APPENDIX A

LUCKY PEAK NATURAL RESOURCE MANAGEMENT ACTIVITIES PROGRAMMATIC BIOLOGICAL ASSESSMENT AND USFWS CONCURRENCE LETTER

US Army Corps of Engineers
Walla Walla District

BUILDING STRONG®

LUCKY PEAK
NATURAL RESOURCE MANAGEMENT ACTIVITIES PROGRAMMATIC

LUCKY PEAK DAM AND LAKE

PM-EC-2012-0210

Biological Assessment

U.S. Army Corps of Engineers
Walla Walla District
Environmental Compliance Section

13 February 2013

This document is a Biological Assessment (BA) prepared pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the U.S. Army Corps of Engineers, Walla Walla District (Corps) Natural Resource Management Activities at Lucky Peak Dam and Lake.

The Corps provides this BA for consultation with the U.S. Fish and Wildlife Service on the effects of Lucky Peak's Natural Resource Management activities on bull trout (*Salvelinus confluentus*), Canada lynx (*Lynx canadensis*), slickspot peppergrass (*Lepidium papilliferum),* Bliss Rapids snail (*Talorconcha serpenticola),* Snake River Physa snail (*Haitia {Physa} natricinia),* greater sage-grouse (*Centrocercus urophasiunus),* yellow-billed cuckoo (*Coccyzus americanus),* North American wolverine (*Gulo gulo luscus*), and Whitebark pine (*Pinus albicaulis*).

In this BA, the Corps concludes that the proposed action may affect, but is not likely to adversely affect bull trout, and will have no effect on Canada lynx, slickspot peppergrass, Bliss Rapids snail, Snake River Physa snail, greater sage-grouse, yellow-billed cuckoo, North American wolverine, and Whitebark pine.

The Corps also determined that the proposed action will result in no take of species listed under the Migratory Bird Treaty Act, or the Bald and Golden Eagle Protection Act.

If additional information regarding this document is required, please contact Jason Achziger, Fishery Biologist in the Environmental Compliance Section of the U.S. Army Corps of Engineers, Walla Walla District, at (509) 527-7262, or by email at jason.k.achziger@usace.army.mil. Other correspondence can be mailed to:

Jason Achziger
Fishery Biologist
Environmental Compliance Section
U.S. Army Corps of Engineers Walla Walla District
201 North Third Ave.
Walla Walla, WA 99362

In reply, please reference Environmental Compliance Section tracking number PM-EC-2012-0210.

Jason Achziger
Fishery Biologist/Preparer
U.S. Army Corps of Engineers
Walla Walla District
Environmental Compliance Section

Benjamin Tice
Biologist/Reviewer
U.S. Army Corps of Engineers
Walla Walla District
Environmental Compliance Section

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Acronyms

ac	Acre(s)
BA	Biological Assessment
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practice
BPBC	Boise Project Board of Control
BO	Biological opinion
BOR	Bureau of Reclamation
BRWMA	Boise River Wildlife Management Area
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
Corps	U.S. Army Corps of Engineers
CRRU	Columbia River Recovery Unit
DPS	Distinct Population Segment
ESA	Endangered Species Act of 1973, as amended
FERC	Federal Energy Regulatory Commission
FMO	Feeding, Migrating, and Overwintering
HUC	Hydrologic Unit Code
IDFG	Idaho Department of Fish and Game
IDOT	Idaho Department of Transportation
IDPR	Idaho Department of Parks and Recreation
km^2	Square Kilometer(s)
LPSP	Lucky Peak State Park
mi	Mile/Miles
mi^2	Square Mile(s)
MPG	Major Population Group
MPI	Matrix of Pathways and Indicators
NMFS	National Marine Fishery Service
NRM	Natural Resource Manager
OHWM	Ordinary High Water Mark
ORV	Off-Road Vehicle
PAH	Poly-cyclic Aromatic Hydrocarbons
PL	Public Law
Project	Walla Walla District's Operating Project: Lucky Peak Lake and Dam
RM	River Mile
Services	National Marine Fisheries Service and U.S. Fish and Wildlife Service
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WRDA	Water Resources Development Act
yr	Year(s)

1. Federal Action

1.1. Introduction

The U.S. Army Corps of Engineers (Corps) proposes to continue its Natural Resource Management Activities at Lucky Peak Dam and Lake in Ada, Boise, and Elmore counties on the Boise River near Boise Idaho.

1.2. Background/History

1.2.1. Lucky Peak Background

Lucky Peak was authorized by the Flood Control Act of 1946. Construction of Lucky Peak Dam began in 1949. It was dedicated June 23, 1955.

1.2.1.1. Project

The project includes the dam, Lucky Peak Lake, federally owned lands managed by the Corps, and operational and recreational facilities. The project provides flood control, fish and wildlife habitat, irrigation and recreation. Since 1961, $1,895,765,000 in potential flood damages have been prevented.

1.2.1.2. Lucky Peak Dam

The dam is a rolled earth and gravel fill dam with an impervious core about 250 feet above the streambed and 1,700 feet long at the crest, with a top elevation of 3,078 feet (ft) mean sea level (msl). The dam is located at river mile (RM) 63.5 on the Boise River. The spillway, located on the left abutment, has a 600-foot long, free-overflow concrete ogee crest with a crest elevation of 3,060 msl and a design capacity of 93,300 cfs. The outlet works, located in the left abutment, consist of a 23 foot diameter tunnel with six slide gates and one hollow jet valve. There are two 10-foot by 23-foot Broome-type emergency gates located in the intake tower.

1.2.1.3. Reservoir (Lucky Peak Lake)

Upstream of Lucky Peak Dam is a storage reservoir, Lucky Peak Lake. The lake, at normal full pool is 12 miles long. Flood storage is at 3,060 msl, normal operating pool is at 3,055 msl, minimum operating pool is at 2,905 msl, and the Boise River is at 2,8,24 msl.

It has 45 miles of shoreline and 3,019 acres of surface area at normal operating pool, with 820 surface acres at minimum operating pool. The reservoir provides a total storage capacity of 306,000 acre-feet at pool elevation 3,060 msl. The lake also includes approximately 4.5 miles of Moores Creek.

In normal water years, Lucky Peak Reservoir is kept nearly full from Memorial Day to Labor Day to provide for recreation. However, the Bureau of Reclamation controls the water storage in Lucky Peak, and stores water as high in the river system as possible, and this means that Arrowrock Reservoir's end-of-season volume may be more than the conservation pool, especially during years of above-average runoff. After Labor Day, Lucky Peak provides water to meet irrigation demands while Arrowrock Reservoir begins to refill (BOR 2004).

1.2.1.4. Generators

A license to construct and operate power facilities at the dam was issued by the Federal Energy Regulatory Commission to the Boise Project Board of Control, a non-federal interest, on June 10, 1980. The powerhouse facility includes a visitor center, reconstruction of the outlet and construction of a second outlet, and the mitigation and enhancement of recreation and operation facilities. The power-production project was dedicated on Oct. 7, 1988. Seattle City Light, under an agreement with the Boise Project Board of Control, operates and maintains the power facility. The three generators are capable of producing a total of 101.25 megawatts of electricity.

1.2.1.5. Lands

There are 4,288 acres of public lands surrounding Lucky Peak Lake. These include fee lands that are federally owned and managed by the Corps, as well as easement lands to which the Corps has specific rights or easements (i.e., flowage or access). There are 4,079 acres of Corps-managed lands that are used for public recreation, wildlife habitat and operation purposes. The state of Idaho operates Lucky Peak State Park at three locations on Lucky Peak Lake. Other recreation areas are operated by the Corps.

The project is in the center of the most important mule deer habitat in Idaho. The dam and its facilities lie within Idaho Department of Fish and Game's (IDFG) Boise River Wildlife Management Area (BRWMA), the major game range in the state. The State of Idaho has developed wildlife habitat especially for mule deer on project lands. The bald eagle also is often present at the site. Other wildlife species common to the project include raptors, upland game birds, songbirds, and small mammals. These species help meet regional desires for hunting and wildlife viewing. Project lands classified Wildlife Management that are licensed to IDFG consist of extensive acreages comprised primarily of grass and shrub-type habitats. These lands are particularly productive and sensitive environments. The USACE has a stewardship responsibility for these areas that transcends management agreements with the licensee, and will use its resources and professional expertise to preserve and protect these areas as productive areas for both consumptive and non-consumptive wildlife.

Lucky Peak Lake is a popular recreation area. The Lucky Peak State Park units are the most visited state parks in the state. The existing recreation facilities at Lucky Peak sites help meet the recreation (especially water recreation) needs of the four-county area. Corps recreation facilities at Lucky Peak Lake consist of 20 day-use areas, four boat launch ramps and three swimming areas. The fiscal year 2011 visitation to Lucky Peak Lake was 789,810 people.

The Lucky Peak Master Plan (USACE 1988) outlines the land use classifications (Table 1, Figure 1). The land use classifications are:

Project Operations

These are lands allocated to provide for the safe, efficient, and continuing operation of the project for flood control, irrigation, and power generation. At Lucky Peak, the dam, outlet works, second outlet works, Boise Project Board of Control (BPBC) powerhouse, project administration office, levee at Barclay Bay, and the quarry near Lucky Peak nursery are in this category. Low-density recreation and wildlife habitat management activities are permitted when they are not in conflict with basic project requirements.

Recreation

Intensive (high-density) recreation use areas are defined as lands on which facilities have been or will be provided to accommodate the recreation needs of visitors in concentrated numbers, together with such adjacent or associated lands without facilities as may be required for open space purposes to make a whole compatible recreation unit. Facilities usually include, but are not limited to, access roads, utilities (water, electric, sewer), restrooms, picnicking, swimming, and boat launching and handling facilities. Uses that are not permitted on intensive-use recreation areas include non-compatible manmade intrusions (i.e., pumping plants, underground or exposed pipelines or cables, overhead transmission lines, nonproject roads, dredging, and filling operations. Exceptions may be made where necessary to serve a demonstrated public need in those instances where no reasonable alternative is available. Measures leading to habitat improvement for the benefit of wildlife may be performed on intensive-use recreation lands insofar as such habitat improvements are compatible with recreation uses.

Multiple Resource Management

Recreation Low-Density. These lands are designated for dispersed or low-impact recreation use. The development of facilities and automobile access to these lands are limited. The emphasis is on providing opportunities for, but is not limited to, picnicking, fishing, hunting, bird watching, ecological workshops and forums, hiking, bicycling, primitive camping, or similar low-density activities. Limited facilities (i.e., benches, tables, sun shelters, vault toilets, and waste receptacles) will be allowed. Utilities (i.e., electricity, water, and sewer) will usually not be provided for these facilities in low-density areas. All such facilities will be in harmony with the natural surroundings so as not to be intrusive to the environment. Landscape development or restoration, when necessary, will utilize plants native or naturalized to the area. Manmade intrusions (i.e., pumping plants, pipelines, transmission lines, non-project roads, dredging, and filling operations) will be permitted with appropriate controls, as necessary to minimize the adverse impact to wildlife and visual or other natural characteristics of the areas. These lands also provide open space between intensive recreation lands and incompatible land uses either on or adjacent to the project. No agricultural uses are permitted on these lands, except when it would be favorable to wildlife and compatible with low-density recreation. Measures leading to wildlife habitat improvement will be a management objective.

Wildlife Management General. Lands classified wildlife management is for the development and management of habitat for wildlife species. Most of these lands are administered under license to IDFG. Licenses, permits, or easements will not be issued on wildlife lands for manmade intrusions (i.e., pumping plants, underground or exposed pipelines or cables, overhead transmission lines, non-project roads, or dredging or filling operations). Exceptions may be made where necessary to serve a demonstrated public need in those instances where no reasonable alternative is available. Such outgrants will include appropriate controls required to preclude or minimize adverse impacts relative to wildlife and visual or other natural characteristics of the areas. Wildlife management lands will be available for low-density recreation activities (i.e., hiking, picnicking, hunting, fishing, nature study, photography, bird watching, and other similar activities).

Easement Lands

The Corps has the right to flood these lands, if necessary for project purposes. These are located on Bureau of Reclamation (BOR) lands just below Arrowrock Dam and downstream of Lydle Gulch, as well as on Idaho Department of Transportation (IDOT) lands between the dam and Sheep Creek and north of Mores Creek Bridge along Highway 21.

License Lands

The Corps acquired a license entitled *Agreement to Occupy and Use Land* from the State of Idaho on tract A-9-L. The tract of land occupies the Discovery Unit of Lucky Peak State Park (LPSP). The Corps has the license "for the purpose of construction, repair, and maintenance" of the shoreline protection (riprap). The riprap protects the tract from projected shore erosion, which could be caused by the outlet waters from Lucky Peak Lake.

Interchange Lands

Approximately 557 acres of Boise National Forest lands within the project boundary were retained under the administrative jurisdiction of the U.S. Forest Service (USFS) when Lucky Peak lands were originally acquired. The 557 acres lie from the old Boise River channel to the project boundary. Approximately 100 acres are below the normal pool elevation 3,055. A Memorandum of Understanding between USFS and the Corps gave the Corps administrative management and control over these lands until the final process was complete, as required by Public Law 84- 804. The lands previously outgranted to USFS for the Lucky Peak nursery were transferred to USFS through the land interchange.

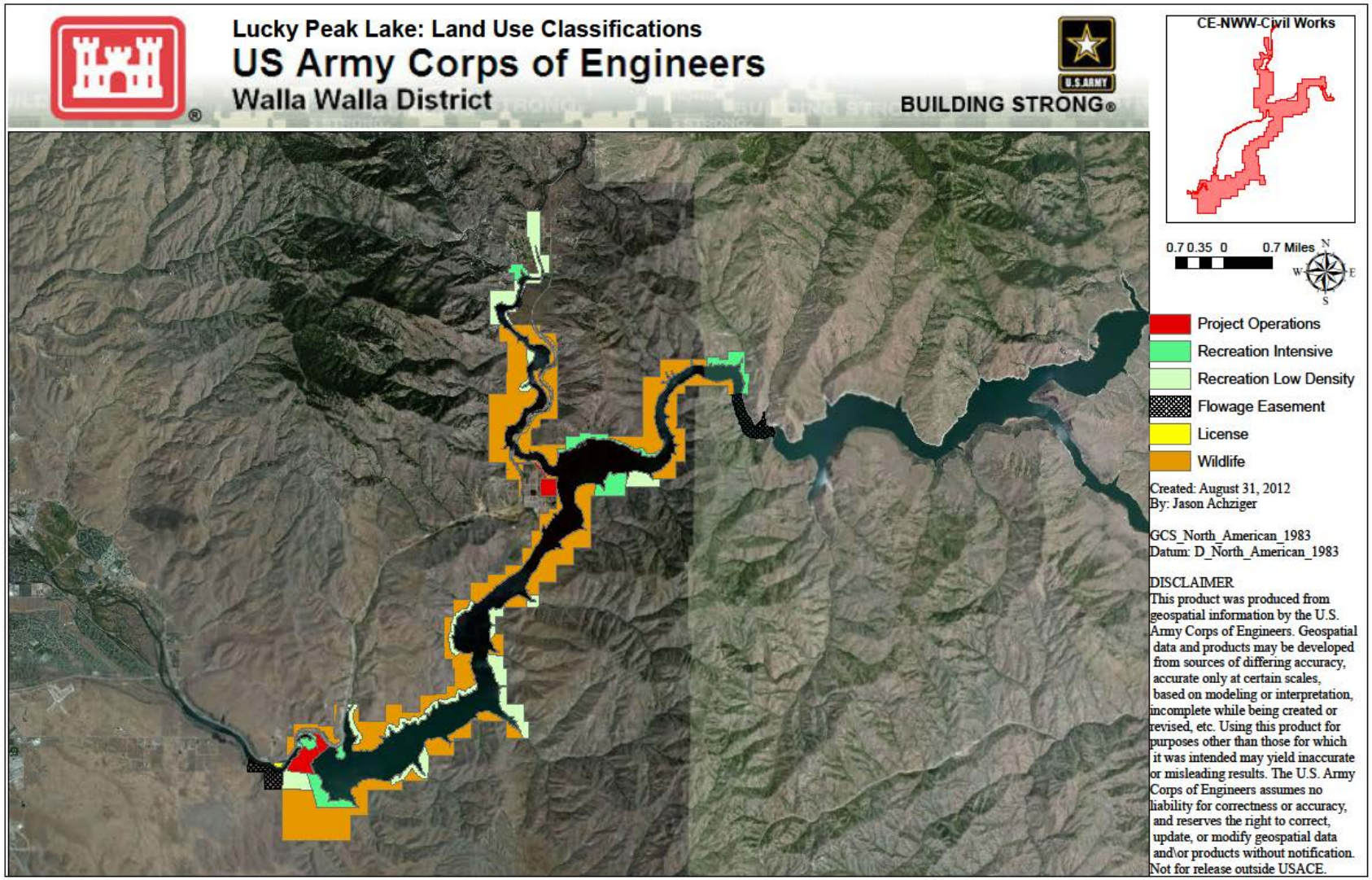
1.2.1.6. People

Less than 10 full-time Walla Walla District employees work at Lucky Peak Dam and Lake. They serve as park rangers, natural resource specialists, administrative staff, and maintenance workers. Temporary employees augment the staff during high-visitation months. Together, they manage the safe and continuous operation of the dam and its facilities. The staff also manages a volunteer program to help maintain and make improvements to Lucky Peak Lake’s numerous public recreation facilities.

Table 1 Land use classification acreages.

Management Unit	Management Unit Acres	Land Use Classification Acres
PROJECT OPERATIONS		**140.7**
Lucky Peak Dam	97.9	
Quarry	42.8	
RECREATION		**385.9**
Sandy Point Unit, LPSP	23.5	
Barclay Bay-Turner Gulch	76	
Viewpoint	11.1	
Sheep Creek	29.9	
Chimney Rock	77.6	
Spring Shores Unit, LPSP	68.3	
Robie Creek	26.9	
Macks Creek	72.6	
MULTIPLE RESOURCE MANAGEMENT		**3,549.30**
Recreation-Low Density		
Lydle Gulch	60.8	
Pipeline Gulch	55.2	
Deer Flat	77.9	
Charcoal	128	
Placer Point	29.8	
Birch Creek	18.9	
Goose Neck Bay	36.6	
Browns Gulch	56.6	
Dead Dog Creek	14.3	
Turnaround Point	12.1	
South Robie Creek	71.6	
Mores Creek	123.1	
Wildlife Management General		
IDFG West	1,101.00	
IDFG East	1,222.50	
IFG North	540.9	
LANDS FULLY ADMINISTERED BY THE COPRS		**4075.9**
EASEMENT LANDS		**105.6**
Boise River	63.2	
Below Arrowrock Dam	9.1	
State Highway 21	33.3	
TOTAL LUCKY PEAK PROJECT LANDS		**4181.5**

Figure 1 Lucky Peak Land Use Classifications.



1.2.2. Documentation of Relevant Correspondence

Email correspondence between Jason Achziger (Corps Fishery Biologist) and Mark Robertson (USFWS) concerning this consultation began with preliminary information gathering in May 2012. Further email correspondence occurred in August 2012, and a site visit was held at Lucky Peak on September 18, 2012.

1.2.3. Federal Action History

The powerplant at Lucky Peak Dam is owned by the BPBC and operated by Seattle City Light, and any potential effects of that operation should be considered through the Federal Energy Regulatory Commission (FERC) license (non-Corps).

Bureau of Reclamation's (BOR) Operations and Maintenance in the Snake River Basin Above Brownlee Reservoir includes Lucky Peak Dam and "Reservoir." According to the biological opinion (BO) for the "Bureau of Reclamation Operations and Maintenance in the Snake River Basin Above Brownlee Reservoir" (USFWS 2005), BOR's BA (BOR 2004) "described Reclamation's proposed action for operation and routine maintenance activities at the Minidoka Project in Wyoming and Idaho; the Boise, Lucky Peak, Little Wood River, Mann Creek, Michaud Flats, Palisades, and Ririe Projects in Idaho; and the Baker, Burnt River, Owyhee, and Vale Projects in Oregon." It also states that "[t]he proposed action includes the storage in and release of water from Anderson Ranch Dam and Reservoir, Arrowrock Dam and Reservoir, Lucky Peak Dam and Reservoir, and the Deer Flat Dams and Lake Lowell."

As such, water control of Lucky Peak Lake was covered by the BOR's action, and subsequent BO. This consultation considers the potential effects from the Corps' natural resource management activities to ESA-listed species on Corps lands at Lucky Peak.

1.3. Authority

Lucky Peak Dam on the Boise River was authorized by Public Law 526 during the 79th Congress, on July 24, 1946 (i.e. the Flood Control Act of 1946). It was dedicated on June 23, 1955 and reached full pool two days later.

1.4. Action Area

The action area, as defined by 50 CFR 402.02, includes all areas to be affected directly or indirectly by the federal action. The immediate area involved in the action includes Lucky Peak Lake and the surrounding Corps owned lands where potential effects of the proposed action are detectable or reasonably certain to occur.

The Corps expects potential effects to occur in the immediate vicinity of natural resource management activities, or immediately downstream of those activities, but confined to Lucky

Peak Lake or Mores Creek[1] in areas adjacent to Corps lands. The action area is within portions of Ada, Boise and Elmore counties in Idaho (Figure 2).

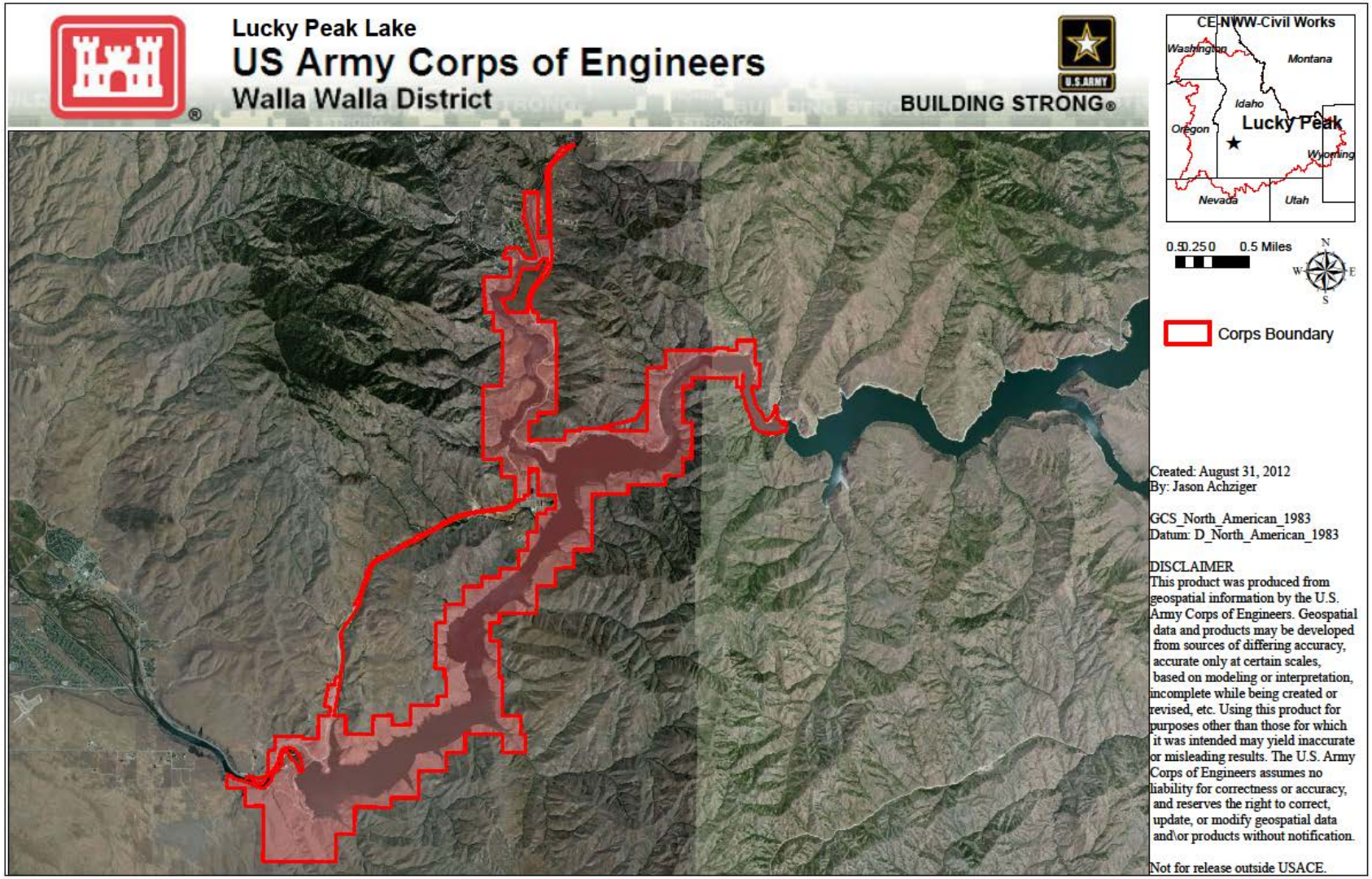
The lands covered by this BA include part of the Boise-Mores U.S. Geological Survey (USGS) 8 digit Hydrological Unit Codes (HUC4) (HUC number 17050112) and the Lower Boise River (HUC number 17050114). The 10 digit HUCs (HUC5) are:

- **17050112 - Boise-Mores**
  - 1705011204 Lower Mores Creek
  - 1705011206 Boise River-Lucky Peak Reservoir
- **17050114 - Lower Boise**
  - 1705011401 Lower Boise River

Lucky Peak is about 7.9 mi east of the City of Boise, Idaho. Beginning approximately 0.5 mi downstream of Lucky Peak Dam (RM 63.5) on the Boise River upstream to Arrowrock Dam (RM 74), approximately 10.5 mi. The Mores Creek arm of Lucky Peak Lake extends upstream 5.5 mi from its confluence with the Boise River.

[1] Mores Creek Park, Robie Creek Park, and the Robie Creek segment are slightly above the inundation area.

Figure 2 Action area.



1.5. Project Purpose and Objectives

The purpose of the proposed action is to continue to perform natural resource management activities at Lucky Peak Dam and Lake.
Add maps

1.6. Project Description

In order to describe the Lucky Peak natural resources management, the Corps has defined the following management categories, or "activities."

