1 Year-round Wetland Acreage

Intermittent restoration has been ongoing at the Site since at least 1992. The South Diversion Ditch was remediated in 1992 and 1993 to cover tailings and decrease the side slopes of the ditch. This action removed 1.0 acres from the year-round wetland stock in 1992, and a further 0.7 acres in 1993. Meanwhile, natural plant growth in the remediated area added 1.1 acres to the year-round wetland stock in 1993, and a further 0.8 acres in 1994.[11] The net result is a total of 13.8 year-round wetland acres by the end of 1994. These estimates are based on aerial photography from 1993, and area calculations using a digitized vegetation map.

The South Diversion Ditch was remediated again in 2008 and 2009, reducing the year-round wetlands by 1.1 acres in 2008 and 0.8 acres in 2009. Meanwhile, 1.6 acres of year-round wetlands were added in 2009, due in part to further widening of the ditch. The net result is a total of 12.0 acres of year-round wetlands by the end of 2010. These estimates are based on aerial photography from 2009 and the Phase 3 Task Completion Report (TCR) for the 2009 Construction Season. Remedial work completed in 2009 in the South Diversion Ditch added 1.1 acres of year-round wetlands during 2010. Remediation in the South Diversion Ditch Terminus Pond removed 2.4 year-round wetland acres in 2010, and added 3.3 acres in 2011. Remedial work in the Embankment Wetland in 2011 removed 5.9 acres of year-round wetlands and an equivalent amount of acreage of year-round wetlands was restored in the same area. The net result is an anticipated total of 15.3 acres of year-round wetlands from the end of 2012 onwards.

4.5.2 Seasonal Wetland Acreage

Seasonal wetlands are estimated to be a constant 4.3 acres throughout the period of analysis, based on aerial photography and digitized vegetation maps.

4.5.3 Wetland Services

Estimates of wetland services and service losses incorporate acreage and conditions for both year-round and seasonal wetlands.[12] Values and services provided by the natural resources of wetlands at the Site include physical resource services, such as water quality and physical substrate, and biotic resource services. Biotic services include typical wetland functions such as biotic habitat, primary production (by plants), decomposition, biodiversity, and food. Faunal production includes fish, amphibians (frogs and

[11] The ditch was widened but not otherwise reconfigured, increasing wetland area by about 10%.
[12] The same service metric was applied to both types of wetland.

toads), reptiles (snakes), mammals, and birds. Of the vertebrate groups, waterfowl and other wetland birds (e.g., Sandhill Cranes) are important in terms of animal biomass, ecological function, and human uses (e.g., wildlife viewing). Water is present in both year-round and seasonal wetlands during spring and summer months (March through September), increasing the total ecological services provided during these seasons relative to fall and winter. For example, many birds and other vertebrates inhabit these wetlands only during spring and summer months, when they feed, reproduce, and raise their young.

Restoration actions in year-round wetland areas have both increased and decreased service losses at the Site.[13] By the end of 1991, natural recovery had reduced service losses to 7% below baseline. Remediation of the South Diversion Ditch in 1992 increased losses to 9% below baseline by the end of 1992. Between 1993 and 1996 services are assumed to have increased by 1 percentage point per year, reaching 5% below baseline by the end of 1996. The South Diversion Ditch was remediated again in 2008, increasing service losses to 6% below baseline for 2009 and 2010. Remediation in 2010 in the South Diversion Ditch Terminus Pond increased service losses to 8% below baseline by the end of 2011, followed by an expected improvement to 4% below baseline by the end of 2012. Wetland vegetation established in the South Diversion Ditch Terminus Pond is expected to generate services rapidly, restoring the year-round wetlands to baseline by the end of 2013.

Improvements beyond baseline are expected to increase services to 30% above baseline (90% of pristine condition) by the end of 2019, and remain at this level from 2020 onward.

4.6 Compensatory Restoration Assumptions

Onsite remediation and post-RI/FS remedial actions began in 1987. Permanent and seasonal wetlands have developed in remediated areas since that time, some as part of site remediation and restoration. Tailings impoundment areas with sufficient hydrology were covered with soil in 1988 and 1989 to encourage the establishment and growth of wetland plants.

Services related to these wetlands are considered part of compensatory restoration. Credit is given for all services accruing in these areas; that is, compensatory restoration areas assume a baseline of 0% services. As with primary restoration, varying levels of natural resource services are provided by wetlands at different stages of recovery. Thus, yearly service metrics represent an estimated average over several areas, including the tailings impoundment, Cottonwood Pond and South Pond. Changes in acreage and service levels are provided as a table in Appendix 2, and graphically in Appendix 3.

