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Idaho Falls, Idaho 83402

SEP 15 2016

Subject: Biological Opinion for Effects to Bull Trout and its Designated Critical Habitat from the Proposed Island Park Bridge Project, City of Salmon, Lemhi County, Idaho, and Concurrence for Effects to Yellow-billed Cuckoo (01EIFW00-2016-F-0875)

Dear Mr. Brochu:

This letter transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) on effects of the U.S. Army Corps of Engineers (Corps) proposal to issue a 404 permit for the Island Park Bridge Project in Lemhi County, Idaho, to bull trout (*Salvelinus confluentus*), a species listed as threatened under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq. [Act]), and its designated critical habitat.

In an email received by the Service July 6, 2016, the Corps requested consultation under section 7 of the Act. Your email included a biological assessment (Assessment) describing effects of the subject action on bull trout and its designated critical habitat. Through the Assessment, the Corps determined that the proposed Island Park Bridge Project was likely to adversely affect bull trout and its designated critical habitat. In the attached Opinion, the Service finds that effects of the proposed Island Park Bridge Project are not likely to jeopardize the coterminous United States population of bull trout. If conditions change such that the analysis in the enclosed Opinion is no longer accurate, reinitiation of formal consultation may be necessary.

The Corps also determined that the proposed Island Park Bridge Project may affect, but is not likely to adversely affect, yellow-billed cuckoo (*Coccyzuz americanus*). The Service concurs with your determination for yellow-billed cuckoo and presents our rationale below.

Proposed Action

The proposed action is the replacement of the Island Park Bridge in the City of Salmon. Work is expected to being September 15, 2016, with most work completed prior to December 31, 2016. The new bridge will be approximately 6 feet higher than the existing bridge and approximately 30 feet outside of the existing footprint. The Salmon River splits into two channels at Island Park. The proposed action will partially divert the west channel into the east channel through the

placement of jersey barriers at the southern point of the island. The new bridge abutments will be constructed, then the existing bridge superstructure will be deconstructed and the existing abutments removed. A new bridge superstructure will then be put into place, and the west to east channel diversion will be removed. An excavator will be used to place and remove the diversion during deconstruction and construction of the bridge.

The proposed action includes 40 conservations measures described in detailed in the Assessment (pp. 14-17). These conservation measures are designed to reduce the degree of impact to the Salmon River and associated riparian area and will be implemented as part of the proposed action.

Species and Habitat Presence in the Action Area

The action area encompasses approximately 13,890 feet of the Salmon River in the City of Salmon; this includes 1 mile upstream and downstream from the bridge site where noise impacts could extend (Assessment, pp. 4-5). Native vegetation dominates most of the action area along the streambanks with the majority of the vegetation consisting of black cottonwood (*Populus balsamifera*), red osier dogwood (*Cornus sericea*), and willow species (*Salix. spp.*). The riparian corridor within the action area contains patches of habitat that fit the general description of yellow-billed cuckoo habitat, with large cottonwood trees, and a dense understory of shrubs. However, the habitat within the action area is considered less preferred because the understory is generally open and the woodlands are fragmented and in a highly disturbed urban environment (Assessment, p. 32).

In Idaho, yellow-billed cuckoo are considered a rare visitor and local summer resident, arriving in Idaho from May to June and leaving from mid to late August. Yellow-billed cuckoos occur in scattered drainages, primarily in the southeastern portion of the state (Assessment, p. 21). Only four sightings of yellow-billed cuckoo have been documented in northern and central Idaho in the 20th century (Assessment, p. 21). Although, a single yellow-billed cuckoo was recorded about 5 miles north of the action area near Salmon in 2003 (Assessment, p. 21), no yellow-billed cuckoos are known to occur in the action area.

Potential Impacts and Effects from the Proposed Action

Project activities will produce noise, an increase in human activity, and result in potential habitat modification (two non-native trees removed). Construction activities will be discrete in time (less than 3 months from September to December), and within an area of existing human disturbance. Native trees are not anticipated to be disturbed, but some native shrubs may be crushed or removed. Any crushed shrubs are anticipated to recover and riparian plantings will replace any removed shrubs.