- Recreation Management
- Access Management
- Boundary Management
- Fire Prevention
- Road Management
- Wildlife Habitat Management
- Bank Stabilization
- Planting
- Partnering with Others

Each activity has specific goals and objectives that are designed to meet the purposes of the Lucky Peak mission, as outlined in the Operation Management Plan.

Manual and mechanical, biological, and chemical treatment of vegetation is conducted under the Corps' Pest Management Program. Concurrence for the Program was issued by USFWS on August 9, 2012 (01EIFWOO-2012-I-0405).

For the purposes of analysis of potential effects, the management activities can be further broken down into management activity "elements." Activities and their associated activity elements are listed in Table 2.

Table 2 Lucky Peak programmatic activity elements.

Lucky Peak Programmatic Activity Elements
Recreation Management
Camping and Day-use Areas
Trails
Culvert Installation, Maintenance, and Repair
Access Management
Gate and/or Barricade Installations
Gate and/or Barricade Modifications
Gate and/or Barricade Refurbishing
Sign Installation/Maintenance
Fence Repair and Maintenance
Fence Removal
Boulder Lining of Roadways
Boundary Management
Boundary Monument Installation
Fire Prevention
Along Roads and Parking Areas
Camping and Day-use Areas
Road Management
Road Reconstruction
Road Maintenance
Culvert Installation, Maintenance, and Repair
Wildlife Habitat Management
IDFG BRWMA
HMU
Nest Boxes and Feeders
Interpretation
Bank Stabilization
Bank Sloping
Planting
Wildlife Habitat
Recreation Areas
Bank Stabilization

Management activities at Lucky Peak are very interrelated. Activity elements have been identified for each management activity based on what activity an element falls into the majority of the time. However, any of the activity elements may occur as part of other management activities from time to time. For example, road management activities will occur as part of routine road management, but will also occur as part of recreation management, access management, and may even occur as part of planting.

For illustration purposes, and to help demonstrate the interrelated nature of activity elements, an "X" has been placed in a box in Table 3 for each activity element (shown in the left column) that

may occur as part of a given management activity (Recreation, Access, Boundary, Fire, Road, Wildlife, Bank Stabilization, Planting).

Table 3 Management activities versus activity elements.

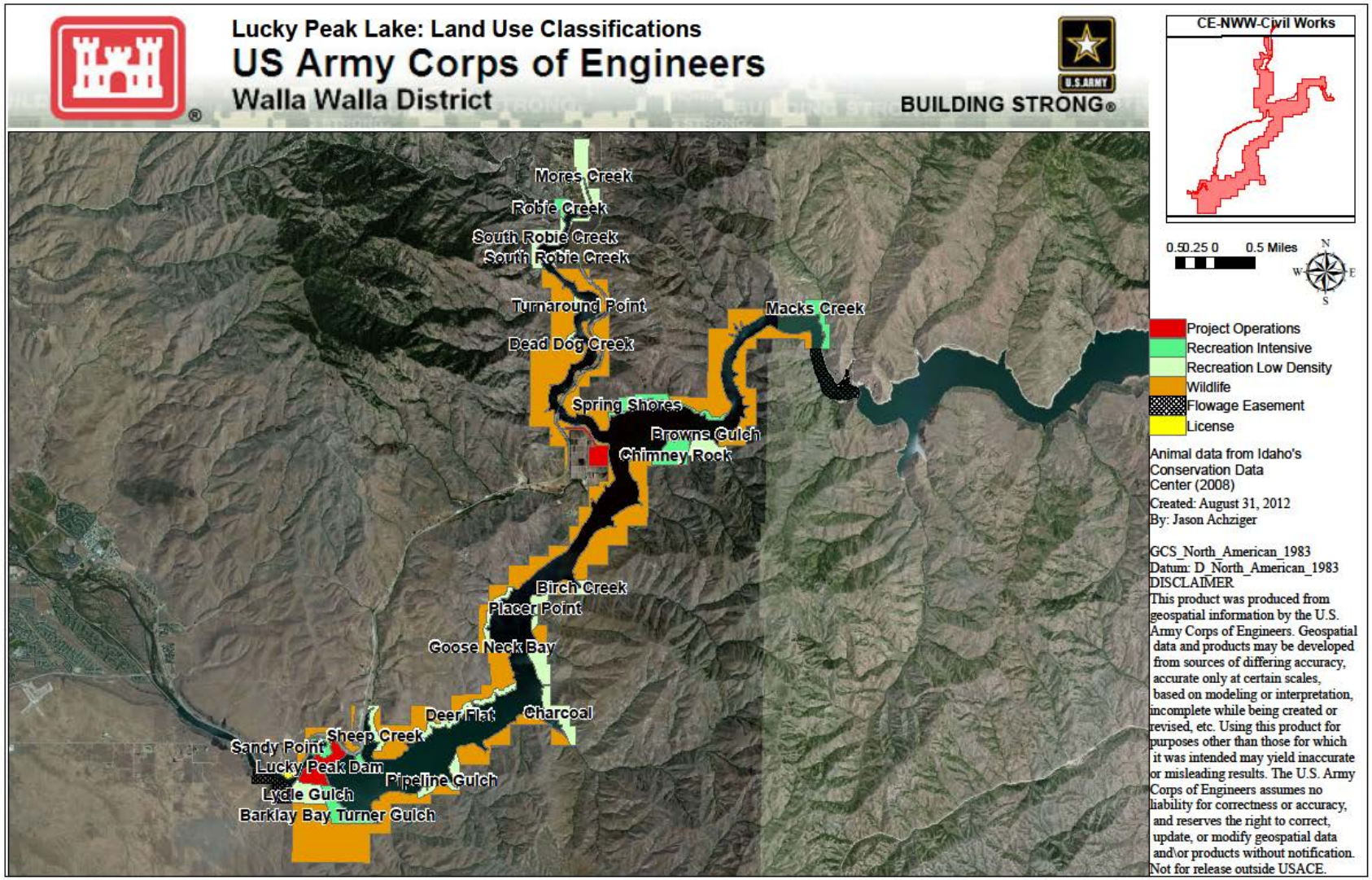
Management Activity								
Activity Element	**Recreation**	**Access**	**Boundary**	**Fire**	**Road**	**Wildlife**	**Bank Stabilization**	**Planting**
Recreation Management in Camping and Day-use Areas	X	X	X	X	X		X	X
Trails	X	X		X	X	X	X	X
Culvert Installation, Maintenance, and Repair	X				X			
Gates	X	X				X		
Signs	X	X	X			X	X	
Fences		X	X				X	X
Boulder Lining Along Roadways	X	X	X		X			
Monumentation			X					
Fire Prevention Along Roads and Parking Areas				X				
Fire Prevention in Camping and Day-use Areas	X			X				
Road Reconstruction	X	X		X	X	X	X	X
Road Maintenance	X	X		X	X	X	X	X
Culvert Installation, Maintenance, and Repair	X	X		X	X	X	X	X
IDFG BRWMA		X	X			X		
HMU		X				X		X
Nest Boxes and Feeders	X				X	X		X
Interpretation	X					X		
Bank Sloping	X				X		X	X
Planting	X	X			X	X	X	X

1.6.1. Recreation Management

There are 20 management units, totaling 1,074 acres that are classified Recreation Intensive Use and Recreation Low Density (Table 1). Recreation facilities at Lucky Peak (Figure 3) (see Appendix A for individual maps) help meet the regional need for recreation within the area. Maintenance, enhancement, and limited expansion of recreation facilities at Lucky Peak Lake will help meet these needs.

The intensive and low-density recreation lands are presently managed by the Corps, with the exception of Sandy Point and Spring Shores, which are managed by IDPR as units of LPSP.

Figure 3 Lucky Peak recreation areas.



1.6.1.1. Camping and Day-use Areas

Recreation areas at Lucky Peak are can be accessed either by existing roads (i.e. Macks Creek) or by boat. In some instances, the sites are accessible only by boat (i.e. Chimney Rock). Each of the recreation areas at Lucky Peak have similar amenities. These are henceforth collectively referred to as "sun shelters", and typically include each of the following (Photo 1):

- Concrete slab
- Sun shelter
- Fire pit
- Picnic table
- Dock and dock "anchor"

Photo 1 Sun shelter in Chimney Rock.

The docks at Lucky Peak are owned by Ada County. Each dock strings typically consists of several docks linked together, a shore and end anchors (often pylons and weights, respectively). The docks are left in year-round, and are out of the water when the lake is drawn down.

The abutment to the dock is the part of the site that may be installed, removed, or maintained by the Corps. They were historically installed using old guard rails, railroad ties, or similar materials that would have been on-hand at the time.

The Corps is proposing to consolidate some of the remote sites into existing developed sites. This makes management easier, as well as maintenance. The Corps will decommission some of the old sites by removing the sun shelters and moving them to areas such as Chimney Rock, where there is available space behind other sun shelters.

Some remote areas are already closed due to safety concerns with the dock anchors or retaining walls (Photo 2). The anchors or walls at these sites will be removed, but likely will require work during periods when the lake is at normal operating pool in order to reach the sites with equipment.

Photo 2 Sun shelter to be decommissioned.

1.6.1.2. Trails

Access to Lucky Peak Lake includes a complex system of roads and trails that serve both project operations and the public. There are also hiking and wildlife viewing trails in different areas around the lake where the topography allows. Most hiking trails provide access to the lake;

however, drawdowns create exposed banks that are difficult to negotiate in most areas. See Appendix A for maps of the various areas showing trails.

Recreation trails are important outdoor recreation facilities at Lucky Peak. Walking, jogging, and bicycling are all popular activities along the reservoir. Full-size vehicles are currently permitted only on designated roads within Corps project boundaries. Each boat-in recreation area also typically has trails that lead from the dock to sun shelters. Other recreation areas, accessible by road, have trails that lead from parking areas to the sun shelters and docks.

Any unauthorized trails will be considered an encroachment or trespass, and will be closed until such time as the trail may be evaluated for its potential to become a designated trail. Any trail designated on Lucky Peak lands will not be reserved for exclusive use, and must be open to general public access.

There is the potential for new dirt trails to be created on a limited basis. For example, there is some local interest in a recreation bike trail (with partnering) from Turner Gulch to Chimney Rock along the southern shore of the lake.

1.6.1.3. Culvert Installation, Maintenance, and Repair

These structures are for the purposes of reducing washouts and erosion of trails. They may include the installation of culverts similar to those used for roads, but smaller, and on intermittent stream crossings along recreation trails or in recreation areas such as Chimney Rock. These may be required for future trails along the lake, and would be installed in order to stabilize the trail.

1.6.2. Access Management

Access to Lucky Peak managed lands is controlled by signage, gates, barricades, other physical barriers, fences, and boundary management. Access Management activities may occur throughout Corps-managed lands at Lucky Peak.

Access management is also important for ensuring access for fire management. This would include building and installing access control structures (gates and barricades) as well as posting the area fire danger ratings and the associated restrictions.

1.6.2.1. Gates

Gates are located at various locations on the boundary of the Corps' property, as well as within project lands. The primary purpose of the gates is to keep vehicles out of lands not open to vehicle use, but they also provide security in places.

1.6.2.1.1. Gates/ Barricade Installation

The Corps proposes to install gates as needed, based on the needs and judgment of the NRMs. This will occur in previously disturbed areas using either equipment or hand tools. Gates will be placed into a hole dug with hand tools or machinery (e.g. a backhoe or a Dingo) (Photo 3). Dirt will be tamped in place around the gate, and the hole will likely be filled with concrete to set the gate in position.

1.6.2.1.2. Gates/ Barricade Modification

The Corps proposes to modify gates as needed, based on the needs and judgment of the NRMs. This will include routine repairs that would not warrant replacing the entire gate (i.e. welding on a wing).

1.6.2.1.3. Gates/ Barricade Refurbishing

The Corps proposes to refurbish gates as needed, based on the needs and judgment of the NRMs. This will also include routine activities incidental to modifying or replacing the gate (e.g. sanding, painting, and hanging signs).

Photo 3 Dingo with auger digging hole for a post.

1.6.2.1.4. Sign Installation/Maintenance

Direction and control of visitors to and within public-use areas depends partly on a coherent and ordered signage system. Signs must communicate direction, information, and regulation messages effectively, while remaining compatible with the surrounding environment. Federally adopted symbols used for both recreation and traffic control should be incorporated into the signage system. Project signs will be in accordance with the criteria prescribed in Engineer Pamphlet 310-1-6a and b, *USACE Sign Standards Manual*, and other applicable regulations.

The Corps proposes to install or maintain signs as needed, based on the needs and judgment of the NRMs. This includes digging a posthole with hand tools or an auger up to 42 inches (in) deep, and placing the post. Post placement will be accomplished through tamping dirt, and may include filling the hole with concrete to prevent the post from falling, or being removed.

The NRMs at Lucky Peak have taken the philosophy that more, repetitive signs are not better, and have reduced signage in many areas by consolidating many signs into one strategically located location. This allows for enforcement, but does not take away from the recreation experience, and also reduces overall footprint and ground disturbance. Consolidation of signs and a reduction in number in recreation areas will continue throughout Lucky Peak.

1.6.2.2. Fences

The project boundary incorporates many miles of fencing, with some additional fencing located inside the project to provide security, guidance, and barriers. Due to the rough terrain, fencing the entire project would not be cost effective. The boundary fence is incomplete. Much of the existing boundary fence is old 5-strand, and is in need of repair, but some is still in good shape.

Additionally, some fence exists between the Corps boundary and the Idaho Department of Fish and Game's (IDFG) BRWMA. Much of this fence is old 5-strand fence, and creates a barrier to wildlife movement between IDFG lands, and "Wildlife General" lands classified under Lucky Peak's Master Plan (USACE 1988), which is licensed to IDFG as part of the BRWMA. IDFG and the Corps are working to identify fencing to be removed to improve wildlife movement across the BRWMA. This fence also creates a confusing boundary for hunters and recreationalists, as ownership and changing rules from one side to the other is unclear.

Inventory of existing and abandoned fences is ongoing, and numbers and locations of existing fences, both in use, and abandoned, will be updated as the inventory progresses.

1.6.2.2.1. Fence Repair/Maintenance

The Corps proposes to repair or maintain fences as needed, based on the needs and judgment of the NRMs. Specific areas of continuing repair include areas along the Lucky Peak boundary with Bureau of Land Management (BLM) because of some of the off-road vehicle (ORV) usage occurring on BLM lands that could spill over onto Corps lands. This area also needs to be repaired from time to time to prevent cattle encroachments

This will primarily include replacing metal t-posts (or wooden posts in some areas). Because of the types of fencing used at Lucky Peak, and the type of terrain and soils, fencing is installed primarily with hand tools. An auger attachment on a Dingo may be used when the soils are dry and difficult to dig in.

1.6.2.2.2. Fence Removal

The Corps proposes to remove much of the fence between Lucky Peak lands and IDFG lands in the BRWMA. This will be done in steep terrain with hand tools or a Dingo. Other areas of fence removal will be incidental to normal fence repair/maintenance. A backhoe could be used for removal in those areas with road access.

1.6.2.3. Boulder Lining Along Roadways

The Corps lines many roadways and parking lots with large boulders for access control. This is done as an alternative to fencing or gate installation in many areas, as it has less ground disturbance, and has less of an impact on the recreation experience for visitors.

1.6.3. Boundary Management

The monumentation on the Lucky Peak boundary serves both the project and the public by identifying Corps lands. However, despite the monumentation, encroachment problems exist.

The Corps will inspect the project boundary when funding and staffing are feasible to insure that all boundary survey markers are properly maintained and that project lands are free of encroachments or other unauthorized use. Inventorying of existing boundary monumentation is ongoing, and numbers and locations of existing monuments will be updated as the inventory progresses.

1.6.3.1. Boundary Monumentation

The purpose for surveying, marking, and posting the Corps boundary is to prevent unintentional trespass and other unauthorized uses of government property by visually identifying property ownership. Lack of identified markings allows for encroachment issues, and until there is a legally recognized boundary in adherence with federal and state cadastral laws and regulations, the Corps will have a hard time defending any enforcement actions.

The following paragraph describes the common activities associated when a boundary survey occurs:

A land surveyor uses a GPS to create control points to establish a known location. When the locations of the control points have been determined to a suitable level of accuracy, the surveyor then executes a traverse by using the path of least resistance between two points. For example, the surveyor will use existing roads that parallel the boundary. The surveyor will then set up a tripod with a total station to measure the distance between set-ups. The surveyor then continues to measure these distances until reaching the other control point. The surveyor gets from point A to B on foot or by an ORV on an established road or trail. After calculating the position of the true boundary line, the surveyor then brushes out a true line, sets the monumentation in accordance with the BLM's Manual of Surveying Instructions, and drives aluminum posts in the ground within a visible interval or at a maximum of 200 feet between boundary posts. All work is accomplished with the use of hand tools. No motorized equipment is used in this process. The monumentation is usually set in a hole approximately two feet deep by eight inches in diameter. These holes are dug with the use of hand tools such as shovels, bars, and clamshell shovels.

Vegetation is cleared and maintained in a 3 ft radius of the monument locations.

1.6.4. Fire Prevention

Because of the dry climate around Lucky Peak, the extreme fire danger during the recreation season, and the numbers of people that visit Lucky Peak annually, the Corps must try to reduce the potential for wildfire on Corps lands at Lucky Peak.

1.6.4.1. Along Roads and Parking Areas

A strip of vegetation on each side of motorized access roads is maintained to prevent accidental wildfire from hot vehicle exhaust, parked vehicles, cigarettes, dragging trailer safety chains, etc. This is ideally accomplished by herbicide application. Manual and mechanical, biological, and chemical treatment of vegetation is conducted under the Corps' Pest Management Program. Concurrence for the Program was issued by USFWS on August 9, 2012 (01EIFWOO-2012-I-0405).

1.6.4.2. Camping and Day-use Areas

Fire prevention work in camping and day-use areas involves using a weed whip to clean and remove organic materials from around fire grills, sun shelters, picnic tables, and trails to docks and restrooms.

1.6.5. Road Management

Highways in the vicinity of Lucky Peak are maintained by the counties (Figure 4). Paved roads in the area are stabilized, and existing culverts seem to be functioning properly.

The Corps has paved roads in many areas (see Appendix A), such as across the dam, Barklay Bay, Turner Gulch, Macks Creek, etc. Dirt roads managed by the Corps are limited to the roads from Sandy Point to Lydle Gulch, Lydle Gulch, and Deer Flat.

1.6.5.1. Roads

The road management program primarily focuses on the maintenance of existing roads and associated drainage structures. However, road management activities will also be implemented as part of Recreation, Access, Fire, Wildlife, Bank Stabilization, and Planting activities. Work will require the use of existing primitive, gravel, and paved surface roads. Existing roads and historic roadbeds will be utilized during the proposed projects to the maximum extent possible.

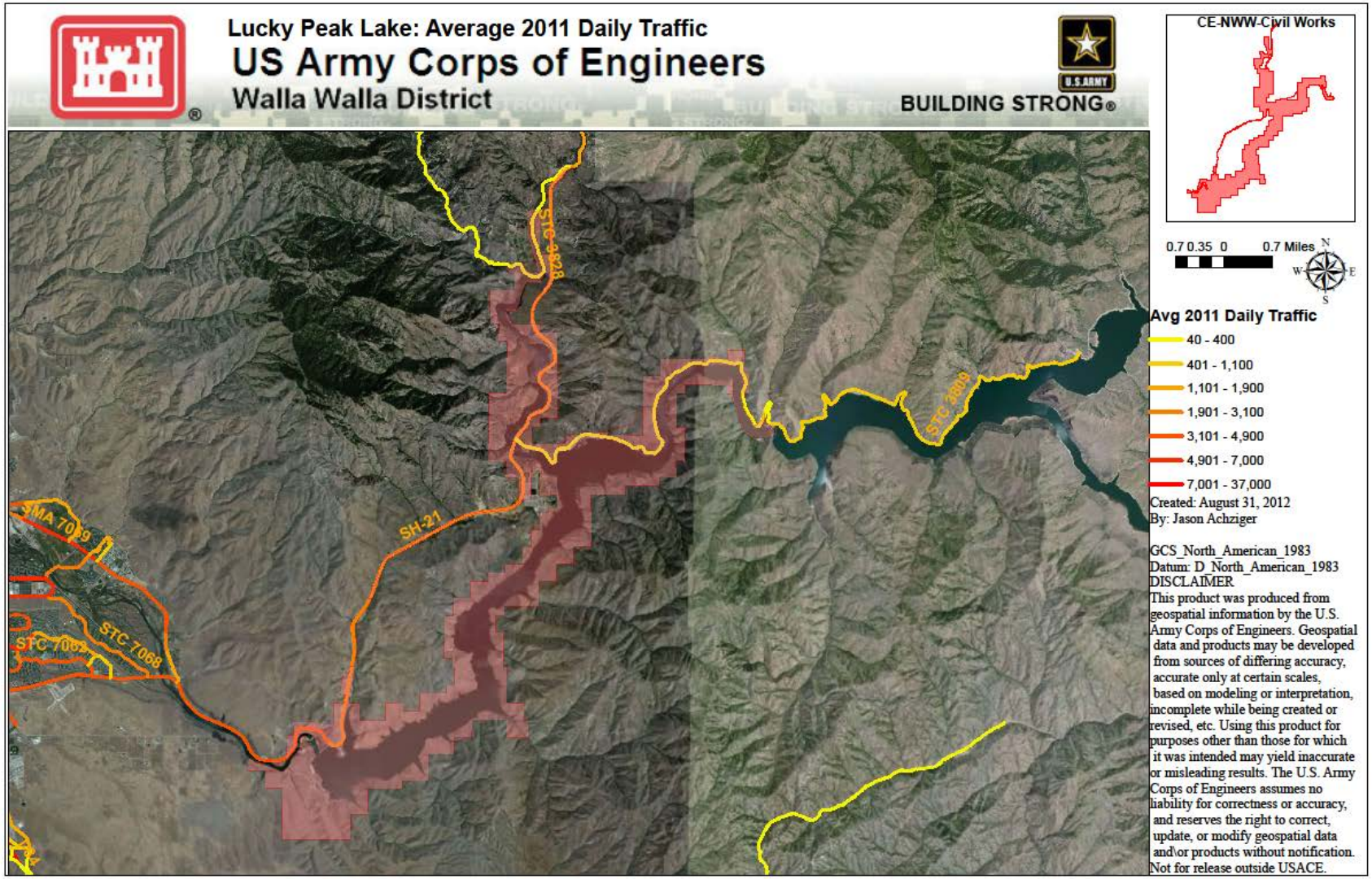
1.6.5.1.1. Road Maintenance

Road maintenance work includes adding gravel, blading, brushing, and ditch and culvert clean-out. It also includes maintenance of the road's associated ditches and other surface drainage, and may include placing a new layer of crushed gravel. This will likely be limited to the dirt roads (i.e., Lydle Gulch, Deer Creek).

1.6.5.2. Culvert Installation, Maintenance, and Repair

These structures are for the purposes of reducing washouts and erosion of roads. They may include the installation of culverts similar to those used for trails, but larger, and on intermittent stream crossings along the Lake or in recreation areas such as Turner Gulch.

Figure 4 Highways in the area of Lucky Peak, and associated average daily traffic in 2011.



1.6.6. Wildlife Habitat Management

Wildlife habitat management on Lucky Peak project lands is accomplished by both IDFG and the Corps. Approximately 2,058 acres of project lands are licensed to IDFG, while the remaining lands classified as "wildlife."

Units managed by the Corps are integrated with the recreation management units. Wildlife developments on recreation units will be managed so as to not adversely affect the ability of the units to provide recreation objectives. These lands will be managed primarily to protect and maintain mule deer winter range and to provide habitat for upland game birds and non-game species.

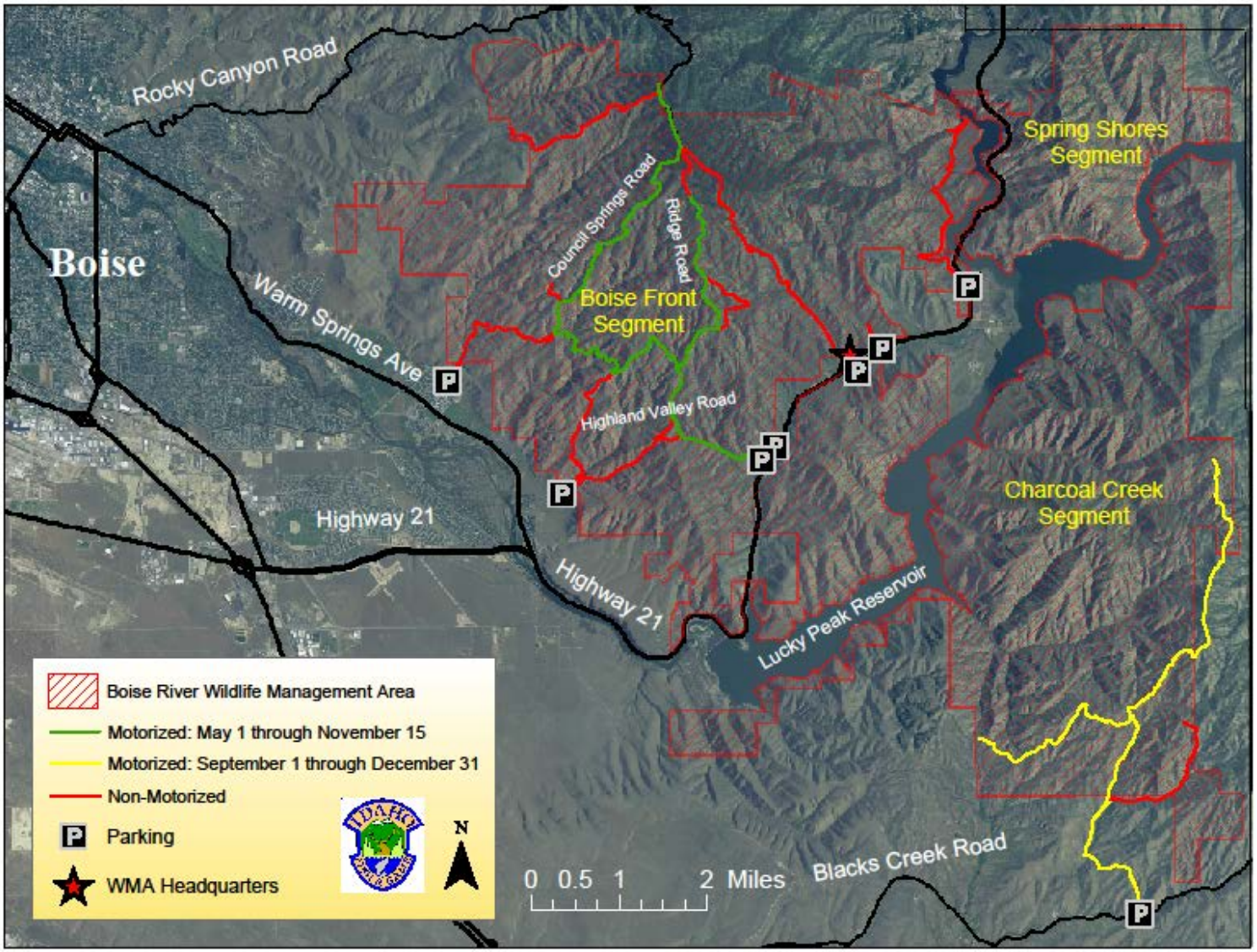
See Appendix B for the current inventory of wildlife species at Lucky Peak[2].