4.6.1 Year-round Wetland Acreage

Soil cover was placed on barren tailings from 1988 to 1992 in depths of six to eighteen inches, allowing wetland plants to establish themselves rapidly. This led to an annual increase of 1.5 acres of year-round wetlands over four years, for a total of 6 acres of new year-round wetlands by the end of 1992. These estimates are based on a linear interpolation between photographs taken in 1989 and 1993.

[13] Primary restoration has affected only year-round wetland areas. Compensatory restoration has affected both year-round and seasonal wetland areas.

In 2008, remediation required more soil to be deposited in impoundment area F-8, resulting in a loss of 4.8 acres of year-round wetlands for that year in F-8. Plant growth in the remediation of Cottonwood Pond area added 1.6 year-round wetland acres.[14] The total area of year-round wetlands was 2.8 acres at the end of 2008. Remediation in impoundment area F-8 and area B-2-E (South Pond) during 2009 resulted in an increase of 7.6 acres of year-round wetlands, for a total of 10.4 acres of year-round wetlands from the end of 2009 onward. These estimates are taken from the Phase 2 TCR for the 2008 Construction Season, the Phase 3 TCR for 2009, and aerial photography from 2009.

4.6.2 Seasonal Wetland Acreage

Soil cover was placed on barren tailings from 1988 to 1992 in depths of six to eighteen inches, allowing wetland plants to establish themselves rapidly. This led to an increase of 42.5 acres of seasonal wetlands above the baseline acreage by the end of 1992. These estimates are based on a linear interpolation between photographs taken in 1989 and 1993.

In 2007, remediation of Cottonwood Pond removed tailings from the area, reducing seasonal wetlands by 2.2 acres for a total of 40.3 seasonal wetland acres by the end of 2007. Wetland plants were established in Cottonwood Pond in 2008, which added 0.8 acres of seasonal wetlands. In 2008, remediation removed 18.4 acres of seasonal wetlands from three areas: South Pond (4 acres of tailings removal), area B-3-E (1.4 acres), and the Impoundment Wetlands (13 acres of soil cover). The net result was 22.7 acres of seasonal wetlands by the end of 2008. The 18.4 acres of seasonal wetlands that were remediated in 2008 were restored in 2009, bringing the seasonal wetland total to 41.1 acres by the end of 2009. These estimates are taken from field-measurement calculations in the Phase 2 TCR for the 2008 Construction Season, the Phase 3 TCR for 2009, and aerial photography from 2009.

In 2010, 0.6 acres of seasonal wetlands were added in area B-1-W, a former upland source-removal area. Meanwhile, an estimated 16.2 acres of seasonal wetlands will be lost to further remediation in 2014, with soil cover placement in tailings impoundment areas F-4, F-5, F-6, and F-7a. However, the actual year that this occurs is not known as it is dependent upon other projects in the Park City area. The resulting seasonal wetland area of 25.7 acres is assumed to remain constant from the end of 2014 onward.

4.6.3 Wetland Services

Estimates of wetland services incorporate acreage and conditions for both year-round and seasonal wetlands. As for Primary Restoration above, a single service metric is reported for the entire site, and seasonal wetlands are assumed to provide equivalent services to those provided by perennial wetlands. Starting in 1988, formation of wetlands on tailings impoundment areas increased total wetland services

[14] Prior to remediation, Cottonwood Pond was a 2.2-acre seasonal wetland. Following remediation, the area contains 0.8 acres of seasonal wetlands, and 1.6 acres of year-round wetlands.

available each year, resulting in 54% services for these areas by the end of 1993.[15] Subsequent remediation resulted in increases and decreases to wetland services at the site:

- Remediation in Cottonwood Pond in 2007 reduced services to 51% of pristine by the end of 2007.
- In 2008, new remediation reduced services in tailings impoundment area F-8, South Pond, and area B-3-E. This reduction was partially offset by the establishment of wetland plants in Cottonwood Pond, for a final service level of 36% of pristine by the end of 2008.
- In 2009, new remediation reduced services in area B-1-W. This reduction was partially offset by the establishment of wetland plants in tailings impoundment area F-8, South Pond, and area B-3-E. The resulting service level was 27% of pristine by the end of 2009.
- In 2014 remediation will reduce services in Impoundment Wetland areas F-4, F-5 and F-6. The resulting service level is estimated to be 66% by the end of 2014.

Wetland vegetation established in the Embankment Wetland is expected to generate services rapidly, reaching 90% of baseline condition by the end of 2017. This level of services is equivalent to the "30% above baseline" level expected for the primary restoration areas from the end of 2019 onward.