Considering yellow-billed cuckoo behavior and lack of its use of habitat in the action area, the project design, location, and timing (after yellow-billed cuckoo have migrated out of the area), and the existing level of disturbance, it is highly unlikely for a yellow-billed cuckoo to be present in the action area during project activities. For these reasons, the Service finds that the effects to yellow-billed cuckoo from the proposed Island Park Bridge Project are discountable.

Concurrence

Based on the Service's review of the Assessment, we concur with the Corps' determination that the action outlined in the Assessment and this letter, may affect, but is not likely to adversely affect yellow-billed cuckoo. This concurrence is based on the existing condition of yellow-billed cuckoo habitat within the action area, duration and timing of the proposed action, and proposed conservation measures that reduce the impacts to riparian vegetation. This concludes informal consultation on the effects of the proposed action to yellow-billed cuckoo. Further consultation pursuant to section 7(a)(2) of the Act is not required.

Reinitiation of consultation on this action may be necessary if: (1) new information reveals effects of the action that may affect yellow-billed cuckoo in a manner or to an extent not considered in the Assessment, (2) the action is subsequently modified in a manner that causes an effect to yellow-billed cuckoo that was not considered in the analysis, or (3) a new species is listed or critical habitat is designated that may be affected by the proposed action. If you have any questions regarding this consultation, please contact Evan Ohr of our Eastern Idaho Field Office at (208) 237-6975 ext. 115 or contact our office at the letterhead address above.

Sincerely,

Sandra M Fisher

for Gregory M. Hughes
State Supervisor

Enclosure

cc: City of Salmon (Cerise)

BIOLOGICAL OPINION
FOR THE
ISLAND PARK BRIDGE
LEMHI COUNTY, IDAHO

01EIFW00-2016-F-0875

FISH AND WILDLIFE SERVICE
IDAHO FISH AND WILDLIFE OFFICE
BOISE, IDAHO

for **Supervisor** Sandy Fisher

Date 15 September 2016

TABLE OF CONTENTS

List of Tables

INTRODUCTION

This document represents the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) on the effects to the threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat from the Army Corps of Engineers' (Corps) proposed issuance of a 404 permit to authorize a bridge replacement in Lemhi County, Idaho. This Opinion was prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; [Act]). The Corps' request for consultation was received on July 6, 2016.

This Opinion is primarily based on the Corps' *Island Park Bridge Biological Assessment* (ERG 2016, entire), dated June 2016, and other sources of information cited herein. The biological assessment (Assessment) is incorporated by reference in this Opinion.

Consultation History

In 2014, the Island Park Bridge was closed due to excessive scour and unsafe conditions. In May 2015, the City of Salmon began coordinating with the Service on replacement of the bridge. Subsequently, the City of Salmon prepared a biological assessment. In the June 2016 Assessment, the Corps determined the proposed action may affect and is likely to adversely affect bull trout and its designated critical habitat.

Through the Assessment, the Corps also determined the proposed action may affect, but is not likely to adversely affect yellow-billed cuckoo (*Coccyzus americanus*). The Service has reviewed the basis for the not likely to adversely affect determination for yellow-billed cuckoo and concurs with this finding for reasons discussed in the transmittal letter for this Opinion. Therefore, yellow-billed cuckoo will not be discussed further.

A chronology of this consultation is presented below. A complete decision record for this consultation is on file at the Service's Eastern Idaho Field Office in Chubbuck, Idaho.

May 3, 2016	The Service participates in a site visit and discusses the construction sequence, project details, and conservation measures.
May 24, 2016	The Service receives a draft biological assessment from the City of Salmon.
June 13, 2016	The Service provides comments to the City of Salmon on the draft biological assessment.
July 6, 2016	The Service receives the final biological assessment and request for initiation of consultation from the Corps.