1.6.6.1. IDFG BRWMA

Portions of Lucky Peak are within the nearly 19,000-acre BRWMA (Figure 5). The Department of the Army License (No. DACW68-3-83-10 grants the use of certain Lucky Peak Lake project lands for the purposes of development, conservation, and management of wildlife resources. Project lands classified Wildlife Management that are licensed to IDFG consist of extensive acreages comprised primarily of grass and shrub-type habitats. These lands are particularly productive and sensitive environments. The IDFG licensed lands are divided into three management units: IDFG West, IDFG East, and IDFG North. There are a total of 2,864.4 acres under the license.

[2] The current inventory of Lucky Peak species is currently unde4r revision from the 1988 Master Plan lists.

Figure 5 Boise River Wildlife Management Area (http://fishandgame.idaho.gov/public/wildlife/wma/).



1.6.6.2. HMU

The Corps has a single habitat management unit (HMU) that is managed at Chimney Rock (see Appendix A for the Chimney Rock map). The HMU is about 1 acre, is fenced, and was planted with about a dozen trees in 2010.

1.6.6.3. Nest Boxes and Feeders

Nest boxes provide nest sites for cavity-nesting birds where suitable nest sites are lacking. Bird species expected to benefit from nest boxes include bluebirds, woodpeckers, wrens, swallows, owls, and kestrels.

Nest boxes will be constructed of rough-cut lumber. Boxes will be constructed following specifications for each target bird species. Boxes will be mounted in trees or on poles where trees are lacking. Boxes will be mounted where they will receive minimum disturbance from recreationists. For example, 24 American kestrel (*Falco sparverius*) nesting boxes were built by Corps employees and volunteers (Boise State Biology graduate students, Golden Eagle Audubon Society and the Idaho Bird Observatory) in support of the American Kestrel Partnership on Saturday, September 22, 2012. The continuing partnership will install and monitor the nesting boxes around Lydle Gulch.

Game-bird feeders provide a supplemental food source for young upland game birds in late spring, summer, and early fall. A typical feeder consists of a hopper covered by an A-frame roof. Grain (i.e., wheat or barley) is loaded into the top of the hopper, and is dispensed through an opening in the bottom of the hopper. The roof protects the hopper and the loose grain from the weather, and provides cover for feeding birds.

Feeders will be placed in brushy draws that provide cover for feeding birds. Feeders will be filled with grain several times from May through November, depending on bird usage and the availability of personnel to fill feeders.

1.6.6.4. Interpretation

The Corps adds interpretive signage in recreation areas to help educate the public on the importance of wildlife, and to help explain the variety of wildlife species at Lucky Peak. An example of this will be at Lucky Peak's new disc golf course in Lydle Gulch, where the Corps has partnered with local groups to build kestrel boxes, and will add signs along trails.

1.6.7. Planting

Native plant material will be used to enhance, suggest, or maintain the character of the natural landscape. In project areas where the natural environment has been altered considerably (i.e., Spring Shores or Sandy Point), non-native plants may be used that will blend with native plants in form, line, color, and texture.

Planting will emphasize natural landforms with groupings of trees and shrubs. It should be informal, avoiding street-like linear plantings.

Manual and mechanical, biological, and chemical treatment of vegetation is conducted under the Corps' Pest Management Program. Concurrence for the Program was issued by USFWS on August 9, 2012 (01EIFWOO-2012-I-0405).

1.6.7.1. Wildlife Plantings

Wildlife planting is done as part of Wildlife Habitat Management. Tree and shrub plantings will be established to provide nesting, hiding, roosting, and thermal cover, as well as food, for birds and mammals. Plantings will be established in areas that lack this type of cover or have insufficient quantity or quality of this type of cover, as well as in areas that have sufficient moisture available from the lake, creeks, or irrigation to support tree and shrub plantings.

A typical tree and shrub planting will use potted seedlings in containers no smaller than 1 gallon, cuttings from existing cottonwoods and willows vegetation, or a combination of both. Species to be planted will be selected based on the type of plant needed (tall tree, tall shrub, low shrub, *etc*.) and the ability of the plant species to survive on the planting site. Native plant species will be used whenever possible. Trees and shrubs will be planted as close to a natural arrangement as possible. They will not be planted in straight lines in order to protect the visual resources.

Perennial food developments provide a supplemental food source for young upland game birds, as well as non-game birds and mammals. Food developments will be placed in areas that are suitable for cultivation, are accessible to farming equipment, and have sufficient moisture available (either from natural sources or irrigation). Food developments will be planted with a perennial grain that produces a large seed crop and is adapted to the Lucky Peak project environment.

1.6.7.2. Reseeding/Site Restoration

Noxious vegetation in the District is typically found in areas containing native vegetation. As such, completely clearing a site of vegetation would not normally occur. If a site were to be cleared for some reason, replanting would occur to enhance the native vegetation's ability to revegetate the site. The following actions will be taken to prevent erosion, restore native vegetation, and stop the proliferation of noxious weeds.

1. The geographic relief will be returned to pre-work state, to include removal of ruts, mounding and any access road(s) deemed unacceptable to remain on site by the

Government. The area shall be shallowly disked or harrowed (approximately 2 inches deep), and hand-raked or hand-pulled to remove all large weeds and skeletons from last year's weeds. The soil surface should have furrows approximately 1-2 inches deep after this activity. The entire impacted area shall be immediately seeded with seed mix using a seeder. All ground preparation and seeding shall be initiated no earlier than February 1 and completed no later than March 1.

2. The Corps will use native seed appropriate to the area, with the greatest potential habitat value. Plantings could include trees, shrubs, and forbs.
3. Herbicidal control will occur in accordance with the District's Pest Management Program.
4. If desirable vegetation does not reestablish itself naturally, the Corps will plant or seed new native vegetation.

1.6.8. Bank Stabilization

As with any reservoir system regulated for water resource uses, there is the need for bank stabilization activities in some areas of Lucky Peak from time to time. This can result from regulation of the pool elevation, wave action (from water traffic or wind), near shore construction activities, or from natural erosion. Bank stabilization activities prevent further degradation of the shoreline, protect resources, enhance safety, and help ensure a good recreation experience for visitors.

Repair of shoreline erosion is of primary concern for areas that are culturally significant, or in areas where shoreline erosion can present a safety hazard to visitors or staff. As described in the Recreation Management section, the Corps is proposing to consolidate some of the remote sites into existing developed sites, and will include the removal of the dock anchors or retaining walls (Photo 2).

The removal of anchors or walls or other bank stabilization activities at remote (boat-in only) sites will require work during periods when the lake is at normal operating pool in order to reach the sites with equipment, but work in other areas where access is possible by land can be done when the pool is drawn down to eliminate potential adverse effects to bull trout or water quality.

1.6.8.1. Bank Sloping

Reshaping of the bank and adjacent areas to reduce the potential for further erosion and enhance safety is the standard bioengineering technique used in major bank stabilization activities at Lucky Peak. It is not typically feasible to fill in large areas where erosion has cut into the bank because of the fluctuating pool, and the probability of the fill being eroded by the fluctuating pool. It is possible, however, to protect the toe of reshaped areas with materials excavated from cut banks (NRCS 1999). Riprap is not typically used for armoring of the banks or toes, but logs and available cobbles and boulders may be used as part of the bioengineering efforts.

Equipment is generally brought onto the site of the bank stabilization and the area is graded appropriately (typically a 2:1 maximum slope) (NRCS 1999). Even grading of the reshaped surface will allow for the establishment of vegetative cover to stabilize the area (Choctawhatchee, Pea, and Yellow Rivers Watershed Management Authority 2000).

1.6.8.2. Plantings

Planting in association with bank stabilization activities are described in the Planting section (above). Plantings are essential in most cases to protect the newly reshaped areas, or stabilize other disturbed areas. A variety of plants (grasses, trees, shrubs, willows, etc) are used in appropriate areas to stabilize the banks, and prevent future erosion to the greatest extent possible (i.e. above normal operating pool to allow for plant survival).

Grass seeding is the most efficient and cost effective method of stabilizing banks and slopes. This method will be considered first and used wherever possible. Grass will slow water movement and allow more infiltration. It will effectively hold soil particles in place, reducing

sedimentation. Trees and shrubs can be used to create a good vegetative filter strip and stabilize steep or wet slopes, stream banks, and/or other areas where stronger and/or larger vegetation than grass is needed for stabilization. Deep-rooted species of trees and shrubs provide greater protection against soil slippage problems (Choctawhatchee, Pea, and Yellow Rivers Watershed Management Authority 2000).

1.6.9. Partnering with Others

1.6.9.1. IDFG

Because the dam and its facilities lie within the BRWMA, the Corps and the IDFG work together to ensure the management of the Corps lands meet the needs of the Corps and the IDFG. The Corps' stewardship responsibility for these areas transcends management agreements with the licensee, and the Corps relies on the IDFG's professional expertise to preserve and protect wildlife areas. The Corps and IDFG have developed an outstanding working relationship and partnership that has grown to benefit both agencies.

1.6.9.2. BOR

Bureau of Reclamation's (BOR) Operations and Maintenance in the Snake River Basin Above Brownlee Reservoir includes Lucky Peak. Arrowrock Dam is on the upstream end of Lucky Peak Lake, and the BOR's Division Dam is downstream of Lucky Peak Dam. The close proximity of BOR facilities, combined with the BOR's regulation of the waters in Lucky Peak Lake, allow for a close working relationship and close coordination between Lucky Peak staff and the BOR. This is not only limited to when the BOR is conducting water management activities, but also includes such things as water rescues below Arrowrock.

1.6.9.3. BLM

Similar to the BOR, the BLM is a close neighbor to the Corps at Lucky Peak. Close cooperation with the BLM is essential in promoting a good neighbor relationship. As mentioned previously, the boundary between Lucky Peak and the BLM is carefully managed, through coordination and partnering with the BLM, to ensure that the management objectives of Lucky Peak are met.

1.6.9.4. LPSP

Lucky Peak State Park (LPSP) is a popular recreation destination for the hundreds of thousands of visitors from Boise and the surrounding areas. The existing recreation facilities at Lucky Peak sites help meet the recreation (especially water recreation) needs of the four-county area. The Corps works closely with the LPSP staff to ensure a safe and meaningful recreational experience.

1.7. Project and Consultation Timeline

The Corps is proposing instituting a 5-year check-in with the Services to streamline the consultation process on this project. This will also allow for minor updates to or clarification of the proposed action, if needed. The check-in will also evaluate whether or not reinitiation is warranted at the time of the check-in, or if supplemental documents can be issued to ensure the Corps' compliance with section 7 for the proposed action.

1.8. Conservation Measures

The Corps proposes the following conservation measures as part of the proposed action in order to reduce potential adverse effects related to implementation of the proposed action. These conservation measures are not meant to be mitigation for the proposed action, but are integral to the reduction of impacts (potential adverse effects) that may be incidental to the proposed action, and must be considered when analyzing the potential effects of the proposed action.

The following impact minimization measures will be implemented by the Corps as part of the proposed action.

1) Inwater work periods:
   a) The Corps will conduct near shore construction activities during periods when Lucky Peak Lake is drawn down to the greatest extent possible to spatially separate any potential adverse effects from the individual bull trout that may inhabit the lake.
   b) Near shore construction type activities (e.g. removing dock anchors or walls) in boat-in only sites will be done during times when the lake is not drawn down to provide access.
2) Erosion control:
   a) When near shore construction type activities occur during times when the lake is not drawn down, the Corps will use appropriate erosion control devices to reduce potential input of suspended sediment in the lake. These control devices may include hay bales, silt fences, or the like.
3) Refueling of equipment (i.e. backhoe) in areas not designed for refueling (i.e. in boat-in only areas) will not occur within 100 feet of open water.
4) Limit, to the greatest extent possible, the operation of vehicles and off road vehicles along the mud flats and beach areas exposed during draw down periods, which could become a potential source for petroleum and sediment exposure.

2. Environmental Baseline

The geographical area for which the environmental baseline is being established is discussed in the Action Area section of this document. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem within the action area. The environmental baseline is a "snapshot" of a species' health at a specified point in time. It does not include the effects of the action under review in the consultation. Much of the baseline information for Lucky Peak was derived from Lucky Peak's Master Plan (USACE 1988).

Temperature and precipitation influence the project throughout the year. Heavy precipitation and runoff in the Boise Mountains require that the lake level be dropped for flood control during the winter and spring. During heavy runoff years, the lake will be held below recreation level (3,055 feet msl) until June or early July. High temperatures during the recreation season encourage high visitor use during the summer and, conversely, below normal temperatures and above normal precipitation discourage visitor use during the summer months.

The Lucky Peak project is located at the junction of three counties. Development pressures on land adjacent to Lucky Peak will be minimal in Ada and Elmore Counties. This is due to the counties' zoning on private lands, which protects the critical deer winter range around Lucky Peak. Additionally, over half of the lands in Ada and Elmore Counties around Lucky Peak are state or federally owned, and are managed for critical deer winter range. Most development pressure will be on lands in Boise County around Mores Creek Arm and Robie Creek, because these lands are in private ownership; and Boise County has no zoning, planning, or building ordinances.

The IDFG manages 2,864.4 acres of licensed project land primarily as mule deer (*Odocoileus hemionus*) winter range as part of IDFG's nearly 19,000-acre BRWMA[3].

Lucky Peak was authorized as a flood control project. This requires the lake levels to drop during the flood season (15 October to 15 July). During normal runoff years, the lake is held down for flood storage to 15 June. The level of Lucky Peak Lake is usually held at normal full pool (3,055 feet msl) during the recreation season (15 June to Labor Day). Storage space in Lucky Peak Lake is also used for irrigation and streamflow maintenance, and the top 5 feet (elevation 3,055 to 3,060) may be used for flood control surcharge. During drought years, the level of the lake will drop below normal full pool during the recreation season to meet irrigation needs.

The lake may fluctuate as much as 100 to 150 ft. Drought years may add to drawdowns. During winter, the lake is also managed for wildlife for the BRWMA. Between January and February, the pool elevation is suppressed so mule deer and elk (*Cervus elephus*) can cross the lake at Moores Creek, at 2,960 ft. A wildlife underpass was also recently completed on Highway 21 near milepost 18.2. This is at an important big game migration "funnel" to the Lake, and was a

[3]Information on IDFG's BRWMA can be found at http://fishandgame.idaho.gov/cms/wildlife/wma/boiseriv/

frequent site of vehicle collisions with mule deer. A bridge replaced the fill that had supported the road, opening this migratory corridor to deer and elk[4].

Substrate in the lake is generally unsuitable for bull trout spawning, as it consists mostly of sand and silt, and basalt outcroppings. Bull trout have been found in past surveys in Mores Creek, but those fish were found upstream from the action area.

The main components influencing vegetation around Lucky Peak Lake are elevation, slope aspect, soil depth, climate, seed availability, and manmade influences. Lucky Peak is located in the high desert province where a sagebrush-steppe association predominates. The climate regiment of a hot dry summer, with most of the precipitation accumulating as snow during the winter months, results in a dominant plant life of low growing shrubs with deep root systems (*i.e.*, bitterbrush and rabbitbrush) capable of absorbing the scant moisture available during the growing season. These shrubs have small leaves that reduce moisture loss through transpiration. Annual forbs (herbs) and grasses flourish in the spring when moisture conditions are most favorable. However, in the sheltered moist areas by streams and favorable shoreline areas, broad-leaved varies (*i.e.*, alder and willow) are found. Ponderosa pines (*Pinus ponderosa*) occupy sheltered northeast slopes in the upper elevations of the immediate project area. In addition, pines can occasionally be seen on lower north-facing slopes near the lake. These slopes have slower evaporation than south- and west-facing slopes. Some introduced black locusts (*Robinia pseudoacacia*) survive on the project in suitable spots. The vegetation inventory for Lucky Peak (Appendix B) is currently undergoing revision from the 1988 Master Plan list (USACE 1988).

The shrub-grassland vegetation that characterizes the project is extremely fragile. Areas disturbed by construction, ORV's, etc., remain so for many years. Additional topsoils are very thin, and soils are extremely erodible at the project. Some disturbed cuts made 30 years ago are still not revegetated. Because of these factors, vegetation and soil need to be protected and disturbance avoided as much as possible.

Lawns and park-like stands of introduced trees have been established at Sandy Point, Spring Shores, and Chimney Rock recreation areas. Evergreens and a few deciduous species have been planted at Deer Flat, Charcoal, Placer Point, and Robie Creek South. Trees in these areas, as well as young trees in several other locations, are irrigated during the summer months by water pumped from the lake. Lichen growth is quite heavy on older talus slopes, as well as on the near-vertical basalt cliffs of the lower two-thirds of the lake area.

Lucky Peak Lake has few shallow areas suitable for the growth of rooted aquatic flora. Late summer drawdown exposes littoral (shore) zones and discourages the growth of aquatic macrophytes. Phytoplankton (minute free-floating vegetation) are the dominant plants in the aquatic ecosystem, although they are not abundant.

The Lucky Peak Master Plan identified areas of the Chimney Rock Management Unit for tree and shrub plantings. This 1-acre area (south of the Chimney Rock developed recreation area) is

[4] https://fishandgame.idaho.gov/ifwis/portal/blog/highway-21-wildlife-underpass-working-photos

managed as Lucky Peak's only HMU. Lucky Peak also has areas outgranted to IDPR's Lucky Peak State Park.

Corps lands at Lucky Peak are currently being subjected to a severe infestation of rush skeletonweed (*Chondrilla juncea*), which may threaten the viability of the mule deer wintering range habitat. This invasive has moved in from uncontrolled adjacent private lands and due to budget constraints has been largely uncontrolled by the IDFG in the licensed areas for wildlife use (A. Sutlick, personal communication, October 26, 2011).

The small areas of trees along the shoreline and in side canyons provide a transition between the riparian and shrub-steppe vegetative communities. These lands support the highest variety of plants and animals on the project. These lands are most desirable for recreation, and provide high aesthetic values. These lands, which provide edge, food, cover, and nesting, are also most favorable for wildlife. The establishment of additional vegetation is extremely difficult because of the lack of rainfall, suitable soil conditions, and lake drawdown.

Due to the steep canyon walls and the 100-140 ft annual drawdown, Lucky Peak Lake does not have a productive littoral zone, and the fish that typically feed on aquatic and terrestrial insects in the band of shallow water must rely mainly on benthic organisms (i.e., aquatic worms and crustaceans), which live on the lake bottom, or smaller fish for food. The most successful species of fish in Lucky Peak have been plankton feeders. Piscivorous fish have an adequate number of northern pikeminnow (*Ptychocheluis oregonensis*), redside shiner (*Richardsonius balteatus*), speckled dace (*Rhinichthys osculus*), and sculpin (*Cottus spp.*) as prey.

The fishery in Lucky Peak is directly dependent on fish stocked by IDFG. IDFG annually stocks catchable rainbow trout (*O. mykiss*), as well juvenile kokanee salmon. The kokanee have attempted spawning in Mores Creek, but with little or no survival. Smallmouth bass, which were historically stocked by IDFG, prey on the rough fish (i.e., northern pikeminnow and redside shiner). Table 4 lists the numbers of the 2 stocked species from 2002-2012[5].

Table 4 Numbers of IDFG stocked fish at Lucky Peak from 2002-2012.

Year	Species and Number Planted	
	Kokanee Salmon	Rainbow trout
2002	190,000	265,751
2003	97,000	414,821
2004	152,560	285,021
2005	200,150	296,560
2006	526,508	218,458
2007	245,000	215,650
2008	195,570	408,334
2009	199,800	193,453
2010	151,050	264,937
2011	174,640	208,319
2012	200,910	264,775

[5] http://fishandgame.idaho.gov/ifwis/fishingplanner/WaterInfo.aspx?qt=1&ID=133&WID=15224

IDFG identified fish species found in Lucky Peak Lake during fish surveys (Table 5). IDFG indicates that this may not be a complete list of species present, and some of the species may only be present in small quantities or seasonally. Several other fish species were identified in Lucky Peak's Master Plan (USACE 1988) (Table 6).

Table 5 Fish species in Lucky Peak Lake identified during IDFG surveys.

Common Name	Scientific Name
Bluegill	*Lepomis macrochirus*
Bridgelip Sucker	*Catostomus columbianus*
Brown Trout	*Salmo trutta trutta*
Columbia Basin Redband Trout	*Oncorhynchus mykiss gairdneri*
Largemouth Bass	*Micropterus salmoides*
Largescale Sucker	*Catostomus macrocheilus*
Mottled Sculpin	*Cottus bairdii*
Mountain Whitefish	*Prosopium williamsoni*
Northern Pikeminnow	*Ptychocheluis oregonensis*
Rainbow Trout (Hatchery)	*Onchorhynchus mykiss*
Redside Shiner	*Richardsonius balteatus*
Sculpin (Var. Species)	*Cottus spp.*
Smallmouth Bass	*Micropterus dolomieu*
Speckled Dace	*Rhinichthys osculus*
Western Mosquitofish	*Gambusia affinis*

Table 6 Fish species identified in Lucky Peak's Master Plan not identified by IDFG surveys.

Common Name	Scientific Name
Brown Bullhead	*Ameiurus nebulosus*
Bull Trout	*Salvelinus confluentus*
Chiselmouth	*Acrochelius alutaceus*
Coho (Silver) Salmon	*Oncorhynchus kisutch*
Cutthroat Trout	*Oncorhynchus clarkii clarkii*
Kokanee Salmon	*Onchorhynchus nerka*
Longnose Dace	*Rhinichthys cataractae*
Mountain Sucker	*Catostomus platyrhynchus*
Tui Chub	*Gila bicolor*

All reproducing fish species in Lucky Peak Lake, except mountain whitefish (*Prosopium williamsoni*), spawn in the lake or its tributaries (IDFG, 1980). Most fish spawn in the spring or early summer, although kokanee salmon (*Oncorhyncus nerka*) spawn in late summer and fall. A few species [i.e., largescale sucker (*Catostomus macrocheilus*), smallmouth bass (*Micropterus dolomieu*), and brown bullhead (*Ameiurus nebulosus*)] will spawn over sandy or rocky lake areas.

No anadromous fish occur near Lucky Peak, as the Hells Canyon Complex (Hells Canyon, Brownlee, and Oxbow Dams) blocked anadromous migration upon their completion. Hells

Canyon Dam is the first complete passage barrier to upstream movement on the Snake River at RM 247. Lucky Peak is at about RM 68.5 on the Boise River.

There are some individual bull trout that may become entrained from Arrowrock Reservoir on the upstream end of Lucky Peak Lake. There is one bull trout recovery unit near Corps managed lands at Lucky Peak: the Southwest Idaho River Basins. Conditions at Lucky Peak are typical of a regulated lake/reservoir-type system. Habitat is not suited for the unique biological requirements of bull trout.

2.1. Matrix of Pathways and Indicators (MPI)

NMFS uses the "Matrix of Pathways and Indicators" (MPI) (NMFS 1996) to summarize important environmental parameters and levels of condition for each. USFWS adopted a similar strategy in 1997. The NMFS matrix is divided into six overall pathways (major rows in the matrix):

- Water Quality
- Channel Condition and Dynamics
- Habitat Access
- Flow/Hydrology
- Habitat Elements
- Watershed Conditions

Each represents a significant pathway by which actions can have potential effects on anadromous salmonids and their habitats, and could be used for analyzing bull trout habitat as well.

There has not been an on-site evaluation for this program of the whole action area described in this BA for current terrestrial or aquatic habitat indicators using the MPI. However, after review of the proposed action, and reviewing all of the pathway indicators in the matrix to determine the potential impacts of the proposed action, the Corps has determined that the natural resource management activities at Lucky Peak will not restore or degrade the function of habitat indicators of the environmental baseline, but will maintain existing baseline conditions within the action area. For the purposes of the MPI checklist, "maintain" means that the function of an indicator does not change (i.e., it applies to all indicators regardless of functional level).

3. Endangered Species Act of 1973: Biological Assessment

3.1. Species Lists

The Corps reviewed the current list of threatened, endangered, and candidate species that pertain to the action area under the jurisdiction of USFWS[6] on September 24, 2012.

3.1.1. Identification of Listed Species

Table 7 identifies ESA-listed species and critical habitats in the action area.

Table 7 Federal Register notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation.

Species	Listing Status	Critical Habitat	Protective Regulations
bull trout (*Salvelinus confluentus*)			
Columbia River DPS	T 6/10/98; 63 FR 31647 31674	9/02/05; 70 FR 56211 56311 10/18/10; 75 FR 63898	
Canada lynx (*Lynx canadensis*)			
Contiguous U.S. DPS	T 3/24/00; 63 FR 16051 16086	2/25/09; 74 FR 8615 8702	
Slickspot Peppergrass (*Lepidium papilliferum*)[7]			
Contiguous U.S., State of Idaho	PT	P	
Bliss Rapids Snail (*Talorconcha serpenticola*)			
Contiguous U.S., State of Idaho	T 12/14/1992; 57 FR 59244 59257	Not applicable	
Snake River Physa Snail (*Haitia {Physa} natricinia*)			
Contiguous U.S., State of Idaho	E 12/14/92; 57 FR 59244 59257	Not applicable	
Greater Sage-Grouse (*Centrocercus urophasiunus*)			
Candidate		Not applicable	
Yellow-billed cuckoo (*Coccyzus americanus*)			
Candidate	C	Not applicable	
North American Wolverine (*Gulo gulo luscus*)			
Candidate	PT	Not applicable	
Whitebark pine (Pinus albicaulis)			
Candidate	C	Not applicable	

Listing status: 'T' means listed as threatened under the ESA; 'E' means listed as endangered; "P" means proposed for listing or designation, "C" means the species is a candidate for listing.