5 HEA Results

Primary Restoration activities at the Site have resulted in a net **credit** of 155 DSAYs. A detailed tally of service losses and gains over time due to the injury and primary restoration activities is provided in Section 0 below. *(see Table 10 and Table 11)*

Compensatory Restoration activities at the Site have also generated a **credit** of 1,713 DSAYs. A detailed tally of service gains over time due to compensatory restoration activities is provided in Section 0 below. *(see Table 12 and Table 13)*

Summing these two sources of credits gives a grand total of 1,868 DSAYs for all activities at the Site. In the future, UPCM may wish to apply or sell these excess DSAYs to address potential natural resource injuries at other sites impacted by historical Park City mining operations. These figures are reported in

[15] That is, by the end of 1993, the newly formed wetlands were providing services equivalent to 54% of pristine wetland condition.

Table 9.

Table 9. Summary HEA Results

Primary Restoration Debit (DSAYs)[a]	-155
Past Losses	*61*
Future Losses	*-216*
Compensatory Restoration Credits (DSAYs)[a]	1,713
Past Gains	*669*
Future Gains	*1,044*
Total DSAYs	1,868

[a] Debits and credits are measured in discounted service acre-years (DSAYs). A negative debit indicates an increase in services above baseline levels, as a result of restoration at the site.

5.1 Debit

Table 10. Primary Restoration: Past Losses

Year	Discount Factor	Baseline Acres	Baseline Services	Baseline SAYs	Total Acres (start of year)	Acres Lost	Acres Gained	Total Acres (mid-year)	Services Present (mid-year)	Service Losses (mid-year)	SAYs Present (mid-year)	Lost DSAYs (mid-year)
1980	2.58	17.0	60%	10.2	17.0			17.0				0.00
1981	2.50	17.0	60%	10.2	17.0			17.0	44%	17%	7.4	7.01
1982	2.43	17.0	60%	10.2	17.0			17.0	45%	16%	7.6	6.40
1983	2.36	17.0	60%	10.2	17.0			17.0	46%	15%	7.7	5.81
1984	2.29	17.0	60%	10.2	17.0			17.0	47%	14%	7.9	5.25
1985	2.22	17.0	60%	10.2	17.0			17.0	48%	13%	8.1	4.72
1986	2.16	17.0	60%	10.2	17.0			17.0	49%	12%	8.2	4.22
1987	2.09	17.0	60%	10.2	17.0		0.3	17.2	50%	11%	8.5	3.58
1988	2.03	17.0	60%	10.2	17.3		0.3	17.5	51%	10%	8.8	2.82
1989	1.97	17.0	60%	10.2	17.6		0.3	17.8	52%	9%	9.1	2.09
1990	1.92	17.0	60%	10.2	17.9			17.9	52%	8%	9.4	1.62
1991	1.86	17.0	60%	10.2	17.9			17.9	53%	7%	9.4	1.41
1992	1.81	17.0	60%	10.2	17.9	1.0		17.4	52%	8%	9.0	2.08
1993	1.75	17.0	60%	10.2	16.9	0.7	1.1	17.1	52%	9%	8.8	2.44
1994	1.70	17.0	60%	10.2	17.3		0.8	17.7	53%	8%	9.3	1.54
1995	1.65	17.0	60%	10.2	18.1			18.1	54%	7%	9.7	0.85
1996	1.60	17.0	60%	10.2	18.1			18.1	55%	6%	9.9	0.54
1997	1.56	17.0	60%	10.2	18.1			18.1	55%	5%	10.0	0.38
1998	1.51	17.0	60%	10.2	18.1			18.1	55%	5%	10.0	0.37
1999	1.47	17.0	60%	10.2	18.1			18.1	55%	5%	10.0	0.36
2000	1.43	17.0	60%	10.2	18.1			18.1	55%	5%	10.0	0.35
2001	1.38	17.0	60%	10.2	18.1			18.1	55%	5%	10.0	0.34
2002	1.34	17.0	60%	10.2	18.1			18.1	55%	5%	10.0	0.33
2003	1.30	17.0	60%	10.2	18.1			18.1	55%	5%	10.0	0.32
2004	1.27	17.0	60%	10.2	18.1			18.1	55%	5%	10.0	0.31
2005	1.23	17.0	60%	10.2	18.1			18.1	55%	5%	10.0	0.30
2006	1.19	17.0	60%	10.2	18.1			18.1	55%	5%	10.0	0.29
2007	1.16	17.0	60%	10.2	18.1	0.2		18.0	55%	5%	9.9	0.35
2008	1.13	17.0	60%	10.2	17.9	1.1		17.4	55%	6%	9.5	0.84
2009	1.09	17.0	60%	10.2	16.8	0.8	1.6	17.2	54%	6%	9.3	1.00
2010	1.06	17.0	60%	10.2	17.6	2.4	1.1	17.0	55%	6%	9.2	1.02
2011	1.03	17.0	60%	10.2	16.3	5.9	3.3	15.0	54%	7%	8.0	2.24
										Past Losses		61.2