PURPOSE AND ORGANIZATION OF THIS BIOLOGICAL OPINION

In accordance with the requirements of section 7(a)(2) of the Act and its implementing regulations, the formal consultation process culminates in the Service's issuance of an Opinion

that sets forth the basis for a determination as to whether the proposed Federal action is likely to jeopardize the continued existence of listed species or to destroy or adversely modify critical habitat, as appropriate. The regulatory definition of jeopardy and a description of the formal consultation process are provided at 50 CFR[1] 402.02 and 402.14, respectively. If the Service finds that the action is not likely to jeopardize a listed species, but anticipates that it is likely to cause incidental take of the species, then the Service must identify that take and exempt it from the prohibitions against such take under section 9 of the Act through an Incidental Take Statement.

Analytical Framework for the Jeopardy and Destruction or Adverse Modification Analyses

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis for bull trout in this Opinion relies on four components:

1. *Status of the Species*, which evaluates the rangewide condition of the bull trout, the factors responsible for that condition, and its survival and recovery needs;

2. *Environmental Baseline*, which supplements the findings of the *Status of the Species* analysis by specifically evaluating the condition of bull trout in the action area, the factors responsible for that condition, and the role of the action area in the survival and recovery of the bull trout;

3. *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on bull trout; and

4. *Cumulative Effects*, which evaluates the effects of future, non-Federal activities reasonably certain to occur in the action area on bull trout.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of bull trout current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of bull trout in the wild, at the rangewide scale.

Interim recovery units were defined in the final listing rule for bull trout for use in completing jeopardy analyses (USFWS 1999, p. 58910). Subsequently, the Recovery Plan for the Coterminous United States Population of Bull Trout (*Salvelinus confluentus*), released by the Service in September 2015, formally established six bull trout recovery units, each of which is individually necessary to conserve the entire listed entity (USFWS 2015, p. 33). Pursuant to Service policy, when an action impairs or precludes the capacity of a recovery unit from providing both the survival and recovery function assigned to it, that action may represent jeopardy to the species. When using this type of analysis, the biological opinion describes how

[1] CFR represents the Code of Federal Regulations which is a codification of the general and permanent rules published in the Federal Register by Executive departments and agencies of the Federal Government. It is published by the Office of the Federal Register National Archives and Records Administration. More information can be found at http://www.gpoaccess.gov/cfr/index.html

the action affects not only the recovery unit's capability, but the relationship of the recovery unit to both the survival and recovery of the listed species as a whole. The following analysis uses this approach and considers the role of the action area and core area (discussed below under the *Status of the Species* section) in the function of the recovery unit as context for evaluating the effects of the proposed Federal action, together with any cumulative effects, on the survival and recovery of the bull trout to make the jeopardy determination. Please note that consideration of the recovery units for purposes of the jeopardy analysis is done within the context of making the jeopardy determination at the scale of the entire listed species in accordance with Service policy (USFWS 2006).

Destruction or Adverse Modification Determination

In accordance with policy and regulation, the destruction or adverse modification analysis for bull trout critical habitat in this Opinion relies on four components:

1. The *Status of Critical Habitat* analysis, which evaluates the rangewide condition of designated critical habitat for the bull trout in terms of physical or biological features (PBFs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall, as well as the intended recovery function in general of critical habitat units;

2. The *Environmental Baseline* analysis, which supplements the *Status of the Critical Habitat* analysis by specifically evaluating the condition of bull trout critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area;

3. The *Effects of the Action* analysis, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PBFs of bull trout critical habitat and how those effects are likely to influence the recovery role of affected critical habitat units; and

4. The *Cumulative Effects* analysis, which evaluates the effects of future, non-Federal activities reasonably certain to occur in the action area on bull trout critical habitat. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Past designations of critical habitat have used the terms "primary constituent elements" (PCEs), "physical or biological features" (PBFs) or "essential features" to characterize the key components of critical habitat that provide for the conservation of the listed species. The new critical habitat regulations (81 FR 7214) discontinue use of the terms PCEs or essential features, and rely exclusively on use of the term PBFs for that purpose because that term is contained in the statute. However, the shift in terminology does not change the approach used in conducting a ''destruction or adverse modification'' analysis, which is the same regardless of whether the original designation identified PCEs, PBFs or essential features. For those reasons, in this Opinion, we use the term PBF to characterize the key components of critical habitat that provide for the conservation of the bull trout.