[6] No species or critical habitats under the jurisdiction of the Nation al Marine Fisheries Service occur in the action area.

[7] Slickspot peppergrass is no longer on the list of threatened and endangered species in Idaho, but the Corps has chosen to analyze the potential effects of the proposed action to streamline potential future listings of the species and subsequent consultation requirements under section 7(a)(2).

3.1.2. Identification of Designated Critical Habitat

No critical habitat exists on Corps lands for bull trout at Lucky Peak. No anadromous species occur near Lucky Peak. No critical habitat exists on Corps lands for Canada lynx. No proposed critical habitat for slickspot peppergrass exists on Corps lands.

3.2. Status of the Species

3.2.1. Listed Species

3.2.1.1. Bull Trout

3.2.1.1.1. Listing History

The USFWS issued a final rule listing the Columbia River population of bull trout as a threatened species on June 10, 1998 (63 FR 31647). Bull trout are currently listed throughout their range in the coterminous United States as a threatened species. In the Columbia River Basin, bull trout historically were found in about 60 % of the basin. They now occur in less than half of their historic range. Populations remain in portions of Oregon, Washington, Idaho, Montana, and Nevada. The final rule for bull trout critical habitat was issued on October 18, 2010. Bull trout are distributed throughout most of the large rivers and associated tributary systems within the Columbia River Distinct Population Segment (DPS), where they exhibit adfluvial, fluvial, and resident life history patterns (USFWS 2002).

3.2.1.1.2. Life History/Biological Requirements

Bull trout exhibit four distinct life history patterns: anadromous, adfluvial, fluvial, and resident. Bull trout that may inhabit Lucky Peak Lake would be adfluvial form. Adfluvial populations spend between one and four years growing in their natal stream and then migrate to lakes. Fluvial populations spend about the same amount of time in their natal streams as their adfluvial siblings, but migrate to larger rivers and streams instead of lakes (Fish 2004). Resident bull trout remain in the stream where they were spawned.

After 1 to 4 years in their natal stream, migratory smolt populations will travel downstream to the coast, a large river, or lake (depending on specific life history) to recruit to the adult stage. Adult individuals achieve sexual maturity at between four and seven years of age. Spawning is usually biennial, occurring only every other year or sometimes every three years, at which point the sexually mature adults fight the current back to the specific headwater in which they were produced to spawn. Several studies have shown a strong preference for spawning in small streams as opposed to larger rivers, although McPhail (1996) suggests that this may be due to sampling biases, due to the difficulty of sampling large swift rivers (Fish 2004). However, spawning is not known to occur, or expected, in the action area.

Bull trout are brood hiders, which means that their reproductive strategy is to hide their young from potential predators in the substrate instead of defending or protecting the young inside the

mouth (mouth brooders) (Breder 1966). Once spawning commences the females will focus all of their time and energy into digging redds in the loose gravel substrate into which they will deposit their eggs. Bull trout prefer small gravel, usually digging their redds in areas dominated by substrate particles less than 20mm in diameter. Redds can range in water depth from 10cm to over a meter, and range in size from less than a meter in diameter to over 2 meters (McPhail and Baxter 1996). While the females are digging redds, the males are trying to court the females while at the same time driving other competing males out of the area. Once the female is satisfied with her nest and her mate, she will release her eggs (up to 5,000) into the redd, closely followed by a male who will cover the eggs with his sperm. Once the eggs are fertilized, the female will sweep pebbles into the nest to cover the eggs by undulating her tail while keeping the caudle and anal fins in contact with the substrate. Spawning seems to cease when water temperatures drop to about 41°F (5°C) (Allen 1987). Unlike salmon species, and like steelhead, bull trout have iteroparity (the ability to spawn multiple times), so after spawning the adults will drift back downstream to their winter homes. Spawning is thought to occur biannually due to the fact that the fish survive spawning and need a year or so to recover afterwards (Fish 2004).

Table 8 shows the thermal ranges for bull trout, life history timing, and the length of time for some of the life history events.

Table 8 Bull trout general life history timing with associated temperatures.

Bull Trout	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Temp	Length	Lethal Limits
Upstream adult migration													10-12.2°C		22°C
Downstream Adult Migration															
Overwintering															
Adult spawning													4-14°C (12, 16)		
Egg incubation													1.2-5.4°C (16)	100-220 days (13)	
Alevin													3.9-4.4°C	60-90 days	
Fry emergence															
Juvenile rearing													3.9-10°C	1-4 years	21°C
Downstream juvenile migration													<12.2°C	At night	21°C

Lucky Peak Lake is drawn down significantly during the winter. Lucky Peak reservoir was not designated as critical habitat for bull trout.

3.2.1.1.3. Distribution

Bull trout are distributed throughout most of the large rivers and associated tributary systems within the Columbia River Recovery Unit. Bull trout exhibit adfluvial, fluvial, and resident life history patterns within the CRRU.

Wydoski and Whitney (2003) indicate that all four life history types of bull trout (anadromous, adfluvial, fluvial, and resident) require water temperatures below 15°C (59° F). They also note that bull trout are occasionally collected in the tailraces of Priest Rapids and Wanapum Dams on the mainstem Columbia River. In Idaho, bull trout were found at elevations from 2000 to 3800 feet in elevation with gradients ranging from 1.9 to 8.3 % (Wydoski and Whitney 2003).

The Boise River basin has been surveyed extensively for bull trout. The Boise National Forest (USFS) and BOR conducted habitat and abundance surveys for bull trout throughout the Mores Creek, Middle Fork, and North Fork Boise River watersheds from 1999 through 2003 (BOR 2004). Bull trout are not known to occur in reach between Lucky Peak Dam and BOR's Diversion Dam.

A small population of bull trout was found in 2000 and 2001 in Mores Creek (a tributary to Lucky Peak Reservoir). Subsequent surveys have not found these fish (BOR unpublished). Entrainment occurs at Arrowrock Dam releasing fish into Lucky Peak Reservoir. Bull trout have been captured in gill net efforts in Lucky Peak Reservoir under a trap and transport program, which was initiated in year 2000 (Salow 2002). Analysis of population structure through use of microsatellite loci found no evidence that bull trout rearing in Mores Creek were a distinct population segment (Whitely et al. 2003). These fish were likely offspring of bull trout entrained through Arrowrock Dam that use the Mores Creek area for spawning and rearing habitat (BOR 2004).

IDFG considers it very unlikely that bull trout are present in the tailrace or swimming area below Luck Peak. All bull trout that inhabit Lucky Peak Lake are regarded and treated as entrained fish from Arrowrock Dam. These fish tend to concentrate below Arrowrock Dam in the spring (March-June) as they attempt to move upstream, but are likely distributed throughout the [lake] the remainder of the year (J. Dillon, IDFG, personal communication, February 23, 2011). "Take" of these entrained fish has been addressed in the Biological Assessments and Opinions prepared for the Arrowrock Dam. Bull trout are not known to occur in reach between Lucky Peak Dam and BOR's Diversion Dam.

3.2.1.1.4. Local Empirical Information

3.2.1.1.4.1. Current Local Population Information

Individual bull trout that may be present in Lucky Peak Lake are entrained from Arrowrock Dam (BOR's action). The fish that could be present would have escaped BOR's trap efforts. Those fish that could escape, and survive, have the potential to be recaptured in future trapping efforts by the BOR. Bull trout are not known to occur in reach between Lucky Peak Dam and BOR's Diversion Dam. Any potential effects that may result from the proposed action would be minimized by performing inwater work during the winter.

3.2.1.1.4.2. Ongoing Monitoring

Monitoring in connection with trap and transport is conducted at Arrowrock Dam by the BOR as part of their BO.

3.2.1.2. Canada Lynx

3.2.1.2.1. Listing History

The Canada lynx was listed as a threatened species in 2000. In 2003, in response to a court order to reconsider the listing, USFWS clarified their final listing decision.

3.2.1.2.2. Life History/Biological Requirements

Canada lynx are medium-sized cats, generally measuring 75-90 centimeters long (30-35 inches) and weighing 8-10.5 kilograms (18-23 pounds). Canada lynx are smaller than the European lynx with a shorter tail and longer hind legs. They have large feet adapted to walking on snow, long legs, tufts on the ears, and black-tipped tails. They are highly adapted for hunting snowshoe hare, the primary prey, in the snows of the boreal forest.

Lynx in the contiguous United States are at the southern margins of a widely distributed range across Canada and Alaska. The center of the North American range is in north-central Canada. Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare (Ruggiero et al. 2000). These forests are generally described as boreal forests. In North America, the distribution of lynx is nearly coincident with that of snowshoe hares. Lynx survivorship, productivity, and population dynamics are closely related to snowshoe hare density in all parts of its range. A minimum density of snowshoe hares (greater than 0.5 hare per hectare (1.2 hares per acre)) distributed across a large landscape is necessary to support survival of lynx kittens and recruitment into and maintenance of a lynx population.

The southernmost extent of the boreal forest that supports lynx occurs in the contiguous United States in the Northeast, western Great Lakes, northern and southern Rockies, and northern Cascades. Here the boreal forest transitions into other vegetation communities and becomes more patchily distributed. As a result, the southern boreal forests generally support lower snowshoe hare densities, hare populations do not appear to be as highly cyclic as snowshoe hares further north, and lynx densities are lower compared to the northern boreal forest. Individual lynx maintain large home ranges (reported as generally ranging from 31 to 216 kilometers^2 (km^2), or 12-83 miles^2 (mi^2). Thus, a lynx population can only persist in a large boreal-forested landscape that contains appropriate forest types, snow depths, and high snowshoe hare densities.

3.2.1.2.3. Distribution

Recent observations of lynx are primarily from the Cascade Range and the Blue Mountains. Canada lynx likely have never been as abundant in the lower 48 States as they were in northern Canada and Alaska because there is less lynx and snowshoe hare habitat at the southern part of the range.

In western states, most lynx occurrences (83%) were associated with Rocky Mountain Conifer Forest, and most (77%) were within the 1,500-2,000 m (4,920-6,560 ft) elevation zone (McKelvey et al. 2000*b*). Primary vegetation that contributes to lynx habitat is lodgepole pine, subalpine fir, and Engelmann spruce (Aubry et al. 2000). In extreme northern Idaho,

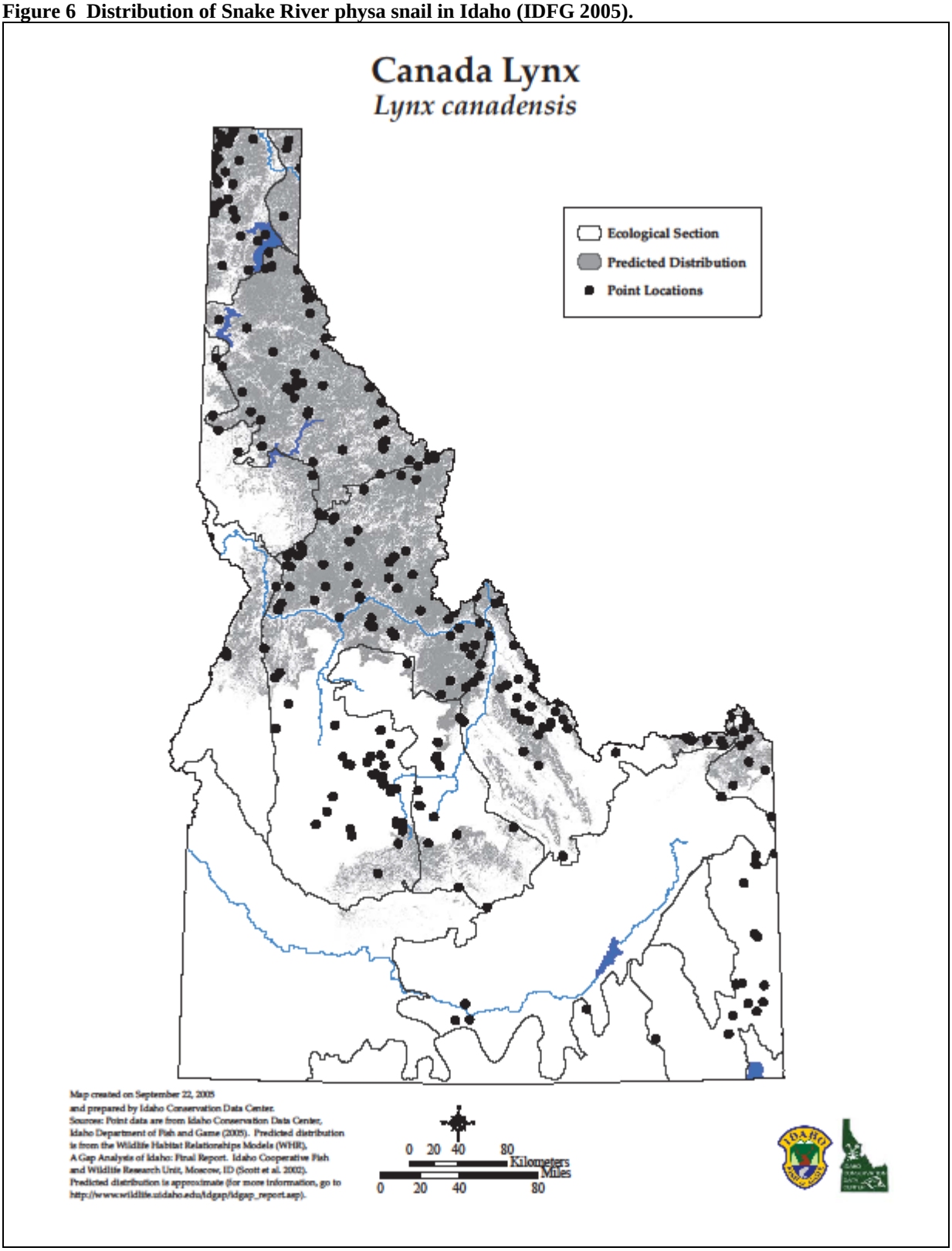
northeastern Washington, and northwestern Montana, cedar-hemlock habitat types may also be considered primary vegetation. In central Idaho, Douglas fir on moist sites at higher elevations may also be considered primary vegetation. Secondary vegetation when interspersed within subalpine forests, may also contribute to lynx habitat. These vegetation types include cool, moist Douglas fir, grand fir, western larch, and aspen forests. Dry forest types (e.g., ponderosa pine, climax lodgepole pine) do not provide lynx habitat (USACE 2006).

3.2.1.2.4. Local Empirical Information

3.2.1.2.4.1. Current Local Population Information

There are no known local populations or individuals of Canada lynx in the action area (IDFG 2005).

Figure 6 Distribution of Snake River physa snail in Idaho (IDFG 2005).



3.2.1.3. Slickspot Peppergrass

3.2.1.3.1. Listing History

Slickspot peppergrass was listed as a candidate species by the USFWS in October 1999 and had been petitioned for listing under the ESA. In January 2004 the USFWS found that a listing was not warranted based on the extent of its range and abundance, as well as the development of a Candidate Conservation Agreement to preserve the species. Slickspot peppergrass was then listed as threatened throughout its range on October 8, 2009. Critical habitat was proposed for the species in 2011, but none within the action area. Currently the status is Proposed Threatened with designated critical habitat. The August 8, 2012 U.S. District Court decision vacated the ESA listing as threatened. Vacating the listing decision converts the plant to its previous "Proposed Threatened" status.

As a result of litigation, slickspot peppergrass is no longer on the list of threatened and endangered species in Idaho (as of September 24, 2012), but the Corps has chosen to analyze the potential effects of the proposed action to streamline potential future listings of the species and subsequent consultation requirements under section 7(a)(2).

3.2.1.3.2. Life History/Biological Requirements

Slickspot peppergrass is a tap-rooted, intricately branched plant. The plant flowers once and then dies, and displays two different life cycles, an annual, and a biennial form. The plant averages 2 to 8 inches, but can reach up to 16 inches in height. Leaves and stems are covered with fine, soft hairs, and the leaves are divided into linear segments. Flowers are numerous, 0.1 inches diameter, white, and 4-petalled. Fruits (siliques) are 0.1 inches, round in outline, flattened, and 2-seeded. The annual form of the Slickspot peppergrass matures, reproduces by setting seed, and dies in one growing season. The biennial life form initiates growth in the first year as a rosette, but does not produce seed and die until the second year. Biennial rosettes must survive dry summers on the Idaho Snake River Plain and Owyhee Plateau, and consequently many of these rosettes die before flowering and producing seed. The proportion of annuals versus biennials in a population can vary greatly.

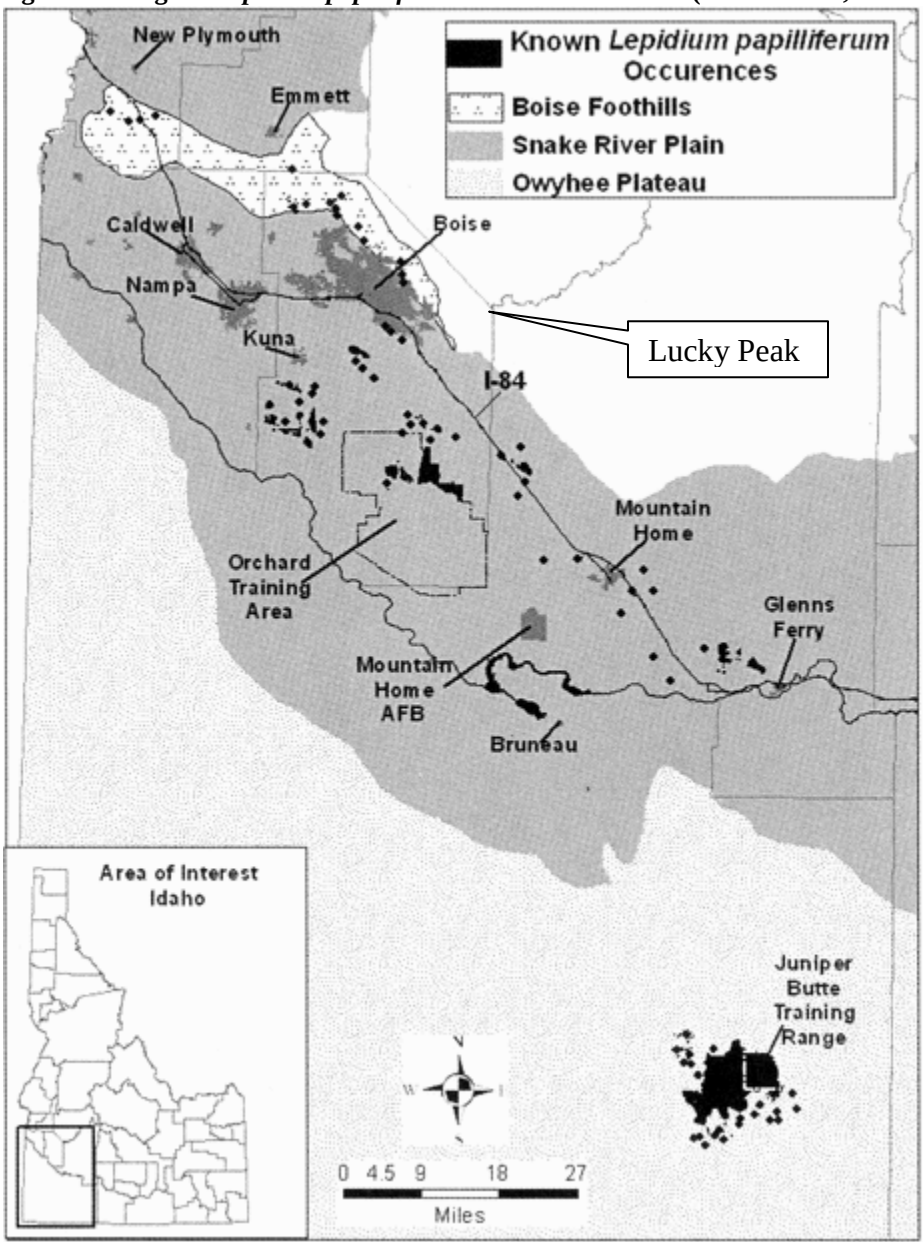
Slickspot peppergrass typically grows in "slickspots", which are small areas (microsites) within larger sagebrush habitat. These microsites are often lower than surrounding areas, so they retain water longer than the surrounding soil. Slickspots may be as small as a square foot, or as large as half a basketball court, and are usually surrounded by big sagebrush, native bunchgrasses, wildflowers, mosses, and lichens.

Slickspot peppergrass occurs only in sagebrush steppe habitats in southwestern Idaho, including the Snake River Plain, Owyhee Plateau, and adjacent foothills in Ada, Canyon, Elmore, Gem, Owyhee, and Payette counties. The total area of sagebrush steppe habitats containing occurrences of slickspot peppergrass is about 20,500 acres. Of this, 91% (18,655 acres) is on federal land managed by the Bureau of Land Management (BLM) and U.S. Air Force (USAF); 3% (615 acres) is on private land; 6% (1,230 acres) occurs on state land; and a small amount of city and county land contain the plant.

3.2.1.3.3. Distribution

Slickspot peppergrass occurs only in sagebrush steppe habitats in southwestern Idaho, including the Snake River Plain, Owyhee Plateau, and adjacent foothills in Ada, Canyon, Elmore, Gem, Owyhee, and Payette counties. Figure 7 shows distribution in relation to (and outside of) Corps lands.

Figure 7 Range of *Lepidium papilliferum* in southwest Idaho (74 FR 52020, October 8, 2009).



3.2.1.3.4. Local Empirical Information

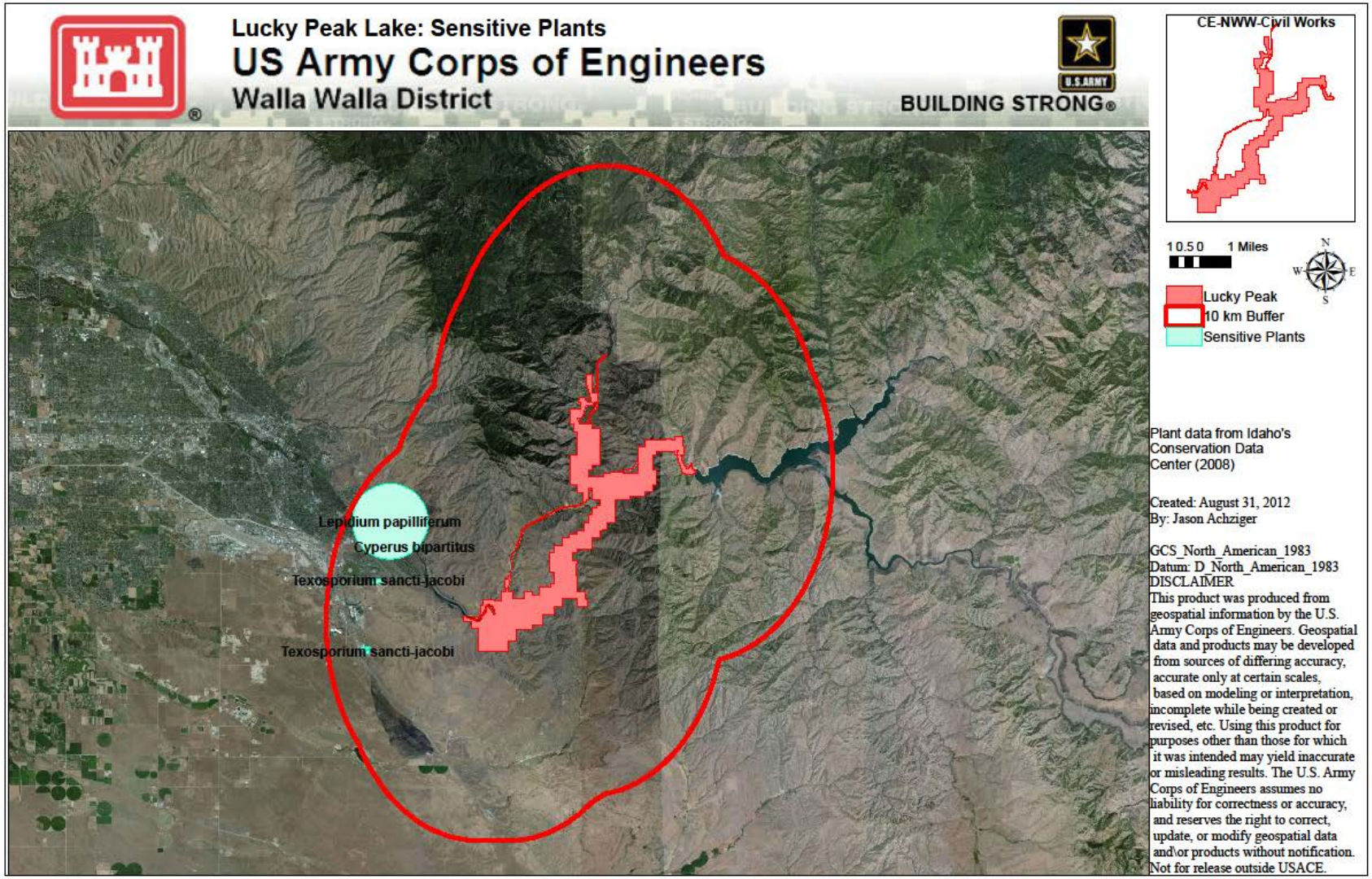
3.2.1.3.4.1. Current Local Population Information

There are no known local populations of Slickspot peppergrass in the action area, but the species is known to occur outside the action area around Boise (Figure 8).

3.2.1.3.4.2. Ongoing Monitoring

There is no known suitable habitat for slickspot peppergrass on Corps lands in the action area. Currently there is no monitoring for slickspot peppergrass on Corps lands. Cursory field surveys in 2011 at Lucky Peak in Lydle Gulch and Chimney Rock found no slickspot peppergrass on Corps managed lands in those areas. The IFWIS database indicates the lack of plant/habitat occurrences as well.