Table 11. Primary Restoration: Future Losses

Year	Discount Factor	Baseline Acres	Baseline Services	Baseline SAYs	Total Acres (start of year)	Acres Lost	Acres Gained	Total Acres (mid-year)	Services Present (mid-year)	Service Losses (mid-year)	SAYs Present (mid-year)	Lost DSAYs (mid-year)
2012	1.00	17.0	60%	10.2	13.7		5.9	16.7	54%	6%	9.0	1.2
2013	0.97	17.0	60%	10.2	19.6			19.6	58%	2%	11.4	-1.1
2014	0.94	17.0	60%	10.2	19.6			19.6	63%	-3%	12.3	-1.9
2015	0.92	17.0	60%	10.2	19.6			19.6	68%	-8%	13.2	-2.8
2016	0.89	17.0	60%	10.2	19.6			19.6	73%	-13%	14.2	-3.6
2017	0.86	17.0	60%	10.2	19.6			19.6	78%	-18%	15.2	-4.3
2018	0.84	17.0	60%	10.2	19.6			19.6	83%	-23%	16.2	-5.0
2019	0.81	17.0	60%	10.2	19.6			19.6	88%	-28%	17.2	-5.7
2020	0.79	17.0	60%	10.2	19.6			19.6	90%	-30%	17.6	-5.9
onward	25.17	17.0	60%	10.2	19.6			19.6	90%	-30%	17.6	-187.3
										Future Losses		-216.3
										Total Losses		**-155.1**

5.2 Compensatory Restoration

Table 12. Compensatory Restoration: Past Gains

Year	Discount Factor	Total Acres (start of year)	Acres Lost	Acres Gained	Total Acres (mid-year)	Compensatory Restoration Services (mid-year)	DSAYs Gained (mid-year)
1980	2.58	0.0			0.0	0%	0.0
1981	2.50	0.0			0.0	0%	0.0
1982	2.43	0.0			0.0	0%	0.0
1983	2.36	0.0			0.0	0%	0.0
1984	2.29	0.0			0.0	0%	0.0
1985	2.22	0.0			0.0	0%	0.0
1986	2.16	0.0			0.0	0%	0.0
1987	2.09	0.0			0.0	0%	0.0
1988	2.03	0.0			0.0	3%	0.0
1989	1.97	0.0		12.2	6.1	9%	1.1
1990	1.92	12.2		12.1	18.3	15%	5.2
1991	1.86	24.3		12.1	30.4	24%	13.6
1992	1.81	36.4		12.1	42.5	38%	28.8
1993	1.75	48.5			48.5	50%	42.1
1994	1.70	48.5			48.5	54%	44.6
1995	1.65	48.5			48.5	54%	43.3
1996	1.60	48.5			48.5	54%	42.0
1997	1.56	48.5			48.5	54%	40.8
1998	1.51	48.5			48.5	54%	39.6
1999	1.47	48.5			48.5	54%	38.5
2000	1.43	48.5			48.5	54%	37.3
2001	1.38	48.5			48.5	54%	36.3
2002	1.34	48.5			48.5	54%	35.2
2003	1.30	48.5			48.5	54%	34.2
2004	1.27	48.5			48.5	54%	33.2
2005	1.23	48.5			48.5	54%	32.2
2006	1.19	48.5			48.5	54%	31.3
2007	1.16	48.5	2.2		47.4	53%	28.8
2008	1.13	46.3	23.2	2.4	35.9	44%	17.6
2009	1.09	25.5		26.0	38.5	32%	13.3
2010	1.06	51.5		0.6	51.8	26%	14.0
2011	1.03	52.1			52.1	30%	16.1
						Past Gains	668.9

Table 13. Compensatory Restoration: Future Gains

Year	Discount Factor	Total Acres (start of year)	Acres Lost	Acres Gained	Total Acres (mid-year)	Compensatory Restoration Services (mid-year)	DSAYs Gained (mid-year)
2012	1.00	52.1			52.1	42%	21.9
2013	0.97	52.1			52.1	54%	27.3
2014	0.94	52.1	16.0		44.1	63%	26.2
2015	0.92	36.1			36.1	71%	23.3
2016	0.89	36.1			36.1	78%	25.0
2017	0.86	36.1			36.1	86%	26.6
onward	27.51	36.1			36.1	90%	893.7
						Future Gains	1,044.0
						Total Gains	**1,712.9**

6 References

Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/wetlands/classwet/index.htm (Version 04DEC1998).