Figure 8 Sensitive plants near Lucky peak.



3.2.1.4. Bliss Rapids Snail

3.2.1.4.1. Listing History

The Bliss Rapids snail (*Taylorconcha serpenticola*) was listed as threatened on December 14, 1992. Critical habitat has not been delineated. On September 16, 2009, the Service published a 12-month petition finding to remove the Bliss Rapids snail from the Endangered Species List. The Service's review of the species' known geographic distribution, habitat requirements, and current threats did not support delisting and the Service declared that the species continues to meet the definition of a threatened species under the Act.

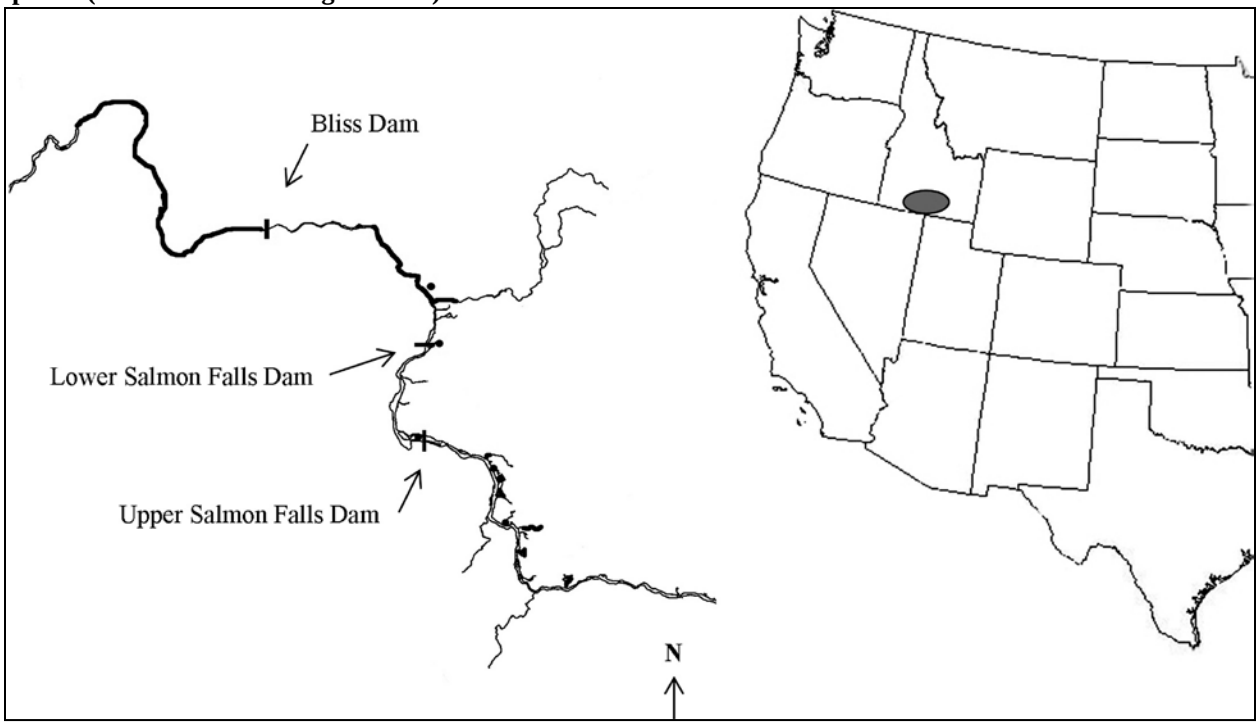
3.2.1.4.2. Life History/Biological Requirements

The Bliss Rapids snail has a very small ovoid/turbinate shell (approximately 0.08 to 0.16- inches long), with about 3.5 to 4.5 whorls (curls or turns in the shell). The shell is clear to white, but appears to have two colors, very light tan to dark brown-red, which results in the "pale" and "orange" forms. The average lifespan of the Bliss Rapids snail is about one year. This species of snail is a "living fossil," in that they are survivors of the late Pliocene Lake Idaho, which covered much of southern Idaho. The Bliss Rapids snail requires free-flowing, cool water environments and is primarily found on cobble boulder substrate, and in water temperatures between 59 and 61 degrees Fahrenheit. Bliss Rapid snails experience a die-off of older adults during the late winter-early spring season following reproduction.

3.2.1.4.3. Distribution

The Bliss Rapids snail occurs in cold-water springs and spring-fed tributaries to the Snake River, and in some reaches of the main stem Snake River. Prior to 1987, the Bliss Rapids snail was known primarily from the main stem Snake River boulder bars above King Hill (RM 546) to lower Salmon Falls Dam (RM573) and upstream in Box Canyon Springs (RM 588). Recent surveys indicate the species is distributed discontinuously over 22 miles, from River Mile (RM) 547-560, RM 566-572, and at RM 580 on the Snake River. The furthest downstream occurrence of the Bliss Rapids snail (RM 547) is about 96 miles upstream of where the Boise River (i.e. the Lucky Peak Project) flows into the Snake. The species is also known to occur in 14 springs or tributaries to the Snake River. The species does not occur in reservoirs. Figure 9 shows distribution, outside of Corps lands.

Figure 9 Current known distribution (approx. 80 river kilometers) of *Taylorconcha serpenticola* in the upper Snake River basin, south-central Idaho, U.S.A. Dark lines and dots indicate current known locations of the species (Richards and Arrington 2008).



3.2.1.4.4. Local Empirical Information

3.2.1.4.4.1. Current Local Population Information

There are no known local populations of Bliss Rapids snails in the action area.

3.2.1.4.4.2. Ongoing Monitoring

Surveys have indicated that the species was thought to be distributed discontinuously over 22 miles, from River Mile (RM) 547-560, RM 566-572, and at RM 580 on the Snake River. The species is also known to occur in 14 springs or tributaries to the Snake River. Recent survey and museum specimen information compiled by Dr. David Hopper, USFWS, Boise, Idaho, indicates that Bliss Rapids snails are discontinuously distributed in the Snake River between River Miles 546 thru 606 (personal communication, B. Kibler, February 6, 2013). The species does not occur in reservoirs. There is no known suitable habitat for Bliss Rapids snail on Corps lands in the action area. Currently there is no monitoring for Bliss Rapids snails on Corps lands.

3.2.1.5. Snake River Physa Snail

3.2.1.5.1. Listing History

The Snake River Physa snail (*Haitia (Physa) natricina*) was listed as endangered on December 14, 1992. Critical habitat has not been delineated.

3.2.1.5.2. Life History/Biological Requirements

The Snake River Physa has an ovoid shell that is amber to brown in color, and has 3 to 3.5 whorls (curls or turns in the shell). The Physa can reach a maximum length of about 6.5 millimeters. The Snake River Physa is believed to have evolved in the Pliocene to Pleistocene lakes and rivers of northern Utah and southeastern Idaho. This species of snail is a "living fossil," in that they are survivors of the late Pliocene Lake Idaho, which covered much of southern Idaho. While much information exists on the family Physidae, very little is known about the biology or ecology of this species. It is believed to be confined to the Snake River, inhabiting areas of swift current on sand to boulder-sized substrate. The species occurs only on the under-side of gravel to boulder substratum, only in swift current in the main stem Snake River. The species' status is uncertain within the current known range, but portions of the middle Snake River (e.g., Milner Reservoir, RM 663 to Lower Salmon Falls Reservoir, RM 572) are of questionable habitat value given current water quality and water use issues. In addition, the sampling in this reach has been limited. Very few live specimens have been recovered from reservoirs, which have been extensively sampled (Federal Register, 1992). Dr. David Hopper, USFWS, Boise, Idaho, suggest listing the full range for the species as the Snake River from River Miles 368 – 675; and the Bruneau River from River Miles 0-7 (personal communication, B. Kibler, February 6, 2013). Snake River Physa snail longevity is believed to coincide with other *Physa* species, averaging two years.

Analysis of Snake River physa substrate preferences (see the U.S. Fish and Wildlife Service's Biological Opinion, Appendix A, for relicensing of the Swan Falls Hydroelectric Project, FERC No. 503) indicates the species selects for gravel to pebble, possibly gravel to cobble, substrates where water velocity keeps the substrate relatively free of fine sediments and macrophyte plant growth. The species has been found at depths between 0.5 to 3 meters. The highest densities of Snake River physa (between 32 to 64 per square meter) have been found in relatively large, relatively contiguous areas of gravel to pebble beds, largely in braided areas of the Snake River, that are largely absent of fine sediments and macrophytes at depths between 1.5 to 2.5 meters in a 10 mile reach downstream of Minidoka Dam. Average water velocity where the species was found in this reach was 0.57 meters per second. Live Snake River physa identified in samples collected by Idaho Power Company between Bliss Dam and Weiser, Idaho, also select for similar habitat, though apparently at much lower densities. Habitat patches in this stretch of the Snake River may generally be smaller and less contiguous. The species is considered to occur in diffusely distributed populations, and likely rarely exhibits high-density colony behavior

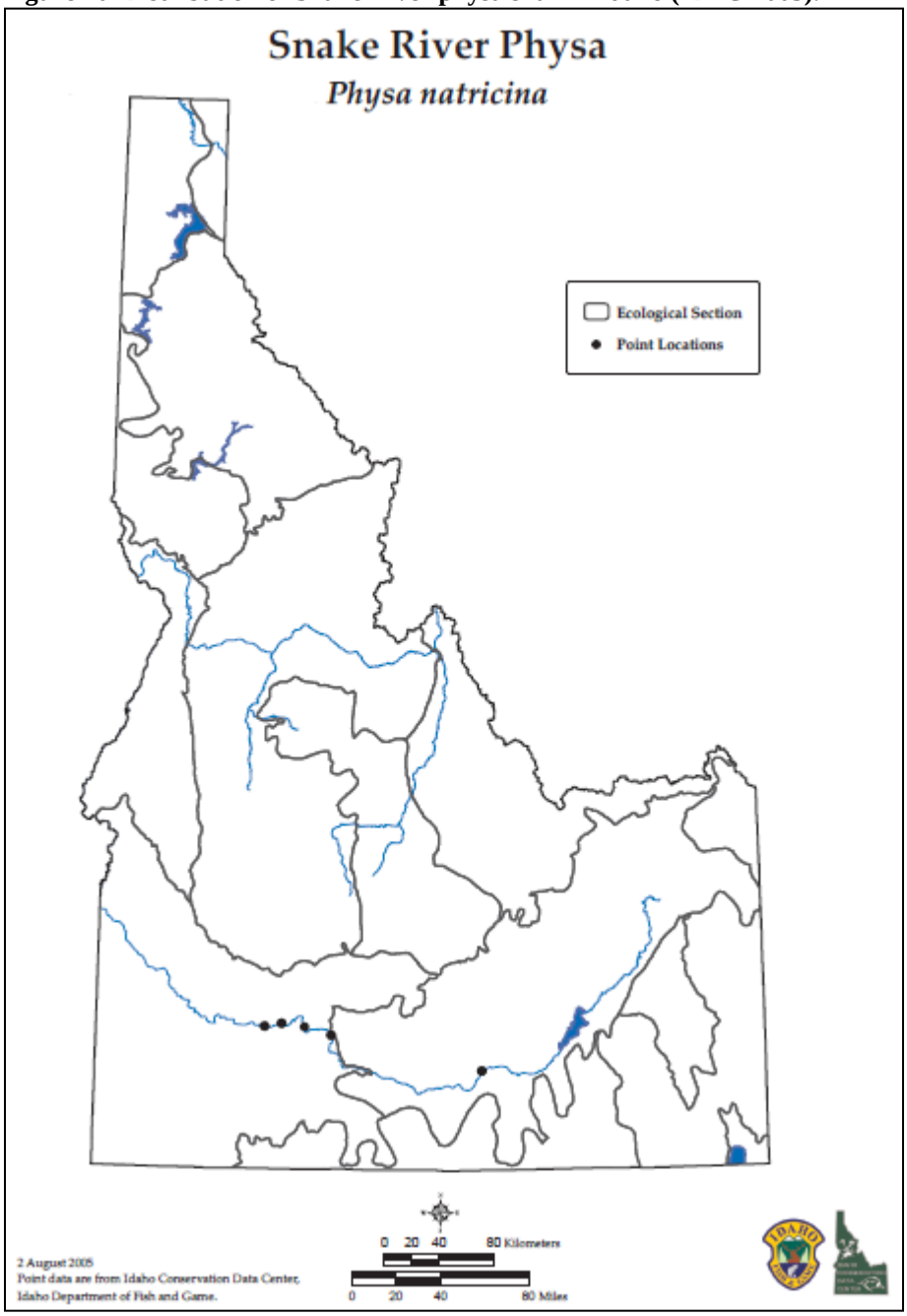
3.2.1.5.3. Distribution

The Snake River Physa snail is a freshwater mollusk found in the middle Snake River of southern Idaho. In 1995, the Service reported the known modern range of the species to be from Grandview, Idaho (RM 487) to the Hagerman Reach of the Snake River (RM 573). More recent investigations have shown this species to occur outside of this historic range to as far downstream as Ontario, Oregon (RM 368), with another population known to occur downstream of Minidoka Dam (RM 675). While the species' current range is estimated to be over 300 river miles, the snail has been recorded in only 5% of over 1,000 samples collected within this area, and it has never been found in high densities. At present Snake River Physa remain in only a few locations in the Hagerman and King Hill reaches, about 90 miles upstream of where the Boise River (i.e. the Lucky Peak Project) flows into the Snake. There is a disjunct population near Minidoka Dam (RM 675). The more recent historic and modern range of Snake River Physa snails includes the Snake River from as far downstream as Ontario, Oregon (RM 368). It is believed that fewer than 50 live Snake River Physa have been collected in the middle Snake River.

The more recent historic and modern range of Snake River Physa snails includes the Snake River from as far downstream as Ontario, Oregon (RM 368), with another population known to occur downstream of Minidoka Dam (RM 675). This part of the Snake River does not lie within the proposed action area. Figure 10 shows distribution, outside of Corps lands.

Snake River Physa can occur in the Snake River at the confluence with the Boise River, which is 63.5 miles downstream of Lucky Peak Dam, well outside the influence of the proposed action, and well outside the action area. The proposed action is expected to have minor effects upstream of the dam, but no effects of the action are reasonably certain to occur outside of Corps lands.

Figure 10 Distribution of Snake River physa snail in Idaho (IDFG 2005).



3.2.1.5.4. Local Empirical Information

3.2.1.5.4.1. Current Local Population Information

There are no known local populations of Snake River Physa snails in the action area.

3.2.1.5.4.2. Ongoing Monitoring

There is no known suitable habitat for Snake River Physa snails on Corps lands in the action area. Currently there is no monitoring for Snake River Physa snails on Corps lands.

3.2.1.6. North American Wolverine

3.2.1.6.1. Listing History

The North American wolverine is currently Proposed Threatened with no proposed or designated critical habitat.

3.2.1.6.2. Life History/Biological Requirements

Wolverines are opportunistic feeders, consuming a variety of foods depending on availability. They primarily scavenge carrion, but also prey on small animals and birds and eat fruits, berries, and insects. Wolverines have an excellent sense of smell, enabling them to find food beneath deep snow. Breeding generally occurs from late spring to early fall. Females undergo delayed implantation until the following winter to spring, when active gestation lasts from 30 to 40 days. Litters are born between February and April, containing one to five kits, with two to three kits being the most common number. Wolverines have large spatial requirements; the availability and distribution of food is likely the primary factor in determining wolverine movements and home range). Wolverines can travel long distances over rough terrain and deep snow, with adult males generally covering greater distances than females. Home ranges of wolverines are generally extremely large, but vary greatly depending on availability of food, gender, age, and differences in habitat (USFWS 2011).

Wolverine habitat consists entirely of alpine, arctic, and sub-arctic regions. Snow cover during the spring is essential for females who use deep snow banks for denning throughout the pregnancy and weaning periods. Habitat areas for wolverines are usually isolated and described as “patchy,” often separated by large areas of unsuitable habitat. Almost all wolverine habitat in the contiguous U.S. is federally owned and managed. Suitable wolverine habitat in Oregon is considered to be the high-elevation forests of the Cascade Range, and of the Blue Mountains, Wallowa Mountains, and Ochoco Mountains. There is potential for wolverines from the Rocky Mountain population to enter Oregon from Idaho, Wyoming, or Montana.

3.2.1.6.3. Distribution

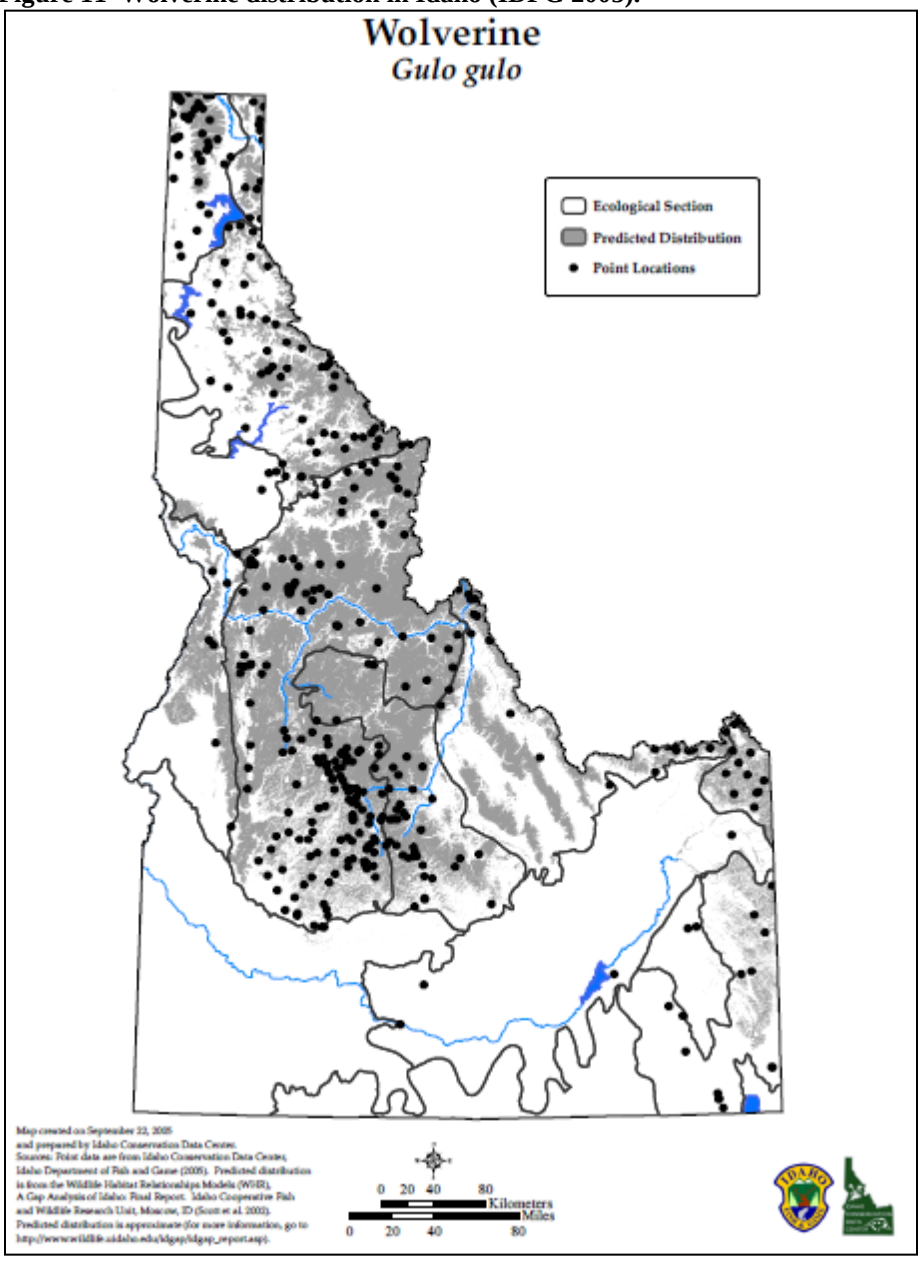
Reproductive dens in Idaho were located in snow-covered boulder talus in subalpine cirque basins (Copeland 1996; Magoun and Copeland 1998). Home ranges of adult wolverines range from less than 100 square kilometers (km^2) to over 900 km^2 [38.5 square miles (mi^2) to 348 mi^2] (Banci 1994). Copeland (1996) found that annual home ranges of resident adult females in central Idaho averaged 384 km^2 (148 mi^2), while the annual home ranges of resident adult males averaged 1,522 km^2 (588 mi^2) (USFWS 2011).

In North America, wolverines occur within a wide variety of habitats, primarily boreal forests, tundra, and western mountains throughout Alaska and Canada; however, the southern portion of the range extends into the contiguous United States. Currently, wolverines appear to be distributed in two regions in the lower 48 states: the northern Cascades in Washington, and the northern Rocky Mountains in Idaho, Montana, and Wyoming. Wolverines were extirpated in historical times from the Sierra Nevada and the southern Rocky Mountains. Wolverines tend to

live in remote and inhospitable places away from human populations. The habitats on Corps lands within the action area are all unsuitable for wolverines.

Figure 11 shows wolverine distribution in Idaho (IDFG 2005).

Figure 11 Wolverine distribution in Idaho (IDFG 2005).



3.2.1.6.4. Local Empirical Information

Wolverines have not been documented at Dworshak and are not on species lists maintained by the Dworshak Wildlife Biologist. Although it is possible, it is likely that wolverines may not occur at elevations consistent with Dworshak Reservoir, as the upper most elevations in the timber forest at Dworshak are at the lower end of the recorded inhabited elevation of wolverines.

Combined with the amount of anthropogenic influence at the reservoir, and the solitary nature of wolverines, it seems highly unlikely that wolverines would occur near the reservoir (R. Davis, personal communication, May 17, 2011).

3.2.1.6.4.1. Current Local Population Information

The species is not known, and, based on the biological requirements, is unlikely to occur at Lucky Peak.

3.2.2. Candidate Species

3.2.2.1. Greater Sage Grouse

3.2.2.1.1. Listing History

The greater sage grouse is currently a candidate for listing under the ESA.

3.2.2.1.2. Life History/Biological Requirements

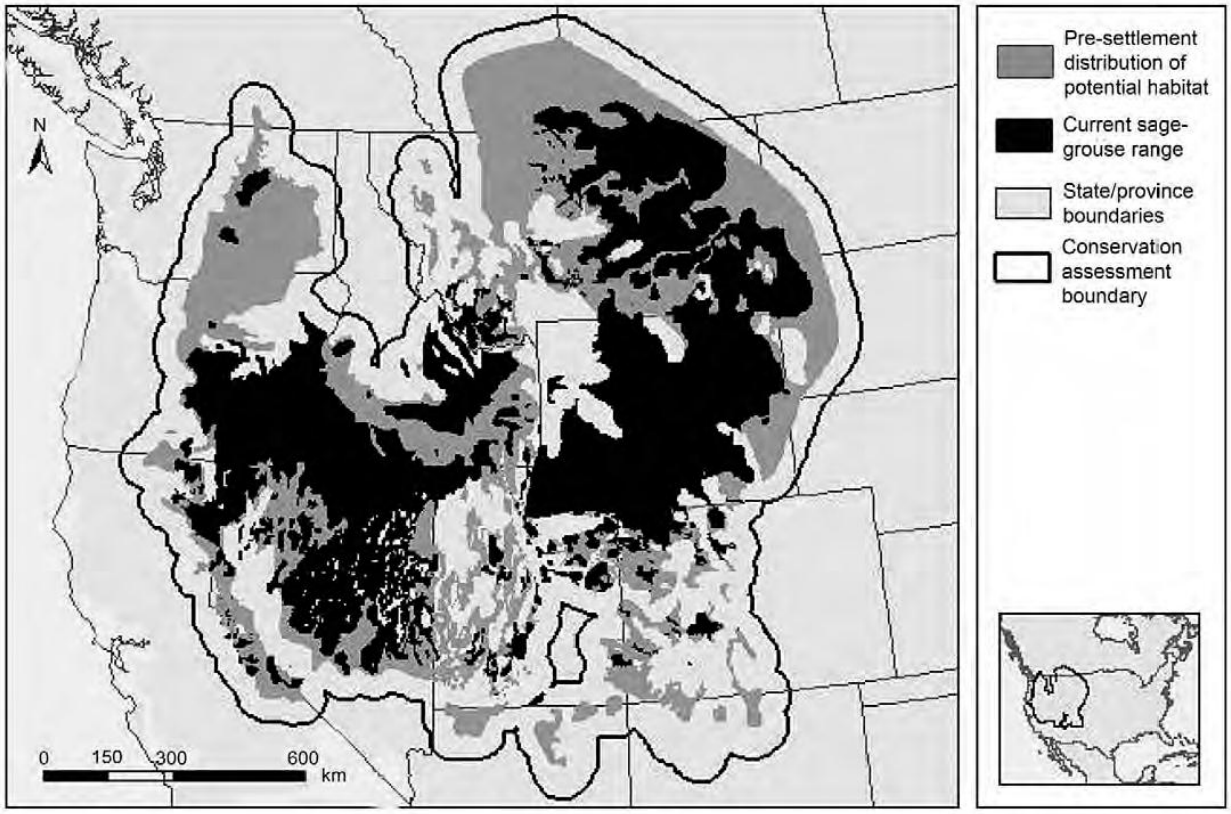
Greater sage grouse are the largest grouse in North America. Males often weigh in excess of 4-5 pounds and hens weigh in at 2-3 pounds. On the ground and in flight they appear almost black, and their long pointed tail is approximately half the length of their body. Both sexes have narrow, pointed tail feathers, feathering to the base of the toes, and a variegated pattern of grayish brown, buff, and black on the upper parts, with paler flanks and a diffuse black pattern on the abdomen. Adult males have blackish-brown throat feathers, which are separated by a narrow band of white from a dark V-shaped pattern on the neck. White breast feathers conceal 2 large, skin sacs (used in courtship displays) which are yellow-green in color. Males also have yellow eyecombs (obvious in the spring during courtship displays). Female sage grouse lack the specialized structures used for courtship displays but generally resemble males in coloration. However, in comparison to males, their throats are buffy with blackish markings and the lower throat and breast are barred which presents a blackish-brown appearance. Immature birds (less than 1 yr. of age) can be distinguished from adults by their light yellowish green toes (adults have dark green toes).