Federal Register. 1982. "Title 33: Navigation and Navigable Waters; Chapter II, Regulatory Programs of the Corps of Engineers," Vol 47, No. 138, p 31810, US Government Printing Office, Washington, D.C.

Jones, C. A. and K. A. Pease. 1997. "Restoration-based compensation measures in natural resource liability statutes," Contemporary Economic Policy 15, 4, October, pp. 111-123.

NOAA. 1999. Discounting and the Treatment of Uncertainty in Natural Resource Damage Assessment. Technical Paper 99-1. Silver Spring, MD: NOAA.

Unsworth, R. and R. Bishop. 1994. Assessing natural resource damages using environmental annuities. Ecological Economics (11): 35-41.

UPCM. Phase 2 Task Completion Report for 2008 Construction Season.

UPCM. Phase 3 Task Completion Report for 2009 Construction Season.

UPCM. RDRA Task Areas, 2009.

U.S. EPA, Region VIII. 2004. Baseline Ecological Risk Assessment for the Richardson Flat Tailings Site, Park City, Summit County, Utah (Public Review Draft).

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Appendix 1 Primary Restoration Notes (Acreage and Services)

Table 14. Primary Restoration Acres and Services

Year	Service Losses (year-end)	Acres Lost	Acres Gained	Total Acres (year-end)	Source	Notes
1980	17%			17.0		CERCLA period starts December 11, 1980
1981	16%			17.0		Natural Establishment of wetland plants within existing wetland areas
1982	15%			17.0		
1983	14%			17.0		
1984	13%			17.0		
1985	12%			17.0		SDD is assumed to be 50% wetlands until 1985
1986	11%			17.0		
1987	10%		0.3	17.3		Natural plant regeneration in South Diversion Ditch (SDD)
1988	9%		0.3	17.6		Natural plant regeneration in SDD
1989	8%		0.3	17.9		Natural plant regeneration in SDD
1990	8%			17.9		
1991	7%			17.9		
1992	9%	1.0		16.9		Remediation of SDD, decrease side slopes, cover tailings
1993	8%	0.7	1.1	17.3	1993 aerial photos and 1996 digital vegetation mapping	Remediation of SDD, decrease side slopes, cover tailings; natural plant regeneration
1994	7%		0.8	18.1		Remediation of SDD; natural plant growth; establishment of wetland plants in existing areas
1995	6%			18.1		
1996	5%			18.1		
1997	5%			18.1		
1998	5%			18.1		
1999	5%			18.1		
2000	5%			18.1		
2001	5%			18.1		
2002	5%			18.1		
2003	5%			18.1		
2004	5%			18.1		
2005	5%			18.1		

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Year	Service Losses (year-end)	Acres Lost	Acres Gained	Total Acres (year-end)	Source	Notes
2006	5%			18.1		
2007	5%	0.2		17.9	Aerial photos	Start of remedial action: Wedge Buttress construction eliminated 0.2 acres of wetlands in the Embankment Wetland
2008	6%	1.1		16.8	Phase 2 Task Completion Report (TCR) for 2008 construction season	Remediation of SDD (Eastern half); year-round wetlands created in SDD
2009	6%	0.8	1.6	17.6	Phase 3 TCR for 2009 construction season; 2009 aerial photos	Remediation of SDD (Western half); year-round wetlands created in SDD
2010	5%	2.4	1.1	16.3	RD/RA Work Plan	Remediation of SDD terminal pond; year-round wetlands created in pond
2011	8%	5.9	3.3	13.7	GPS measurement of remediated area on October 5, 2011.	Remediation of Embankment Wetland; year-round wetlands created in Embankment wetland; Establishment of plants in SDD terminal pond
2012	4%		5.9	19.6		Wetland plants established in SDD terminal pond and embankment wetland.
2013	0%			19.6		Wetland plants established throughout the site.
2014	-5%			19.6		Wetland plants established throughout the site.
2015	-10%			19.6		
2016	-15%			19.6		
2017	-20%			19.6		
2018	-25%			19.6		
2019	-30%			19.6		
onward	-30%			19.6		

Appendix 2 Compensatory Restoration Notes (Acreage and Services)

Table 15. Compensatory Restoration Acres and Services

Year	Service Gains (year-end)	Acres Lost	Acres Gained	Total Acres (year-end)	Source	Notes
1980						
1981	0%					
1982	0%					
1983	0%					
1984	0%					
1985	0%					
1986	0%					
1987	0%					
1988	6%					Soil cover placement to interrupt soil-plant exposure pathway
1989	12%		12.2	12.2	Aerial photos and linear interpolation	Establishment of wetland plants; 1.5 acres from natural plant growth on soil cover placed over barren tailings; 9.7 acres from soil cover over barren tailings and natural plant growth; 1.0 acre from natural plant regeneration in Cottonwood and South Pond areas.
1990	18%		12.1	24.3	Aerial photos and linear interpolation	Establishment of wetland plants; 1.5 acres from natural plant growth on soil cover placed over barren tailings; 9.7 acres from soil cover over barren tailings and natural plant growth; 1.0 acre from natural plant regeneration in Cottonwood and South Pond areas.
1991	30%		12.1	36.4	Aerial photos and linear interpolation	Establishment of wetland plants; 1.5 acres from natural plant growth on soil cover placed over barren tailings; 9.7 acres from soil cover over barren tailings and natural plant growth; 1.0 acre from natural plant regeneration in Cottonwood and South Pond areas.
1992	45%		12.1	48.5	Aerial photos and linear interpolation	Establishment of wetland plants; 1.5 acres from natural plant growth on soil cover placed over barren tailings; 9.7 acres from soil cover over barren tailings and natural plant growth; 1.0 acre from natural plant regeneration in Cottonwood and South Pond areas.
1993	54%			48.5	Digitized vegetation map	Natural establishment of wetland plants
1994	54%			48.5		
1995	54%			48.5		
1996	54%			48.5		
1997	54%			48.5		
1998	54%			48.5		

Richardson Flat HEA

Year	Service Gains (year-end)	Acres Lost	Acres Gained	Total Acres (year-end)	Source	Notes
1999	54%			48.5		
2000	54%			48.5		
2001	54%			48.5		
2002	54%			48.5		
2003	54%			48.5		
2004	54%			48.5		
2005	54%			48.5		
2006	54%			48.5		
2007	51%	2.2		46.3	Field measurements; Phase 2 Task Completion Report (TCR) for 2008 Construction Season.	Remediation in Cottonwood Pond; removal of tailings: 2.4 acre wetland was constructed in a former 2.2 acre wetland
2008	36%	23.2	2.4	25.5	Phase 2 Task Completion Report (TCR) for 2008 Construction Season and 2009 aerial photography	4.8 acres lost to remediation in F-8 (Soil cover placed in Impoundment Wetland area F-8); 18.4 acres lost to remediation in South Pond (4 acres, tailings removal), B-3-E (1.4 acres) and Impoundment Wetlands (13 acres, soil cover); 2.4 acres created in 2007 in the Cottonwood Pond area.
2009	27%		26.0	51.5	Phase 3 Task Completion Report (TCR) for 2009 Construction Season.	Remediation in B-1-W; 7.6 acres created in 2008 in the South Pond and Impoundment Wetland area F-8; 18.4 acres created in 2008 in the South Pond, B-3-E and Impoundment wetlands areas.
2010	24%		0.6	52.1	Phase 3 Task Completion Report (TCR) for 2009 Construction Season.	0.6 acres created in 2009 in B-1-W, a former upland source-removal area
2011	36%			52.1		Establishment of wetland plants throughout the Site.
2012	48%			52.1	Estimate	Establishment of wetland plants throughout the Site.
2013	60%			52.1	Estimate	Establishment of wetland plants throughout the Site.
2014	66%	16.0		36.1	Estimate	Wetland plants establishment throughout the Site; estimated 16 acres lost (permanently) to fill and soil cover placement in Impoundment areas F-4, F-5, F-6 and F-7a; service levels in restored areas exceed baseline conditions because of contouring, water management, and vegetation enhancement.
2015	75%			36.1		
2016	81%			36.1		
2017	90%			36.1		
onward	90%			36.1		