Greater sage grouse are found in shrub-steppe and meadow-steppe habitats. They are typically found in areas with low, rolling hills adjacent to valleys. They prefer medium-density sagebrush mixed with a variety of other plants for cover and food. The birds are found at elevations ranging from 4,000 to over 9,000 feet.

3.2.2.1.3. Distribution

The greater sage grouse occurs in 11 states and 2 Canadian provinces including Alberta, California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, Saskatchewan, South Dakota, Utah, Washington, and Wyoming. This bird is widely distributed throughout sagebrush–dominated habitats of southern Idaho (Schroeder et al. 1999). Figure 12 shows distribution.

Figure 12 Greater sage-grouse distribution (Knick and Connely 2011).



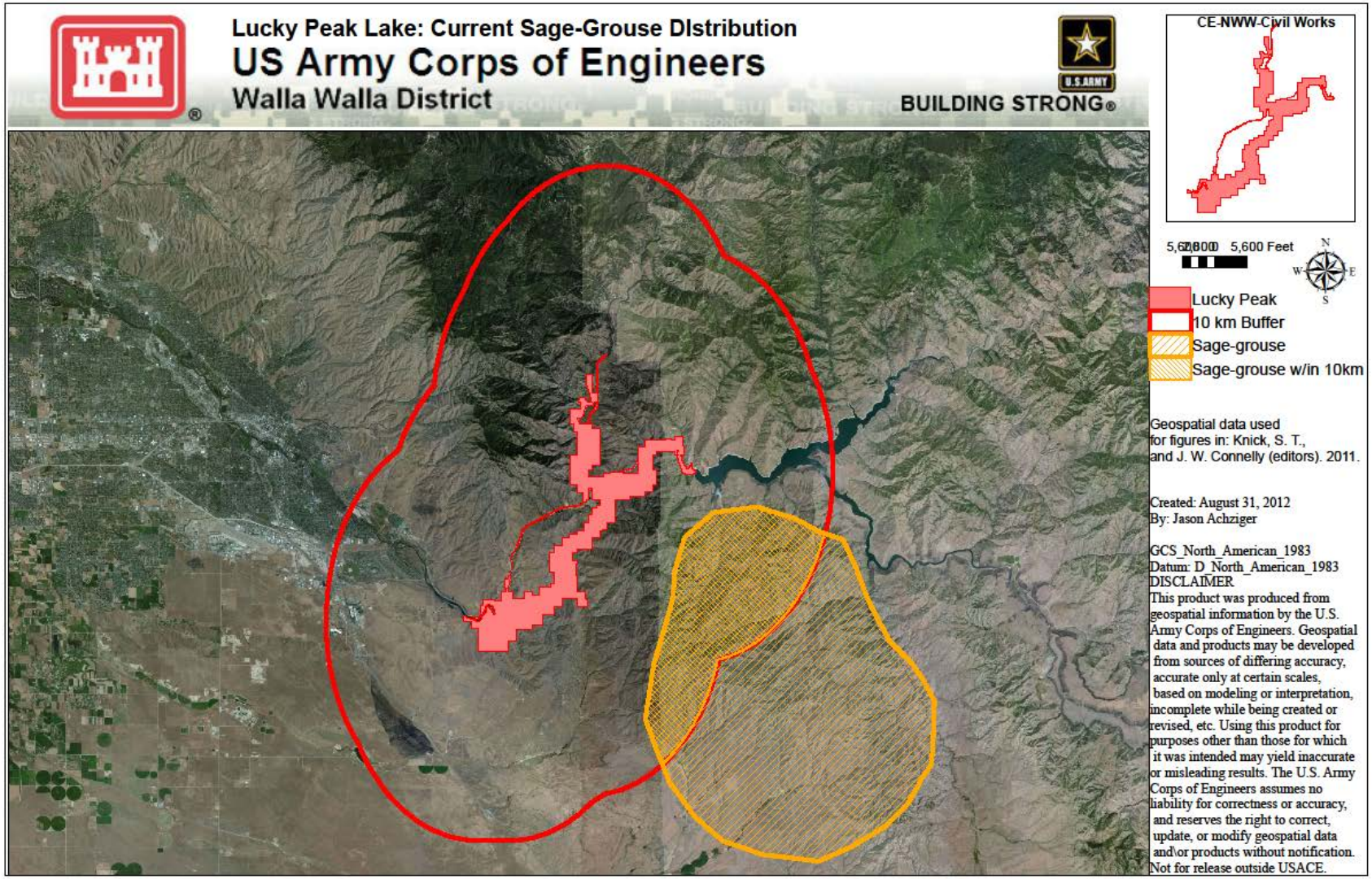
3.2.2.1.4. Local Empirical Information

3.2.2.1.4.1. Current Local Population Information

There is no current local population of greater sage grouse at Lucky Peak, but there is outside of Lucky Peak (Figure 13).

Geospatial data from Knick and Connely (2011) for current greater sage grouse is illustrated in the orange crosshatched area of Figure 12. A 10-kilometer (6.2 mile) buffer from the outside of Corps lands at Lucky Peak was added to illustrate the buffer applied to major roads in the Conservation Plan for the Greater Sage Grouse (Idaho Sage-grouse Advisory Committee 2006). There are areas within the buffer where sage grouse may occur (double hatched orange area), but they are still outside Corps lands, and the action area.

Figure 13 Greater sage-grouse current distribution (orange crosshatched area) in relation to Corps managed lands (red area) at Lucky Peak.



3.2.2.2. Yellow-billed Cuckoo

3.2.2.2.1. Listing History

The yellow-billed cuckoo is currently a candidate for listing under the ESA.

3.2.2.2.2. Life History/Biological Requirements

The yellow-billed cuckoo is a medium sized brown bird, about 12 inches long and weighing about two ounces. The bird's most notable physical features are a long boldly patterned black and white tail and an elongated down-curved bill, which is yellow on the bottom.

Although many species of cuckoos are brood parasites (laying their eggs in other birds' nests), the yellow-billed cuckoo usually builds its own nest and raises its own young. The distinct call of the cuckoo has been described as sounding like "cow, cow, cow, cow, cow, cow..." a series of clucks that become slower and run down the scale at the end. The yellow-billed cuckoo is sometimes called the raincrow or stormcrow, because it often calls before a rainstorm.

Yellow-billed cuckoos prefer open woodlands with clearings and a dense shrub layer. They are often found in woodlands near streams, rivers, or lakes. In North America, their preferred habitats include abandoned farmland, old fruit orchards, successional shrubland, and dense thickets. In winter, yellow-billed cuckoos can be found in tropical habitats with similar structure, such as scrub forest and mangroves.

In Idaho, they are reported to occur most frequently and consistently in cottonwood forests with thick understory. Dense understory foliage appears to be an important factor in nest site selection, while cottonwood trees are an important foraging habitat. Yellow-billed cuckoos appear to require large blocks of riparian habitat for nesting (IDFG 2005).

3.2.2.2.3. Distribution

In the Pacific Northwest, the species was formerly fairly common locally in willow bottoms along Willamette and Columbia Rivers in Oregon, and in the Puget Sound lowlands and along the lower Columbia River in Washington (Gabrielson and Jewett 1970, pp. 329–330; Jewett et al. 1953, pp. 342–343; Roberson 1980, pp. 225–226; Marshall 1996, as cited in USFWS 2010c). The species was also found locally in southeast British Columbia (Hughes 1999), but the available data are not adequate to determine historic abundance. The species was rare east of the Cascade Mountains in these States and provinces. The last confirmed breeding records were in the 1930s in Washington. It may now be extirpated from Washington. The Washington Department of Fish and Wildlife rank the species as having historical occurrences only, but still being expected to occur in Washington and it is currently a state candidate species (Washington Natural Heritage Program 2009, p. 9, 35; Washington Department of Fish and Wildlife 2007, p. 4). Although several surveys have been conducted in Okanogan and Yakima Counties in the last several years to check locations of previous sightings (Okanogan County) and potential habitat (Yakima County), no cuckoos were detected, despite a small number of statewide accounts in recent years (Salzer 2010, as cited in USFWS 2010c).

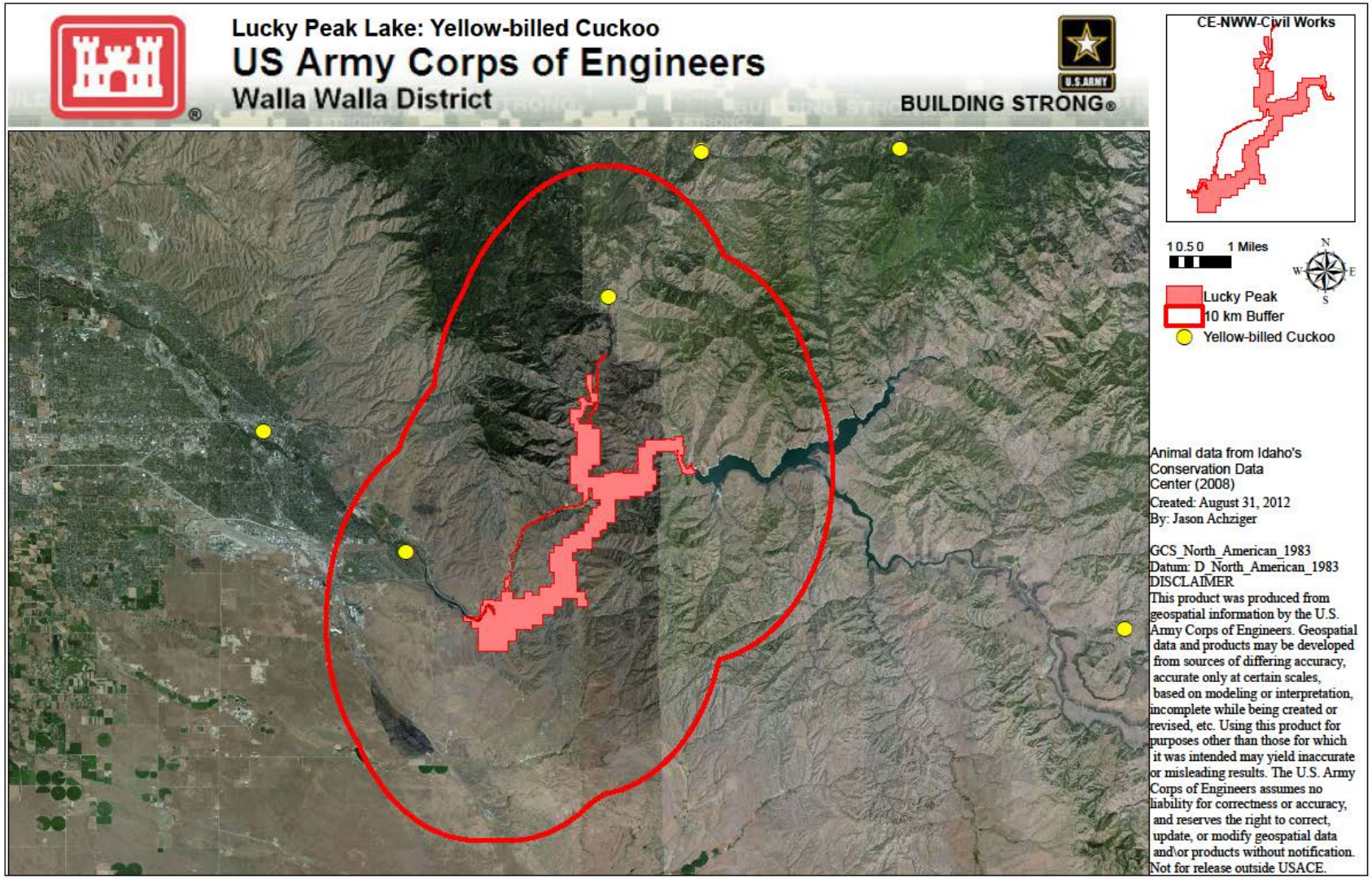
According to the Washington breeding bird atlas, yellow-billed cuckoo is believed to have been extirpated as a breeder in Washington (Smith *et al.* 1997). Figure 14 shows distribution in Idaho.

3.2.2.2.4. Local Empirical Information

3.2.2.2.4.1. Current Local Population Information

There are no known populations of yellow-billed cuckoo in the action area. This species is known to occur outside the action area around Lucky Peak (Figure 14). Based on the habitat requirements of the species, is unlikely to occur in the action area due to the lack of suitable and abundant riparian habitat. The proposed action is expected to have minor effects upstream of the dam, but no effects of the action are reasonably certain to occur outside of Corps lands.

Figure 14 Yellow-billed cuckoo distribution in Idaho (IDFG 2005).



3.2.2.3. Whitebark Pine

3.2.2.3.1. Listing History

Whitebark pine is currently a candidate species, and was petitioned for listing as threatened or endangered by the USFWS on December 14, 2010.

3.2.2.3.2. Life History/Biological Requirements

Whitebark pine is a 5-needled conifer classified as a stone pine, which includes five species worldwide. Stone pines are distinguished by large, dense seeds that lack wings and therefore depend upon birds and squirrels for dispersal across the landscape. Whitebark pine is typically found in cold, windy, high elevation or high latitude sites in western North America and as a result, many stands are geographically isolated. It is a stress-tolerant pine and its hardiness allows it to grow where other conifer species cannot. The whitebark pine tree is considered a keystone species because it regulates runoff by slowing the progress of snowmelt, reduces soil erosion by initiating early succession after fires and other disturbances, and provides seeds that are a high-energy food source for some birds and mammals (USFWS 2011b).

This tree is native to the northern Rocky Mountains, the north Cascade Mountains, and the Sierra Nevada Range. Whitebark pine grows at mountain elevations over 6,000 feet elevation up to timberline. It prefers open, sunny places to grow and will survive where the soil is dry and rocky. Whitebark pines rarely grow alone, you find them in clusters of 3-5 trees because of how the seeds are dispersed (USFS 2012).

3.2.2.3.3. Distribution

The species is distributed in Coastal Mountain Ranges (from British Columbia, Washington, Oregon, down to east-central California) and Rocky Mountain Ranges (from northern British Columbia and Alberta to Idaho, Montana, Wyoming, and Nevada) (USFWS 2011b).

3.2.2.3.4. Local Empirical Information

The species is not known, and, based on the biological requirements, is unlikely to occur at Lucky Peak.

3.3. Effects of the Action

This section includes an analysis of general project-related effects of the proposed action, but does not include effects on PCEs of critical habitat, as no critical habitat has been designated in the action area. The actions selected for this programmatic consultation all have predictable effects regardless of where they are carried out on Corps managed lands at Lucky Peak.

Factors to be considered in the analysis include proximity of the action, distribution, timing, nature of the effect, duration and disturbance frequency, disturbance intensity, and disturbance severity.

The implementation of natural resource management activities will have some minor, unavoidable, short-term adverse effects such as increased turbidity and riparian disturbance, in order to meet the management objectives. The Corps incorporated conservation measures into the proposed action to minimize the impact of, and reduce the potential for potential adverse effects. However, short-term effects may not be completely avoidable and some may still be reasonably certain to occur.

The Corps approached its analysis of potential effects through a series of steps.

1. The first step is designed to identify aspects of proposed actions that may have direct and indirect effect on the physical, chemical, and biotic environment of an action area. As part of this step, the spatial extent of these direct and indirect effects, including changes in that spatial extent over time are identified.

2. The second step will determine if there is a concurrence (either spatially, temporally, or both) of ESA-listed species or designated critical habitat to potential stressors that may result from the proposed action. This is based on local distribution information and timing of the proposed action.

3. Once concurrence is determined, then the potential for exposure to potential stressors is analyzed through a series of steps.

4. If it is determined that a given species or critical habitat for a given species may potentially be exposed to potential stressors, then an analysis of a potential response must take place. Once we identify which listed resources may be exposed potential stressors and the nature of that exposure, an examination of the scientific and commercial data available is used to determine whether and how those listed resources are likely to respond given their exposure.

5. The exposure and response analyses are used to assess the likelihood of listed individuals and their habitat to be adversely affected from the stressors of the action.

The natural resource management activities related t bank stabilization and planting in riparian areas is likely to have a benefit to aquatic species by restoring native vegetation and thereby restoring ecosystem and riparian function. Adult bull trout may benefit from restored riparian habitats through increased prey species that would colonize the improved ecosystem.

Several species identified in this document, although occurring in counties that have Corps managed lands within them, are spatially separated from Corps managed lands.

The approach to the effects analysis used the following questions (adapted from Johnson 2009) to determine the extent, if any, of potential effects, and justify the effects determination for each species:

1. Is the proposed action likely to produce potential stressors or subsidies that would reasonably be expected to act directly on individual organisms or to have direct or indirect consequences (positive or negative) on the environment?

    a. An answer of “no’ to #1 would result in a “no effect” determination by the Corps.
    b. An answer of “yes” to #1 would result in moving to #2.

2. If the proposed action is likely to produce those potential stressors, are endangered or threatened individuals likely to be exposed to one or more of those potential stressors or subsidies or one or more of the proposed action’s direct or indirect consequences on the environment?

    a. An answer of “no’ to #2 would result in a “no effect” determination by the Corps.
    b. An answer of “yes” to #2 would result a “may affect” determination by the Corps, and moving to #3.

3. If listed individuals are likely to be exposed, are those listed individuals likely to respond, positively or negatively, to that exposure?

    a. An answer of “no’ to #3 would result in a “not likely to adversely affect” determination by the Corps.
    b. An answer of “yes” to #3 would result in moving to #4.

4. If listed individuals are likely to respond, are those responses likely to be sufficient to reduce their individual performance?

    a. An answer of “no’ to #4 would result in a “not likely to adversely affect” determination by the Corps.
    b. An answer of “yes” to #4 would result in a “likely to adversely affect” determination by the Corps. This determination, for any potential effect, and for any given species, would result in a “may affect, likely to adversely affect” determination for that species.

In order to analyze exposure of potential effects of the proposed action, it must be determined if potential stressors could be produced as a result of the action, as proposed.

Near-shore construction-type (i.e. ground-disturbing) activities are widely accepted to produce potential stressors in aquatic environments.

Those species that are listed in the counties containing Corps lands, but that do not occur within the action area either spatially or temporally, have no potential to be exposed to potential stressors, and, according to 2.a. (above), a “no effect” determination can be made for those species (Table 9).

Conversely, according to 2.b. (above), a “may affect” determination must be made for those species that occur in spatial and temporal proximity of the proposed action in the action area (Table 9).

Exposure to potential stressors will be reduced by the implementation of the proposed conservation measures. If the individuals are exposed to potential stressors, then an analysis of the response must take place to gauge the effect on the individual. An individual fish may respond directly or indirectly to exposure to stressors. Examples of response by species include mortality, behavioral modification, reduced predator avoidance, reduced growth and reproduction, physiological, and habitat alteration.

Responses are a function of the likelihood of exposure, and the extent of that exposure to potential stressors, combined with reductions in that likelihood and extent due to conservation measures. Responses are specific to the type of stressors, and will be identified as such in each potential effect section.

The exposure profile combined with the response profile will determine the effect to the species. Potential effects will be drastically minimized by the implementation of proposed conservation measures.

Table 9 May Affect determinations based on spatial and temporal proximity of the species to the proposed action.

Species	Species Determination
Bull trout	May Affect
Canada lynx	No Effect
Slickspot Peppergrass	No Effect
Bliss Rapids Snail	No Effect
Snake River Physa Snail	No Effect
Greater sage-grouse	No Effect
Yellow-billed cuckoo	No Effect
North American wolverine	No Effect
Whitebark pine	No Effect

Table 10 lists the species that warrant "may affect" determinations for the proposed action. Species that warrant a "no effect" determination will not be discussed, and final effects determinations (not likely or likely to adversely affect) will be included in the conclusion of the analysis of potential adverse effects at the end of this section.

Table 10 "May affect" determinations.

Species	Species Determination
Bull trout	May Affect

3.3.1. Disturbance

Near-shore construction-type activities occurring adjacent to occupied lake areas have the potential to disturb juvenile and adult bull trout that may be in the area. This disturbance is caused by the physical presence of people traveling immediately adjacent to the lake to complete boat anchor or wall removal, or bank stabilization activities in boat-in sites. Lake levels to drop during the flood season (15 October to 15 July), when effects from disturbance are unlikely to occur. During normal runoff years, the lake is held down for flood storage to 15 June. The level of Lucky Peak Lake is usually held at normal full pool (3,055 feet msl) during the recreation season (15 June to Labor Day), when effects could result from near shore construction activities. ATV and other vehicles that operate on the exposed mud flats and beaches during the reservoir drawdown period will be limited by conservation measures, and the effects from these vehicles are expected to be undetectable.

These effects will cause some juveniles and adults to seek alternative habitat. Fish that seek suboptimal forage and cover will have increased behavioral stress (avoidance, displacement), and sub-lethal responses (increased respiration, reduced feeding success, reduced growth rates).

Because of their limited occurrence in the action area, concentration at Arrowrock from March to June, and low lake levels, disturbance effects are not likely to occur on bull trout when the lake is drawn down and, therefore, bull trout will not likely be exposed to this potential stressor. When the lake is full, near-shore construction-type activities could produce potential stressors, and bull trout may be exposed to those stressors. Conservation measures will, however, reduce the exposure probability. The potential for the exposure, combined with the existing baseline conditions at Lucky Peak, reduce the likelihood of a response to the exposure of this potential stressor, and it is, therefore insignificant.

3.3.2. Turbidity and Fine Sediment

Near-shore construction-type activities that are extensive, intensive, and immediately adjacent to Lucky Peak Lake or Mores Creek may cause instream fine sediment delivery, resulting in localized sediment deposition or turbidity increases. This would be relative to baseline conditions, and would only have the potential to affect bull trout that may be present in the area at the same time described in the Disturbance section (above). This impact will be minimized by planting (as described above). ATV and other vehicles that operate on the exposed mud flats and

beaches during the reservoir drawdown period will be limited by conservation measures, and the effects from these vehicles are expected to be undetectable.

Given baseline conditions, the limited presence in the action area by bull trout, and the minimal amount of potential turbidity and fine sediment in relation to the baseline, this effect is insignificant to bull trout.

3.3.3. Water Temperature

There is limited riparian vegetation around the lake at Lucky Peak, and any near shore activities in riparian areas are not likely to decrease shading, or increase water temperatures of the heavily regulated system. The proposed action will have no effect on water temperature.

3.3.4. Chemical Contamination

Operation of equipment such as ATVs, pick-ups, mowers, and tractors requires the use of petroleum-based fuel and lubricants, which, if spilled into the channel of a water body or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants contain poly-cyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids, but only at high levels of exposure and can cause lethal and sub-lethal chronic effects to other aquatic organisms (Neff 1985). Mowers and herbicide application equipment will be staged outside of riparian zones, and all equipment will be cleaned and fueled only in these staging areas. ATV and other vehicles that operate on the exposed mud flats and beaches during the reservoir drawdown period will be limited by conservation measures, and the effects from these vehicles are expected to be undetectable. The proposed conservation measures will likely reduce the risk of chemical contamination to a level that is not reasonably certain to occur, and is, therefore, discountable.

3.3.5. Food Resources

Listed aquatic species may be indirectly affected if their food source is impacted. However, potential disturbance of food resources would be limited in nature, confined to the immediate vicinity of near shore construction activities, and would not likely reduce the overall abundance of food resources for the few individual bull trout entrained into Lucky Peak Lake. The potential for effects resulting from the proposed action on food resources has a low risk of occurring at a level that is reasonably certain to reduce the availability and abundance of prey species and food resources, and is discountable for bull trout.

Bank stabilization activities and plantings would likely result in improved riparian vegetation, and could actually benefit (albeit minimally) bull trout that are entrained in to Lucky Peak Lake.

3.3.6. Riparian Vegetation Management

Riparian and emergent aquatic vegetation provides hiding cover or refuge for aquatic organisms. Riparian vegetation may be affected directly and indirectly by invasive plant treatment, mainly

herbicides. Some emergent aquatic vegetation is invasive (such as common reed grass and purple loosestrife) and can take over native vegetation, resulting in an undesirable monoculture.

None of the proposed activities will remove enough streamside shade to cause a measurable increase in stream temperature. No measurable effect on bull trout is likely as a result of the minimal amount of stream shade reduction, and this effect is, therefore discountable.

Bank stabilization activities and plantings would likely result in improved riparian vegetation, and could actually benefit (albeit minimally) bull trout that are entrained in to Lucky Peak Lake.

3.4. Cumulative Effects

Ongoing, nonfederal activities in the action area likely will continue to follow recent patterns with a slight, negative, or neutral effect on habitat conditions. Agricultural and residential activities likely will continue. Although the human population in the action area has recently declined, demand for agricultural, commercial, or residential development is likely to increase over the long term. The action area is used for a wide variety of activities year-round. The use of the area for recreation is expected to continue into the foreseeable future. Non-federal public docks are expected to continue to be used. BOR's O&M at Arrowrock is also reasonably certain to continue into the foreseeable future, along with the BPBC's control of the Boise River. The local population is also expected to continue to grow at current rates[8] of about 2.2%, which could eventually result in minor increases in recreational activities or water supply demands in the area.

[8] http://quickfacts.census.gov/qfd/states/16/16001.html

3.5. Determinations

The effect of the proposed action was evaluated based on the exposure and response to potential stressors. Each individual effect could result in an adverse effect to bull trout. However, it is the combined determination for the proposed action overall, for each species and critical habitat, that is the ultimate determination that needs to be made. These determinations are based on findings in the exposure and response analyses.

A “no effect” determination was made for those species or critical habitats that are temporally or spatially separated from potential stressors of the action, and could, therefore, not be exposed to potential stressors of the proposed action. Those species that had a “may affect” determination after the exposure analysis went through the response analysis for each potential stressor.

A “not likely to adversely affect” determination was made for those species or critical habitats unlikely to have a response sufficient to reduce their individual performance, or for effects that were insignificant or discountable. The Corps, through analysis of the proposed action in relation to baseline conditions and potential adverse effects, has determined that the proposed action will not result in the response of any individual bull trout that is likely to be sufficient to reduce their individual performance.