Appendix 3 Detailed Input Timelines and Graphs

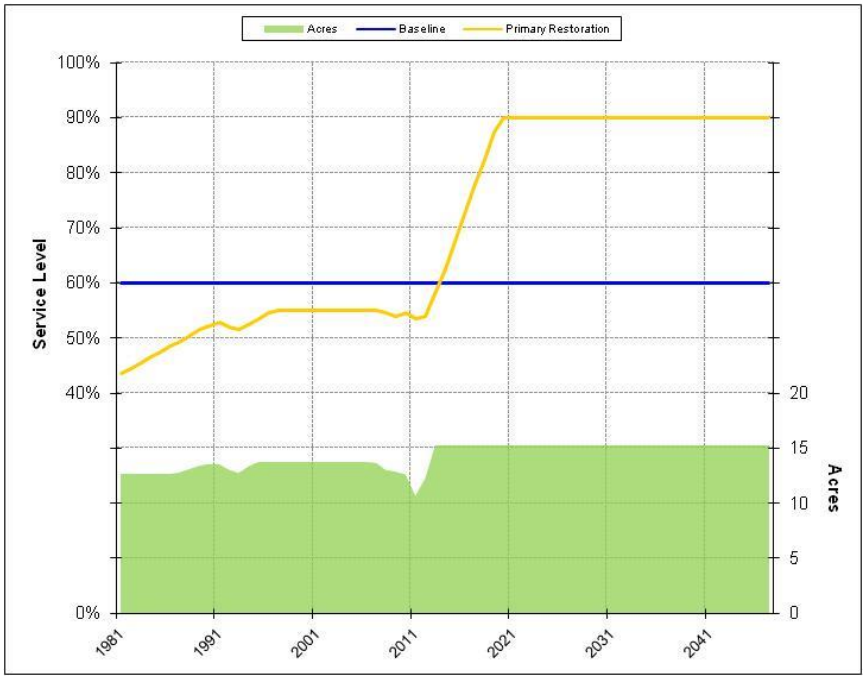

Figure 4. Year-round Wetlands (Primary Restoration)

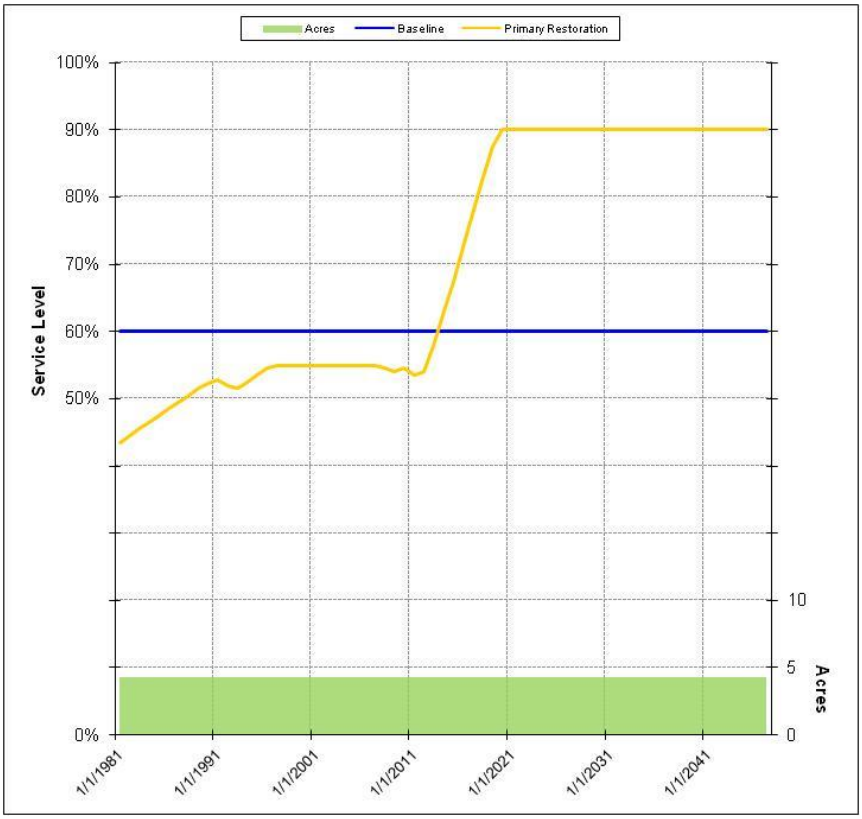

Figure 5. Seasonal Wetlands (Primary Restoration)