Critical habitat has not been designated for bull trout at Lucky Peak. The proposed action does have the potential to adversely affect bull trout in Lucky Peak Lake when near shore work is done between Labor Day and Memorial Day. However, due to project design, implementation of proposed conservation measures, the low density of bull trout in Lucky Peak Lake entrained from Arrowrock Dam, the Corps to conclude that the proposed action at Lucky Peak **may affect, but is not likely to adversely affect** bull trout in Lucky Peak Lake.

The combined summary of species and critical habitat determinations is shown in Table 11.

Table 11 Summary of Determination of Effects on Listed Species and Critical Habitat.

Species	Species Determination	Critical Habitat Determination
Bull trout	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
Canada lynx	No Effect	No Effect
Slickspot Peppergrass	No Effect	No Effect
Bliss Rapids Snail	No Effect	None Designated
Snake River Physa Snail	No Effect	None Designated
Greater sage-grouse	No Effect	None Designated
Yellow-billed cuckoo	No Effect	None Designated
North American wolverine	No Effect	None Designated

4. Migratory Bird Treaty Act of 1918, As Amended

The MBTA prohibits the taking of and commerce in listed migratory birds (live or dead), any parts of listed migratory birds, their feathers, or nests. Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof.

The current list of bird species that occurs at Lucky peak can be found in Appendix A. The programmatic actions described in this document may occur at any time of the year. However, some of those actions are designed to benefit migratory bird species. The Corps has an environmental stewardship responsibility, and works closely with the IDFG and local bird organizations to maximize the possible benefit of Lucky Peak activities for migratory birds. The Corps has determined that there will be no take of any migratory birds as a result of the proposed action.

5. Bald and Golden Eagle Protection Act of 1940, As Amended

The BGEPA prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions. Take under the BGEPA includes both direct taking of individuals and take due to disturbance. Disturbance is defined as: "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-caused alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagles return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering" (USFWS 2007a).

Bald eagles are found at or near Lucky Peak from November through April, where they forage on fish in the open water near the dam, or scavenge on deer carcasses. If the lake is not iced over, bald eagles can be found perched along its length. Generally, golden eagles tend to be found in the hills rather than in areas immediately adjacent to the lake. They frequent areas where deer concentrate (*e.g.*, Mores Creek), and feed on road-kills, ice-kills, and deer that have died from other causes. An average of five bald eagles and seven golden eagles have been observed each year at Lucky Peak during the annual National Wildlife Federation Midwinter Bald Eagle Survey 1979-1983 (IDFG, 1984). Data furnished to the Corps from annual counts coordinated by U.S. Bureau of Land Management for the period 1979 to 1985 resulted in averages of four bald eagles and three golden eagles (USACE 1988).

Table 12 shows the life history timing of bald eagles in the Pacific region. Bald eagle sightings at Lucky Peak are shown in Figure 15. This data was taken from 2008 IDFG geospatial data. Golden eagles are not known to occur at Lucky Peak.

Table 12 Bald eagle life history timing for the Pacific region.

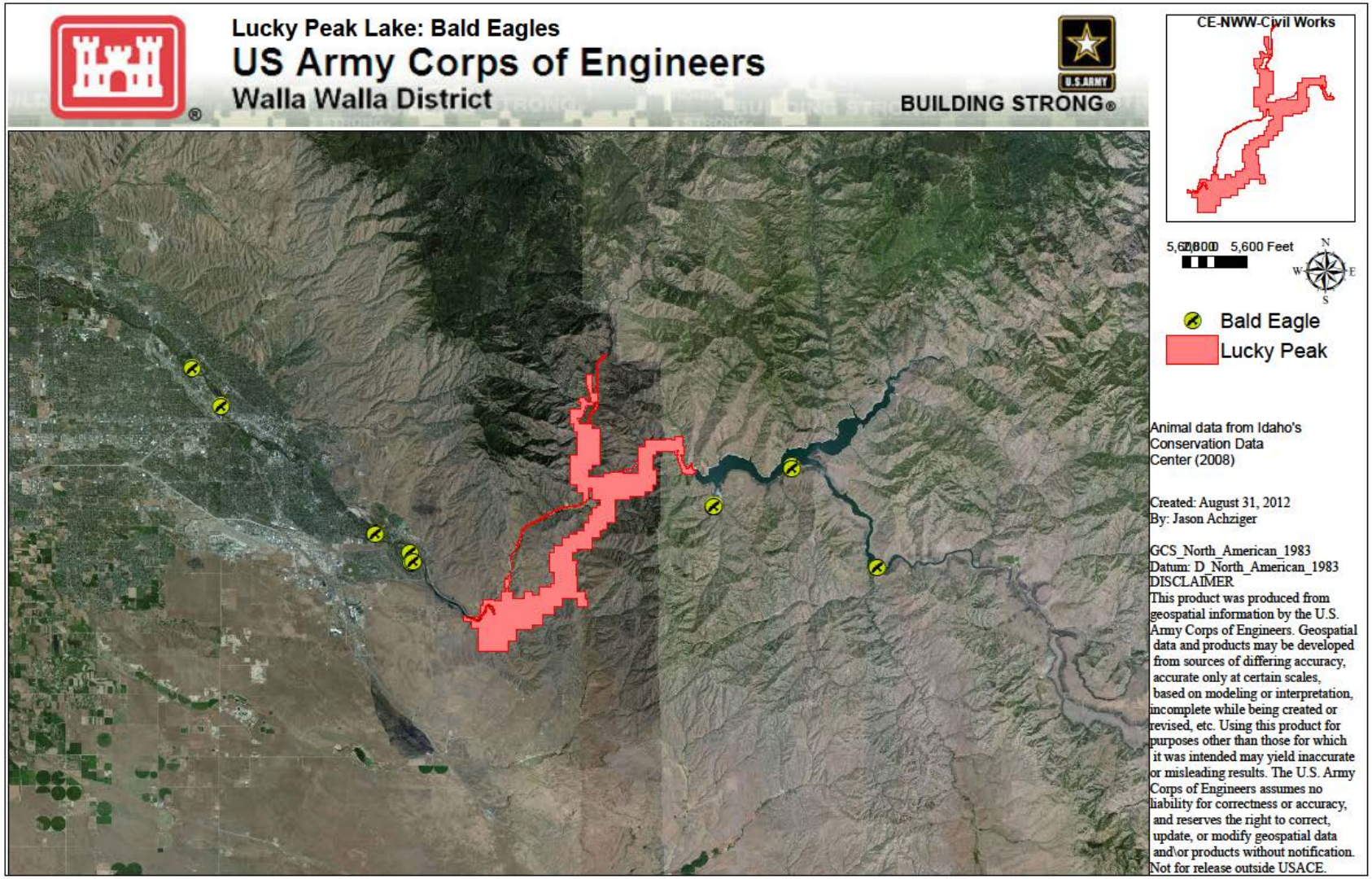
Bald Eagle Life History Timing-Pacific Region											
SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
				Nest Building							
					Egg Laying/Incubation						
						Hatching/Rearing Young					
									Fledgling Young		

USFWS. 2007a. National Bald Eagle Management Guidelines. Retrieved November 10, 2009 from: http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf

The current list of bird species that occurs at Lucky peak can be found in Appendix A. The programmatic actions described in this document may occur at any time of the year. However, as described in the Migratory Bird section of this document, some of those actions are designed to benefit migratory bird species.

The Corps has an environmental stewardship responsibility, and works closely with the IDFG and local bird organizations to maximize the possible benefit of Lucky Peak activities for migratory birds and avoid impacts to eagles. The Corps has determined that there will be no take of bald or golden eagles as a result of the proposed action.

Figure 15 Bald eagle sighting locations near Lucky Peak.



6. References

Aubry, K.B., G.M. Koehler, and J.R. Squires. 2000. Ecology of Canada lynx in Southern Boreal Forests. In: Ecology and Conservation of Lynx in the United States (eds. Ruggiero LF et al.), pp. 373–396. University Press of Colorado, Boulder, Colorado, USA.

Baldwin, P. 2003. The Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Department of Defense (DOD) Readiness Activities: Current Law and Legislative Proposals. Report for Congress. Order Code RL31415. Available at: http://www.nationalaglawcenter.org/assets/crs/RL31415.pdf

Baxter, J.S., E.B. Taylor, R.H. Devlia, J. Hagen, and J.D. McPhail. 1997. Evidence of natural hybridization between Dolly Varden (Salvelinus malma) and bull trout (Salvelinus confluentus) in a northcentral British Colombia watershed. Canadian Journal of Fisheries and Aquatic Sciences 54: 421-429.

Bell M. 1990. Fisheries Handbook of Engineering Requirements and Biological Criteria. Third. U.S. Army Corps of Engineers, North Pacific Division. Portland, Oregon. pp.1~1-35~7.

BOR (Bureau of Reclamation). 2004. Biological Assessment for Bureau of Reclamation Operations and Maintenance in the Snake River Basin Above Brownlee Reservoir. Pacific Northwest Region. Snake River Area. November. Available at: http://www.usbr.gov/pn/programs/UpperSnake/2004ba/pdf/ba-upsnake2004.pdf

Choctawhatchee, Pea and Yellow Rivers Watershed Management Authority. 2000. Recommended Practices Manual: a guide for maintenance and service of unpaved roads. February. Available at: http://water.epa.gov/polwaste/nps/unpavedroads.cfm

EPA (Environmental Protection Agency). 1993. Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters. Available at: http://www.epa.gov/owow/NPS/MMGI/Chapter6/index.html

EPA (Environmental Protection Agency). 2007. National Management Measures to Control Nonpoint Source Pollution from Hydromodification. Nonpoint Source Control Branch, Office of Wetlands, Oceans and Watersheds, U.S. Environmental Protection Agency, Office of Water. July. Available at: http://www.epa.gov/owow/NPS/hydromod/pdf/Hydromod_all_web.pdf

Fish, M.A. 2004. Taxonomy, ecology, and life history of bull trout, *Salvelinus confluentus* (Suckley). Available at: http://watershed.ucdavis.edu/skeena_river/documents/initial_reports/MAFish.pdf

Hanson, J., E. Schriever, and J. Erhardt. 2007. Bull Trout Life History Investigations in the North Fork Clearwater River Basin. Final Report 2000 – 2006. Prepared for the U.S. Army Corps of Engineers, Walla Walla District, 201 N. Third Avenue, Walla Walla, WA

99362; under subcontract to Normandeau Associated, Inc. , 1921 River road, P.O. Box 10, Drumore, PA 17518.

Idaho Sage-grouse Advisory Committee. 2006. Conservation Plan for the Greater Sage-grouse in Idaho. http://fishandgame.idaho.gov/public/wildlife/sageGrouse/conservPlan.pdf

IDFG (Idaho Department of Fish and Game). 2005. Idaho Comprehensive Wildlife Conservation Strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. http://fishandgame.idaho.gov/cms/tech/CDC/cwcs.cfm

Johnson, C. 2009. Notes on ESA section 7 effects determinations. In: Effects determination guidance. Protected Resources Division. Pacific Island Regional Guidance. National Marine Fisheries Service. January. Available at: http://www.fpir.noaa.gov/Library/PRD/ESA%20Consultation/Final%20Action%20Agency%20Consultation%20Package%20Files%20for%20website%201-12-09/Effects%20Determination%20Guidance%20-%201-12-09.pdf

Knick, S.T. and J.W. Connely (eds.). 2011. Greater sage-grouse: Ecology and Conservation of a landscape species and its habitats. Geospatial data and maps available at: http://sagemap.wr.usgs.gov/docs/sab/figure20.1.jpg

McKelvey KS, K.B. Aubry, and Y.K. Ortega. 2000. History and distribution of lynx in the contiguous United States. In: Ecology and Conservation of Lynx in the United States (eds. Ruggiero LF et al.), pp. 207–264. University Press of Colorado, Boulder, Colorado, USA.

McPhail, J.D., and J. Baxter. 1996. A review of bull trout (*Salvelinus confluentus*) life history of habitat use in the relation to compensation and improvement opportunities. Dept of Zool. And Fish. Centre, Univ. of B.C., Vancouver, BC. Draft. 58pp

Neff, J.M. 1985. Polycyclic aromatic hydrocarbons. Pages 416–454 in G.M. Rand and S.R. Petrocelli, editors. Fundamentals of aquatic toxicology. Hemisphere Publishing, Washington, D.C.

NMFS (National Marine Fisheries Service). 1996. Making Endangered Species Act determinations of effect for individual and grouped actions at the watershed scale. The National Marine Fisheries Service Environmental and Technical Services Division, Habitat Conservation Branch, Seattle, WA. Available at: http://www.nwr.noaa.gov/Publications/Reference-Documents/upload/matrix_1996.pdf

NRCS (Natural Resource Conservation Service). 1999. Protecting Streambanks from Erosion: Tips for Small Acreages in Oregon. Washington County Soil and Water Conservation District (SWCD) and the Small Acreage Steering Committee. Available at: http://www.or.nrcs.usda.gov/news/factsheets/fs4.pdf

Richards, D.C., and T.D. Arrington. 2008. Threatened Bliss Rapids snails' susceptibility to desiccation: Potential impact from hydroelectric facilities. American Malacological Buletin, 24(1):91-96. Available at: http://www.bioone.org/doi/abs/10.4003/0740-2783-24.1.91

Rieman, B.E., and J.D. McIntyre. 1993. Demographic and habitat requirements of bull trout *Salvelinus confluentus*. General Technical Report INT-GTR-302. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. 2000. The scientific basis for lynx conservation: qualified insights. Pages 443-454 *in* L.F. Ruggiero, K.B Aubry, S.W. Buskirk, et al. Ecology and conservation of lynx in the contiguous United States. University Press of Colorado, Boulder.

Salow, T. 2002. *Trap and Transport of Bull Trout (Salvelinus confluentus) from Lucky Peak Reservoir to Arrowrock Reservoir, Idaho*. Summary report submitted to the U.S. Fish and Wildlife Service, Bureau of Reclamation, Snake River Area Office, Boise, Idaho.

USACE (U.S. Army Corps of Engineers). 1988. Lucky Peak Master Plan. Design Memorandum No. 5. July.

USFS (U.S. Forest Service). 2012. Whitebark Pine. Boise National Forest. Accessed September 28, 2012 from: http://www.fs.usda.gov/detail/boise/about-forest/?cid=fsed_009687

USFWS (U.S. Fish and Wildlife Service). 1998. *Bull Trout Interim Conservation Guidance*. USFWS Lacey, Washington.

USFWS (U.S. Fish and Wildlife Service). 1998. *Final Action: Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout*. Federal Register: June 10, 1998 (Volume 63, Number 111). Boise, ID: U.S. Department of Interior, Snake River Basin Field Office.

USFWS (U.S. Fish and Wildlife Service). 2002. Bull Trout (*Salvelinus confluentus*) Draft Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 137 pps.

USFWS (U.S. Fish and Wildlife Service). 2005. U.S. Fish and Wildlife Service Biological Opinion for Bureau of Reclamation Operations and Maintenance in the Snake River Basin Above Brownlee Reservoir. Snake River Fish and Wildlife Office. Boise, Idaho. March. Available at: http://www.fws.gov/idaho/publications/BOs/Final.pdf

USFWS (U.S. Fish and Wildlife Service). 2007. National Bald Eagle management Guidelines. Available at: http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf

USFWS (U.S. Fish and Wildlife Service). 2010c. Species assessment and listing priority assignment form: *Coccyzus americanus*. Available at: http://ecos.fws.gov/docs/candidate/assessments/2010/r8/B06R_V01.pdf

USFWS (U.S. Fish and Wildlife Service). 2010e. Species assessment and listing priority assignment form: *Physaria douglasii subspecies tuplashensis, previously Lesquerella tuplashensis*. Available at: http://ecos.fws.gov/docs/candidate/assessments/2010/r1/Q3HR_P01.pdf

USFWS (U.S. Fish and Wildlife Service). 2011. Species profile: North American wolverine (*Gulo gulo luscus*). Environmental Conservation Online System. Available at: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0FA

USFWS (U.S. Fish and Wildlife Service). 2011a. Bald Eagle Management Guidelines and Conservation: Pacific Region. Available at: http://www.fws.gov/pacific/eagle/ . Updated January 10, 2011.

USFWS (U.S. Fish and Wildlife Service). 2011b. Whitebark pine. U.S. Fish and Wildlife. Endangered species. Accessed February 2, 2012 from: http://www.fws.gov/mountain-prairie/species/plants/whitebarkpine/

Whiteley, A.R., P. Spruell, and F.W. Allendorf. 2003. *Population Genetics of Boise Basin Bull Trout (Salvelinus confluentus)*. Final report to the Bureau of Reclamation under Grant No. 1425-01FG107420. Bureau of Reclamation, Snake River Area Office, Boise, Idaho.

Wydoski, R. and R. Whitney. 2003. Inland Fishes of Washington. Second Edition. American Fisheries Society, Bethesda, MD in association with University of Washington Press, Seattle. 322 pp.

DEPARTMENT OF THE ARMY
WALLA WALLA DISTRICT, CORPS OF ENGINEERS
201 NORTH THIRD AVENUE
WALLA WALLA WA 99362-1876

REPLY TO
ATTENTION OF:

February 19, 2013

Planning, Programs, and Project (1165-2-26a)
Management Division

Mr. Mark Robertson
U.S. Fish and Wildlife Service
1387 S. Vinnell Way
Room 368
Boise, Idaho 83709

Dear Mr. Robertson:

Pursuant to Section 7(c) of the Endangered Species Act, we request your review and informal consultation on the programmatic Lucky Peak Natural Resource Management Activities project. We determined that our proposed project "may affect, but is not likely to adversely affect" bull trout. We have also determined that our proposed would have "no effect" on Canada lynx, slickspot peppergrass, Bliss Rapids snail, Snake River Physa snail, greater sage-grouse, yellow-billed cuckoo, North American wolverine, and Whitebark pine. Enclosed for your review is our biological assessment.

If you have any questions or would like additional information about the proposed action, please contact Mr. Jason Achziger at 509-527-7262, or by email at Jason.K.Achizger@usace.army.mil.

Sincerely,

Michael S. Francis
Chief, Environmental Compliance Section

Enclosure

United States Department of the Interior

U.S. Fish and Wildlife Service

Idaho Fish And Wildlife Office
1387 S. Vinnell Way, Room 368
Boise, Idaho 83709
Telephone (208) 378-5243
http://www.fws.gov/idaho

Michael S. Francis
Department of the Army
Walla Walla District, Corps of Engineers
201 North Third Avenue
Walla Walla, Washington 99362-1876

MAR 1 2 2013

Subject: Lucky Peak Natural Resource Management Activities—Ada, Boise, and Elmore Counties, Idaho—Concurrence
In Reply Refer To: IFWO-01EIFW00-2012-I-0467

Dear Mr. Francis:

This letter transmits the U.S. Fish and Wildlife Service's (Service) concurrence on the effects to species listed under the Endangered Species Act (Act) of 1973, as amended, for the Lucky Peak Natural Resource Management Activities (Project) in Ada, Boise, and Elmore Counties, Idaho. In a letter dated February 19, 2013, and received February 25, 2013, the U.S. Army Corps of Engineers (USACOE) requested concurrence with the determinations, documented in your Biological Assessment (Assessment), that the proposed action is not likely to adversely affect the bull trout (*Salvelinus confluentus*). Bull trout critical habitat does not occur in the action area. The USACOE also determined that the Project will have no effect on the Canada lynx (*Lynx canadensis*), slickspot peppergrass (*Lepidium papilliferum*), Bliss Rapids snail (*Taylorconcha serpenticola*), greater sage-grouse (*Centrocercus urophasianus*) , yellow-billed cuckoo (*Coccyzus americanus*), North American wolverine (*Gulo gulo luscus*), and whitebark pine (*Pinus albicaulis*); the Services acknowledges the determinations for these species.

The USACOE proposes to continue its Natural Resource Management Activities at Lucky Peak Dam and Lake in Ada, Boise, and Elmore Counties on the Boise River near Boise, Idaho. The purpose of the proposed action is to implement eight natural resource management activities and twenty-four activity elements (Table 1) as outlined in the Luck Peak Operation Management Plan. Narratives of these specific activities and elements can be found on pages 15 through 32 of the Assessment. The USACOE proposes to implement these programmatic actions, coordinating with the Service on a repeating 5-year schedule, to allow opportunities for incorporation of minor updates to or clarification of the proposed actions. The USACOE will use the 5-year check-in process to formally assess whether reinitiating consultation with the Service is warranted, or if supplemental documents may be issued to the Service to ensure continued compliance with section 7 of the Act.

Table 1. Lucky Peak Programmatic Natural Resource Management Activities and Elements

Activity	Activity Element
Recreation Management	Camping and Day-Use Areas
	Trails
	Culvert Installation, Maintenance and Repair
Access Management	Gate and/or Barricade Installations
	Gate and/or Barricade Modifications
	Gate and/or Barricade Refurbishing
	Sign Installation/Maintenance
	Fence Repair and Maintenance
	Fence Removal
	Boulder Lining of Roadways
Boundary Management	Boundary Monument Installation
Fire Prevention	Along Roads and Parking Areas
	Camping and Day-Use Area
Road Management	Road Reconstruction
	Road Maintenance
	Culvert Installation, Maintenance, and Repair
Wildlife Habitat Management	Idaho Fish and Game Boise River Wildlife Management Area
	Habitat Management Unit (Chimney Rock)
	Nest Boxes and Feeders
	Interpretation
Bank Stabilization	Bank Sloping
Planting	Wildlife Habitat
	Recreation Areas
	Bank Stabilization

Service concurrence that the effects of the Project is not likely to adversely affect bull trout is based on the following rationales presented in the Assessment.

- Information from the Idaho Department of Fish and Game indicates that entrainment of bull trout through Lucky Peak Dam is not occurring. Natural upstream spawning migration behavior seasonally isolates adult fish from Lucky Peak Dam, as bull trout concentrate at the base of Arrowrock Dam, where they are removed by the Bureau of Reclamation and returned to Arrowrock Reservoir. Any remaining bull trout disperse throughout Lucky Peak Lake. Therefore, the effect on bull trout of entrainment through Lucky Peak Dam is discountable.
- The USACOE will conduct near shore construction activities during periods when Lucky Peak Lake is drawn down to the greatest extent possible to spatially separate any potential adverse effects from individual bull trout inhabiting the lake. Due to the spatial separation, effects to bull trout from near shore construction are not expected, and therefore are discountable.
- Most near shore construction activities will occur in the dry during lake drawdown. However, when these activities must occur during times when the lake is not drawn down, the USACOE will use appropriate erosion control devices (e.g., hay bales or silt

fences) to reduce potential input of suspended sediment in bull trout habitat. Incorporation of these measures is expected to reduce potential sediment input to insignificant levels.

- The USACOE will refuel equipment (e.g., backhoes) in areas designed for refueling (i.e., in boat-in only areas), or will ensure that refueling will not occur within 100 feet of open water. As a result of spatial separation, the potential for fuel spills to affect occupied bull trout habitat is not expected and potential effects from refueling of equipment is considered discountable.
- The USACOE will limit the operation of off road vehicles along the mud flats and beach areas exposed during draw down periods. As a result of spatial separation from bull trout habitats of potential petroleum and sediment exposure, recreational use of off road vehicles will result in discountable effects to bull trout or their habitat.
- Excavation of banks for stabilization can result in some seasonal reduction in riparian vegetation and associated food base. However, bank stabilization and riparian plantings are anticipated to improve the long term quality of the riparian vegetation, and increase available prey for bull trout. The size of the stabilization actions will be small and isolated, and erosion control measures will be incorporated to reduce effects to insignificant levels.
- The control of invasive plants is anticipated to temporarily remove some shade and refuge for aquatic organisms. However, control actions will ensure that enough vegetation remains after treatment to prevent measurable changes in water temperature and prey production, and conditions may be improved such that native aquatic/riparian vegetation may expand. Therefore, the effect of invasive plant control on bull trout habitat will be insignificant.

Thank you for your early coordination efforts for this project, and your continued interest in the conservation of threatened and endangered species. If during the 5-year implementation period the proposal addressed in the Assessment is modified, environmental conditions change, new species become proposed or listed, or additional information becomes available regarding potential effects to listed species, you should verify with the Service that your conclusions remain valid. Please contact Mark Robertson (208) 378-5287 or Bob Kibler (208) 378-5255 if you have questions concerning this letter or require additional assistance.

Sincerely,

for Brian T. Kelly
State Supervisor

cc: Walla Walla District USACOE, Walla Walla (Achziger, Tice)

APPENDIX B

TRAIL CONSTRUCTION SPECIFICATIONS

Specification for Trail Construction by Southwest Idaho Mountain bike Association (SWIMBA)

1. GENERAL

1.1. Scope of Work

The work to be performed would be the complete construction of the Lake View Trail. SWIMBA would furnish all necessary labor, materials, equipment, tools, transportation, and supplies to complete the project in accordance with the provisions of this document.

1.2. Project Location

The project would start at Lydle Gulch located across Lucky Peak Dam from Highway 21. The project would stay primarily within the U. S. Army Corp of Engineer boundaries on the “south bank” but may include several short sections of trail going up drainages on other land ownerships.

1.3. Access

This project would be accessible by track vehicles at the beginning point and along the constructed trail, and by boat/watercraft everywhere else. Any authorization to cross non-USACE land must be arranged with the landowner.

1.4. Identification of Project Area

The trail would follow existing wildlife trails, were appropriate, to maximize benefits to wildlife and minimize additional impacts. This proposal is for general scoping discussions. The specific route would be identified on the ground the entire length with flagging and surveyors tape for final approval by USACE personnel. Utilization of Natural Resource Conservation Service (NRCS) soil survey information would assist in trail location and construction methods.

1.5. Start and Progress of Work

The start of the project would be determined based on discussions with USACE. A proposed schedule would be developed and would follow SWIMBA’s typical trail building approach.

2. SPECIFICATIONS.

2.1. Trail Construction Standards

Chain saws, weed whips, brush saws, come-alongs, Single Track 240 trail building machine, or similar equipment are the only mechanized equipment permitted on the project unless specific written permission is given by USACE.