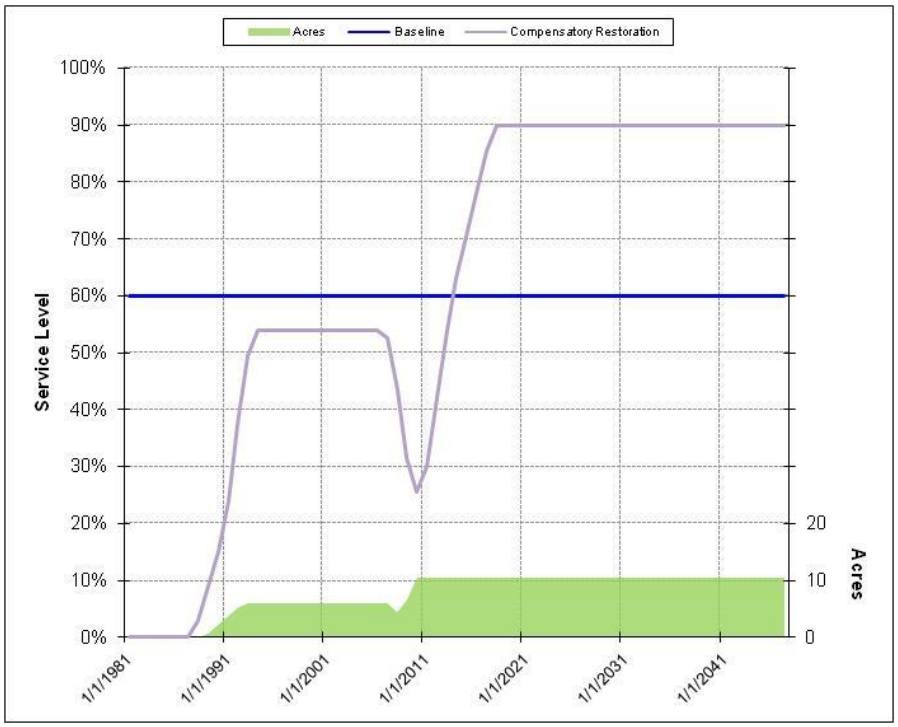

Figure 6. Year-round Wetlands (Compensatory Restoration)

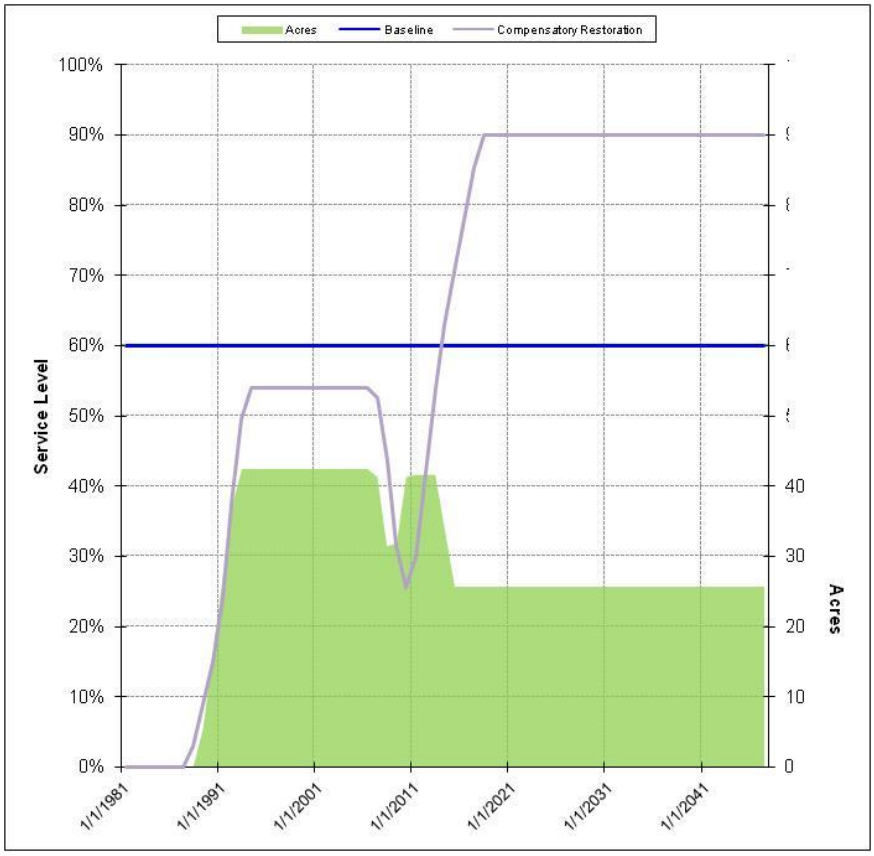

Figure 7. Seasonal Wetlands (Compensatory Restoration)

Appendix 4 Site Photographs

Figure 8. Cottonwood Pond (Source: UPCM; August 21, 2009)

Figure 9. South Pond (Source: UPCM; August 14, 2009)

Figure 10. South Diversion Ditch (Source: UPCM; August 14, 2009)