The trail would be constructed following the U.S. Forest Service Trail Class Matrix and Design Parameters with the designated use being bicycles. The design would follow those outlined in Trail Class 3 for trail width, cross slopes and design grades. For more information concerning design go to:

https://www.fs.fed.us/recreation/programs/trail-management/documents/trailfundamentals/National_Trail_Class_Matrix_10_16_2008.pdf

To keep the trail aligned and prevent unnecessary construction, the route would be flagged on the ground, and approved by land managing agency personnel,

2.2. Trail Clearing

This work would consist of clearing, grubbing, and removing rock and roots from the clearing limits of the trail. The area to be cleared within the trail corridor would be no more than 6 feet on either side of the trail except in areas where enlargement fulfills recommended fire prevention prescriptions. Great care would be given to brush and other plants vital to winter habitat for mule deer and elk.

In areas with grass/sage brush habitat, SWIMBA would follow U.S. Forest Service trail matrix class 3 clearing standards of 60 to 72 inches in width.

Near stream crossings and other areas with heavy alder and thick brush, SWIMBA would clear the trail to 6 feet on either side of the center of the trail. This would allow for seasonal brush growth without interfering with the design standard. Organic matter including leaves, duff, surface roots, and stumps would be removed from the trail, spread not more than 4 inches in depth, and placed to maintain drainage. Roots less than 50% exposed and over 2 inches in diameter would not be removed from the trail.

Organic matter including leaves, duff, surface roots, and stumps would be removed from the trail, spread not more than 4 inches in depth and would be placed to maintain drainage. Roots less than 50% exposed and over 2 inches in diameter would not be removed from the trail.

2.3. Tread Construction

The tread is defined as the cleared area of a trail. The proposed trail development includes the excavation and placement of all excavated material from within the trail way limits. Types of landform construction include embankment removal, ditches, back slopes, fill slopes, and drainage dips.

The trail tread would be constructed in a manner to positively shed water and prevent channeling, ponding, and pooling at all times. SWIMBA would follow trail building best management practices and trail construction techniques of out sloping and grade reversals as the primary methods used to prevent channeling and erosion with water bars only used as a last resort. The trail design grade and cross slope would follow the Trail Class 3 standard of 3%-10% for general grade and not to exceed 15% grade for short sections, and a cross slope 3% to 8% out slope with the occasional in slope to accommodate corners which turn into the hillside.

1. The first section of trail from Turner Gulch to Charcoal Gulch would have a goal of 4%-5% grade slope and general Trail Class 3 cross slope standard to provide a quality experience for beginners.

2. From Charcoal Gulch to Long Gulch and Lydle Gulch to Turner Gulch the trail would follow the general Trail Class 3 grade and cross slope standards.

The Trail Class 3 bicycle design turn radius is 4 to 8 feet, however the latest trail building techniques are moving toward a 10 feet plus turn radius to accommodate increased in speeds and to reduce the amount of erosion and wash boarding coming into corners. SWIMBA would deviate from the Trail Class 3 standard when site lines allow for bicycles to go faster without causing trail conflicts with other users.

Bridges would be constructed as needed for resource protection and appropriate access following Trail Class 3 design requirements. Bridges would be constructed where needed to reduce stream channel siltation. SWIMBA would consult with USACE personnel on streams requiring bridges to minimize erosion and sedimentation. Bridges would be built above the high water mark to avoid damage during spring runoff or flash floods.

Bridges would be built to cross short ravines too steep for traditional trail building techniques.

3. Best Management Practices

Petroleum product management – SWIMBA would use vapor proof and self-closing containers not to exceed 5.3 gallons to transport petroleum products. A spill containment and spill kit would be on hand at all times. All petroleum products would be transported (boat) and stored in a secondary containment container. No more than 20 gallons of petroleum product would be on the construction site at one time.

Construction would occur during the spring and fall outside of bird nesting periods and stressful periods for wintering wildlife. Construction may occur during the nesting period if the area to be developed is found clear of nesting birds by a qualified biologist.

Trail layout and construction would be done in a manner to minimize vital wintertime feed (sage brush and bitter brush) removal. Materials removed from the trail tread would be disposed of in such a manner to reduce the occurrence of invasive species.

Clinometers would be used to assure the trail is within the design parameters listed for trail slope. Electronic levels would be used to spot check grade cross slope.

4. Land Management Agency Coordination

SWIMBA would conduct a pre-work conference with USACE, BLM and IDFG, representatives before beginning work.

SWIMBA would work with land management representatives to ensure that trail segments are built the land managers requirements. Any discrepancies would be discussed and resolved before moving forward with additional trail development. SWIMBA would determine at what intervals these reviews should take place with the appropriate land management agency representative.

Trail Design Parameters

Hiker/Pedestrian (FSH 2309.18, Section 23.11, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent.[1] Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use HIKER/PEDESTRIAN		Trail Class 1	Trail Class 2	Trail Class 3[2]	Trail Class 4[2]	Trail Class 5[2]
Design Tread Width	**Wilderness** (Single Lane)	0″ – 12″	6″ – 18″	12″ – 24″ Exception: may be 36″ – 48″ at steep side slopes	18″ – 24″ Exception: may be 36″ – 48″ at steep side slopes	Not applicable
	Non-Wilderness (Single Lane)	0″ – 12″	6″ – 18″	18″ – 36″	24″ – 60″	36″ – 72″
	Non-Wilderness (Double Lane)	36″	36″	36″ – 60″	48″ – 72″	72″ – 120″
	Structures (Minimum Width)	18″	18″	18″	36″	36″
Design Surface[3]	**Type**	Native, ungraded May be continuously rough	Native, limited grading May be continuously rough	Native, with some onsite borrow or imported material where needed for stabilization and occasional grading Intermittently rough	Native with improved sections of borrow or imported material, and routine grading Minor roughness	Likely imported material, and routine grading Uniform, firm, and stable
	Protrusions	≤ 24″ Likely common and continuous	≤ 6″ May be common and continuous	≤ 3″ May be common, not continuous	≤ 3″ Uncommon, not continuous	No protrusions
	Obstacles (Maximum Height)	24″	14″	10″	8″	No obstacles
Design Grade[3]	**Target Grade**	5% – 25%	5% – 18%	3% – 12%	2% – 10%	2% – 5%
	Short Pitch Maximum	40%	35%	25%	15%	5% FSTAG: 5% – 12%[2]
	Maximum Pitch Density	20% – 40% of trail	20% – 30% of trail	10% – 20% of trail	5% – 20% of trail	0% – 5% of trail

Designed Use HIKER/PEDESTRIAN		Trail Class 1	Trail Class 2	Trail Class 3[2]	Trail Class 4[2]	Trail Class 5[2]
Design Cross Slope	**Target Cross Slope**	Natural side slope	5% – 20%	5% – 10%	3% – 7%	2% – 3% (or crowned)
	Maximum Cross Slope	Natural side slope	25%	15%	10%	3%
Design Clearing	**Height**	6′	6′ – 7′	7′ – 8′	8′ – 10′	8′ – 10′
	Width	≥ 24″ Some vegetation may encroach into clearing area	24″ – 48″ Some light vegetation may encroach into clearing area	36″ – 60″	48″ – 72″	60″ – 72″
	Shoulder Clearance	3″ – 6″	6″ – 12″	12″ – 18″	12″ – 18″	12″ – 24″
Design Turn	**Radius**	No minimum	2′ – 3′	3′ – 6′	4′ – 8′	6′ – 8′

[1] For definitions of Design Parameter attributes (for example, Design Tread Width and Short Pitch Maximum) see FSH 2309.18, Section 05.

[2] Trail Classes 3, 4, and 5, in particular, have the potential to provide accessible passage. If assessing or designing trails for accessibility, refer to the Forest Service Trail Accessibility Guidelines (FSTAG) for more specific technical provisions and tolerances (FSM 2350).

[3] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Trail Design Parameters

Pack and Saddle (FSH 2309.18, Section 23.12, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent.[1] Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use PACK AND SADDLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	**Wilderness** (Single Lane)	Typically not designed or actively managed for equestrians, although use may be allowed	12″ – 18″ May be up to 48″ along steep side slopes 48″ – 60″ or greater along precipices	18″ – 24″ May be up to 48″ along steep side slopes 48″ – 60″ or greater along precipices	24″ May be up to 48″ along steep side slopes 48″ – 60″ or greater along precipices	Typically not designed or actively managed for equestrians, although use may be allowed
	Non-Wilderness (Single Lane)		12″ – 24″ May be up to 48″ along steep side slopes 48″ – 60″ or greater along precipices	18″ – 48″ 48″ – 60″ or greater along precipices	24″ – 96″ 48″ – 60″ or greater along precipices	
	Non-Wilderness (Double Lane)		60″	60″ – 84″	84″ – 120″	
	Structures (Minimum Width)		Other than bridges: 36″ Bridges without handrails: 60″ Bridges with handrails: 84″ clear width	Other than bridges: 36″ Bridges without handrails: 60″ Bridges with handrails: 84″ clear width	Other than bridges: 36″ Bridges without handrails: 60″ Bridges with handrails: 84″ clear width	
Design Surface[2]	**Type**		Native, with limited grading May be frequently rough	Native, with some onsite borrow or imported material where needed for stabilization and occasional grading Intermittently rough	Native, with improved sections of borrow or imported material and routine grading Minor roughness	
	Protrusions		≤ 6″ May be common and continuous	≤ 3″ May be common, not continuous	≤ 3″ Uncommon, not continuous	
	Obstacles (Maximum Height)		12″	6″	3″	

Designed Use PACK AND SADDLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Grade[2]	Target Grade	Typically not designed or actively managed for equestrians, although use may be allowed	5% – 20%	3% – 12%	2% – 10%	Typically not designed or actively managed for equestrians, although use may be allowed
	Short Pitch Maximum		30%	20%	15%	
	Maximum Pitch Density		15% – 20% of trail	5% – 15% of trail	5% – 10% of trail	
Design Cross Slope	Target Cross Slope		5% – 10%	3% – 5%	0% – 5%	
	Maximum Cross Slope		10%	8%	5%	
Design Clearing	Height		8′ – 10′	10′	10′ – 12′	
	Width		72″ Some light vegetation may encroach into clearing area	72″ – 96″	96″	
	Shoulder Clearance		6″ – 12″ Pack clearance: 36″ x 36″	12″ – 18″ Pack clearance: 36″ x 36″	12″ – 18″ Pack clearance: 36″ x 36″	
Design Turn	Radius		4′ – 5′	5′ – 8′	6′ – 10′	

[1] For definitions of Design Parameter attributes (for example, Design Tread Width and Short Pitch Maximum) see FSH 2309.18, Section 05.

[2] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Trail Design Parameters

Bicycle (FSH 2309.18, Section 23.13, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent.[1] Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use BICYCLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	**Single Lane**	6″ – 12″	12″ – 24″	18″ – 36″	24″ – 48″	36″ – 60″
	Double Lane	36″ – 48″	36″ – 48″	36″ – 48″	48″ – 84″	72″ – 120″
	Structures (Minimum Width)	18″	18″	36″	48″	60″
Design Surface[2]	**Type**	Native, ungraded May be continuously rough Sections of soft or unstable tread on grades < 5% may be common and continuous	Native, with limited grading May be continuously rough Sections of soft or unstable tread on grades < 5% may be common	Native, with some onsite borrow or imported material where needed for stabilization and occasional grading Intermittently rough Sections of soft or unstable tread on grades < 5% may be present, but not common	Native, with improved sections of borrow or imported materials and routine grading Stable, with minor roughness	Likely imported material and routine grading Uniform, firm, and stable
	Protrusions	≤ 24″ Likely common and continuous	≤ 6″ May be common and continuous	≤ 3″ May be common, but not continuous	≤ 3″ Uncommon and not continuous	No protrusions
	Obstacles (Maximum Height)	24″	12″	10″	8″	No obstacles
Design Grade[2]	**Target Grade**	5% – 20%	5% – 12%	3% – 10%	2% – 8%	2% – 5%
	Short Pitch Maximum	30% 50% on downhill segments only	25% 35% on downhill segments only	15%	10%	8%
	Maximum Pitch Density	20% – 30% of trail	10% – 30% of trail	10% – 20% of trail	5% – 10% of trail	0% – 5% of trail
Design Cross Slope	**Target Cross Slope**	5% – 10%	5% – 8%	3% – 8%	3% – 5%	2% – 3%
	Maximum Cross Slope	10%	10%	8%	5%	5%

Designed Use BICYCLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Clearing	**Height**	6′	6′ – 8′	8′	8′ – 9′	8′ – 9′
	Width	24″ – 36″ Some vegetation may encroach into clearing area	36″ – 48″ Some light vegetation may encroach into clearing area	60″ – 72″	72″ – 96″	72″ – 96″
	Shoulder Clearance	0″ – 12″	6″ – 12″	6″ – 12″	6″ – 18″	12″ – 18″
Design Turn	**Radius**	2′ – 3′	3′ – 6′	4′ – 8′	8′ – 10′	8′ – 12′

[1] For definitions of Design Parameter attributes (for example, Design Tread Width and Short Pitch Maximum) see FSH 2309.18, Section 05.

[2] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Trail Design Parameters

Motorcycle (FSH 2309.18, Section 23.21, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent.[1] Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use MOTORCYCLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	**Single Lane**	Typically not designed or actively managed for motorcycles, although use may be allowed	8″ – 24″	18″ – 36″	24″ – 48″	Typically not designed or actively managed for motorcycles, although use may be allowed
	Double Lane		48″	48″ – 60″	60″ – 72″	
	Structures (Minimum Width)		36″	48″	48″	
Design Surface[2]	**Type**		Native, with limited grading May be continuously rough Sections of soft or unstable tread on grades < 5% may be common and continuous	Native, with some onsite borrow or imported material where needed for stabilization and occasional grading Intermittently rough Sections of soft or unstable tread on grades < 5% may be present	Native, with imported materials for tread stabilization likely and routine grading Minor roughness Sections of soft tread not common	
	Protrusions		≤ 6″ May be common and continuous	≤ 3″ May be common, but not continuous	≤ 3″ Uncommon and not continuous	
	Obstacles (Maximum Height)		18″ May be common or placed for increased challenge	12″ Common and left for increased challenge	3″ Uncommon	
Design Grade[2]	**Target Grade**		10% – 25%	5% – 20%	3% – 10%	
	Short Pitch Maximum		40%	25%	15%	
	Maximum Pitch Density		20% – 40% of trail	15% – 30% of trail	10% – 20% of trail	

Designed Use MOTORCYCLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Cross Slope	**Target Cross Slope**	Typically not designed or actively managed for motorcycles, although use may be allowed	5% – 10%	5% – 8%	3% – 5%	Typically not designed or actively managed for motorcycles, although use may be allowed
	Maximum Cross Slope		15%	10%	10%	
Design Clearing	**Height**		6′ – 7′	6′ – 8′	8′ – 10′	
	Width (On steep side hills, increase clearing on uphill side by 6″ – 12″)		36″ – 48″ Some light vegetation may encroach into clearing area	48″ – 60″	60″ – 72″	
	Shoulder Clearance		6″ – 12″	12″ – 18″	12″ – 24″	
Design Turn	**Radius**		3′ – 4′	4′ – 6′	5′ – 8′	

[1] For definitions of Design Parameter attributes (for example, Design Tread Width and Short Pitch Maximum) see FSH 2309.18, Section 05.

[2] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Trail Design Parameters

All-Terrain Vehicle (FSH 2309.18, Section 23.22, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent.[1] Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use ALL-TERRAIN VEHICLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	**Single Lane**	Typically not designed or actively managed for ATVs, although use may be allowed	48″ – 60″	60″	60″ – 72″	Typically not designed or actively managed for ATVs, although use may be allowed
	Double Lane		96″	96″ – 108″	96″ – 120″	
	Structures (Minimum Width)		60″	60″	60″	
Design Surface[2]	**Type**		Native, with limited grading May be continuously rough Sections of soft or unstable tread on grades < 5% may be common and continuous	Native, with some onsite borrow or imported material where needed for stabilization and occasional grading Intermittently rough Sections of soft or unstable tread on grades < 5% may be present	Native, with imported materials for tread stabilization likely and routine grading Minor roughness Sections of soft tread uncommon	
	Protrusions		≤ 6″ May be common and continuous	≤ 3″ May be common, but not continuous	≤ 3″ Uncommon and not continuous	
	Obstacles (Maximum Height)		12″ May be common or placed for increased challenge	6″ May be common and left for increased challenge	3″ Uncommon	
Design Grade[2]	**Target Grade**		10% – 25%	5% – 15%	3% – 10%	
	Short Pitch Maximum		35%	25%	15%	
	Maximum Pitch Density		20% – 40% of trail	15% – 30% of trail	10% – 20% of trail	

Designed Use ALL-TERRAIN VEHICLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Cross Slope	**Target Cross Slope**	Typically not designed or actively managed for ATVs, although use may be allowed	5% – 10%	3% – 8%	3% – 5%	Typically not designed or actively managed for ATVs, although use may be allowed
	Maximum Cross Slope		15%	10%	8%	
Design Clearing	**Height**		6′ – 7′	6′ – 8′	8′ – 10′	
	Width (On steep side hills, increase clearing on uphill side by 6″ – 12″)		60″ Some light vegetation may encroach into clearing area	60″ – 72″	72″ – 96″	
	Shoulder Clearance		0″ – 6″	6″ – 12″	12″ – 18″	
Design Turn	**Radius**		6′ – 8′	8′ – 10′	8′ – 12′	

[1] For definitions of Design Parameter attributes (for example, Design Tread Width and Short Pitch Maximum) see FSH 2309.18, Section 05.

[2] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Trail Design Parameters

Four-Wheel Drive Vehicle > 50″ (FSH 2309.18, Section 23.23, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent.[1] Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use FOUR-WHEEL DRIVE VEHICLE > 50″		**Trail Class 1**	**Trail Class 2**	**Trail Class 3**	**Trail Class 4**	**Trail Class 5**
Design Tread Width	**Single Lane**	Typically not designed or actively managed for 4WD vehicles > 50″, although use may be allowed	72″ – 84″	72″ – 96″	96″ – 120″	Typically not designed or actively managed for 4WD vehicles > 50″, although use may be allowed
	Double Lane		16′	16′	16′	
	Structures (Minimum Width)		96″	96″	96″	
Design Surface[2]	**Type**		Native, with limited grading May be continuously rough Sections of soft or unstable tread on grades < 5% may be common and continuous	Native, with some on-site borrow or imported material where needed for stabilization and occasional grading Intermittently rough Sections of soft or unstable tread on grades < 5% may be present	Native, with imported materials for tread stabilization likely and routine grading Minor roughness Sections of soft tread uncommon	
	Protrusions		≤ 12″ May be common and continuous	≤ 8″ May be common and continuous	≤ 4″ May be common and continuous	
	Obstacles (Maximum Height)		36″ May be common or placed for increased challenge	24″ Common and left for increased challenge	12″ Uncommon	
Design Grade[2]	**Target Grade**		10% – 21%	5% – 18%	5% – 12%	
	Short Pitch Maximum		25%	20%	15%	
	Maximum Pitch Density		20% – 30% of trail	10% – 20% of trail	5% – 10% of trail	

Four-Wheel Drive Vehicle > 50″ (FSH 2309.18, Section 23.23, Exhibit 01)

Designed Use FOUR-WHEEL DRIVE VEHICLE > 50″		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Cross Slope	**Target Cross Slope**	Typically not designed or actively managed for 4WD vehicles > 50″, although use may be allowed	8% – 15%	5% – 12%	5% – 8%	Typically not designed or actively managed for 4WD vehicles > 50″, although use may be allowed
	Maximum Cross Slope		15%	12%	8%	
Design Clearing	**Height**		6′ – 8′	6′ – 8′	8′ – 10′	
	Width		72″ – 84″ Some light vegetation may encroach into clearing area	72″ – 96″	96″ – 144″	
	Shoulder Clearance		0″ – 6″	6″ – 12″	12″ – 18″	
Design Turn	**Radius**		10′ – 15′	15′ – 20′	20′ – 30′	

[1] For definitions of Design Parameter attributes (for example, Design Tread Width and Short Pitch Maximum) see FSH 2309.18, Section 05.

[2] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Trail Design Parameters

Cross-Country Ski (FSH 2309.18, Section 23.31, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent.[1] Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use CROSS-COUNTRY SKI		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	**Single Lane**	Typically not designed or actively managed for cross-country skiing, although use may be allowed	2′ – 4′ Typically not groomed	6′ – 8′ Or width of grooming equipment	8′– 10′ Or width of grooming equipment	Typically not designed or actively managed for cross-country skiing, although use may be allowed
	Double Lane		6′ – 8′	8′ – 12′	12′ – 16′	
	Structures (Minimum Width)		36″	36″	36″	
Design Surface[2]	**Type**		Generally no machine grooming	May receive occasional machine grooming for snow compaction and track setting	Regular machine grooming for snow compaction and track setting	
	Protrusions		No protrusions	No protrusions	No protrusions	
	Obstacles (Maximum Height)		12″ Uncommon	8″ Uncommon (no obstacles if machine groomed)	No obstacles	
Design Grade[2]	**Target Grade**		5% – 15%	2% – 10%	0% – 8%	
	Short Pitch Maximum		25%	20%	12%	
	Maximum Pitch Density		10% – 20% of trail	5% – 15% of trail	0% – 10% of trail	
Design Cross Slope	**Target Cross Slope**		0% – 10%	0% – 5%	0% – 5%	
	Maximum Cross Slope (For up to 50″)		20%	15%	10%	

Designed Use CROSS-COUNTRY SKI		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Clearing	**Height** (Above normal maximum snow level)	Typically not designed or actively managed for cross-country skiing, although use may be allowed	6′ – 8′	8′ Or height of grooming equipment	8′ – 10′	Typically not designed or actively managed for cross-country skiing, although use may be allowed
	Width		24″ – 60″ Light vegetation may encroach into clearing area	72″ – 120″ Light vegetation may encroach into clearing area	96″ – 168″ Widen clearing at turns or if increased sight distance needed	
	Shoulder Clearance		0″ – 6″	0″ – 12″	0″ – 24″	
Design Turn	**Radius**		8′ – 10′	15′ – 20′ Or to accommodate grooming equipment	≥ 25′	

[1] For definitions of Design Parameter attributes (for example, Design Tread Width and Short Pitch Maximum) see FSH 2309.18, Section 05.

[2] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Trail Design Parameters

Snowshoe (FSH 2309.18, Section 23.32, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent.[1] Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use SNOWSHOE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	**Single Lane**	Typically not designed or actively managed for snowshoe, although use may be allowed	36″	36″ – 48″	36″ – 60″	Typically not designed or actively managed for snowshoe, although use may be allowed
	Double Lane		60″	72″	72″ – 96″	
	Structures (Minimum Width)		36″	48″	48″	
Design Surface[2]	**Type**		Generally no machine grooming	May receive occasional machine grooming for snow compaction	Likely to receive occasional machine grooming for snow compaction	
	Protrusions		No protrusions	No protrusions	No protrusions	
	Obstacles (Maximum Height)		12″ Uncommon	8″ Uncommon (no obstacles if machine groomed)	No obstacles	
Design Grade[2]	**Target Grade**		10% – 20%	5% – 15%	0% – 10%	
	Short Pitch Maximum		30%	20%	15%	
	Maximum Pitch Density		5% – 20% of trail	5% – 25% of trail	0% – 10% of trail	
Design Cross Slope	**Target Cross Slope**		0% – 10%	0% – 5%	0% – 5%	
	Maximum Cross Slope		20%	15%	10%	

Designed Use SNOWSHOE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Clearing	**Height** (Above normal maximum snow level)	Typically not designed or actively managed for snowshoe, although use may be allowed	6′ – 8′	8′	8′ – 10′	Typically not designed or actively managed for snowshoe, although use may be allowed
	Width		48″ Some light vegetation may encroach into clearing area	72″ Light vegetation may encroach into clearing area	72″ – 96″	
	Shoulder Clearance		0″	12″	12″ – 24″	
Design Turn	**Radius**		3′ – 4′	3′ – 6′	4′ – 8′ Or to accommodate grooming equipment	

[1] For definitions of Design Parameter attributes (for example, Design Tread Width and Short Pitch Maximum) see FSH 2309.18, Section 05.

[2] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Trail Design Parameters

Snowmobile (FSH 2309.18, Section 23.33, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent.[1] Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use SNOWMOBILE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	**Single Lane**	Typically not designed or actively managed for snowmobiles, although use may be allowed	4′ – 6′ Typically not groomed	6′ – 8′ Or width of grooming equipment On turns with tight radius, increase groomed width to ≥ 10′	8′ – 10′ Or minimum width of grooming equipment On turns with tight radius, increase groomed width to ≥ 12′	Typically not designed or actively managed for snowmobiles, although use may be allowed
	Double Lane		10′ Typically not groomed	10′ – 12′	12′ – 20′	
	Structures (Minimum Width)		6′	12′	18′	
Design Surface[2]	**Type**		Generally no machine grooming Commonly rough and bumpy	May receive occasional machine grooming for snow compaction and conditioning Frequently rough and bumpy	Regular machine grooming for snow compaction and conditioning Commonly smooth	
	Protrusions		No protrusions	No protrusions	No protrusions	
	Obstacles (Maximum Height)		12″ Uncommon	6″ Uncommon (no obstacles if machine groomed)	No obstacles	
Design Grade[2]	**Target Grade**		0% – 12%	0% – 10%	0% – 8%	
	Short Pitch Maximum		35%	25%	20%	
	Maximum Pitch Density		15% – 30% of trail	10% – 20% of trail	5% – 10% of trail	

Designed Use SNOWMOBILE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Cross Slope	**Target Cross Slope**	Typically not designed or actively managed for snowmobiles, although use may be allowed	0% – 10%	0% – 5%	0%	Typically not designed or actively managed for snowmobiles, although use may be allowed
	Maximum Cross Slope		15%	10%	5%	
Design Clearing	**Height** (Above normal maximum snow level)		6′	6′ – 8′ Provide sufficient clearance for grooming equipment	8′ – 12′ Provide sufficient clearance for grooming equipment	
	Width		6′ – 12′ Some light vegetation may encroach into clearing area	8′ – 14 ′ Light vegetation may encroach into clearing area	10′ – 22′ Widen clearing at turns or if increased sight distance needed	
	Shoulder Clearance		6″ – 12″	12″ – 18″	12″ – 24″	
Design Turn	**Radius**		8′ – 10′	15′ – 20′ Or sufficient radius for grooming equipment	25′ – 50′	

[1] For definitions of Design Parameter attributes (for example, Design Tread Width and Short Pitch Maximum) see FSH 2309.18, Section 05.

[2] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.