For purposes of making the destruction or adverse modification determination, the effects of the proposed Federal action, together with any cumulative effects, are evaluated to determine if the critical habitat rangewide would remain functional (or retain the current ability for the PBFs to be functionally re-established in areas of currently unsuitable but capable habitat) to serve its intended conservation/recovery role for the bull trout.

I. DESCRIPTION OF THE PROPOSED ACTION

A. Action Area

The term "action area" is defined in the regulations as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." An action includes activities or programs "directly or indirectly causing modifications to the land, water, or air" (50 CFR 402.02). In this case, the area where land, water, or air is likely to be affected includes a 2,330 foot reach of the Salmon River from approximately 100 feet above Island Park downstream to the Norton irrigation diversion dam. This reach includes the areas of the existing Island Park Bridge, the six river access points, and the east and west channels of the Salmon River around the island.

The action area also includes the areas that noise disturbance is expected to extend beyond the construction site, and the length of the Salmon River that sediment is expected to move downstream from the project site. Construction site impacts will be contained with a 2,500 feet long and 500 feet wide area. Noise and disturbance from construction activities are anticipated to extend approximately 1 mile upstream and downstream from the construction site. The proposed action is anticipated to result in sediment effects in up to 3,300 feet of the Salmon River. In total, the action area (including the area of noise disturbance) spans 13,890 feet of the Salmon River. The action area is within the City of Salmon, in Lemhi County, Idaho (Assessment, p. 5).

B. Proposed Action

The term "action" is defined in the implementing regulations for section 7 as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas" (50 CFR 402.02).

The Corps' proposed action is the issuance of a 404 permit for the replacement of the Island Park Bridge, which spans the west channel of the Salmon River. The existing bridge will be replaced with a single-span, one-lane bridge, approximately 6 feet higher than the existing bridge. The span will increase by approximately 30 feet.

Bridge replacement includes: 1) preconstruction, 2) dewatering, 3) bridge deconstruction/construction, and 4) revegetation and site cleanup. These actions are described in detail in the Assessment (pp. 7-13) and below.

1. Preconstruction

All areas used for project construction, equipment staging areas, maintenance, and refueling areas will be identified, marked, and fenced off by the contractor for safety purposes. All access points in and around the Island Park Bridge will be closed to both vehicular and pedestrian traffic during the proposed action.

Erosion and sediment control measures will be installed to ensure that Best Management Practices (BMP) of erosion/storm water are in place (Assessment, p. 8). Techniques from the Idaho Transportation Department Temporary and Construction Site BMPs will be used, as appropriate, to implement protection measures. Refueling of equipment will occur on the island as needed with the use of a small truck fitted with a 100 gallon tank. The truck will be mobilized across the existing bridge or a refueling hose will be run across the bridge deck to equipment. Refueling of vehicles or equipment on the island will be within a spill containment cell. A trailer with spill kit will be at the ready during refueling operations. Vehicles and equipment off the island will be refueled or maintained more than 150 feet from surface water.

2. Dewatering

The project will involve dewatering portions of the Salmon River using diversion dams or cofferdams. Idaho Department of Fish and Game (IDFG) will be notified and given a minimum of a 48 hour notice to be onsite for fish salvage prior to any dewatering and dam construction. Work will cease if IDFG is not available to perform fish salvage operations. Conservation measures addressing fish salvage operations are addressed in the Assessment (pp. 14-17). The dewatering will occur in four phases:

- Phase I- Diverting partial channel flow from the west channel to east channel;
- Phase II- Cofferdam around east abutment work areas during concrete pouring and placement of riprap;
- Phase III- Cofferdam around west abutment work areas during concrete pouring and placement of riprap;
- Phase IV- Removal of upstream diversion dam and rewatering west channel.

During Phase I the west channel will be partially dewatered through the construction of a diversion dam. To do this, an excavator will be walked down the bank and forded in the east channel using Entry and Exit 1 (Assessment, Figure A-1). The excavator will then be walked down the bank at Entry 3, then walked up the stream channel for positioning of the diversion materials. Materials will be mobilized from the island (several large concrete blocks and jersey barriers). The excavator and materials will be stationed at the south point of the island. Materials will be placed off the edge of the upstream point of the island. If additional construction materials are required, they will be moved across the existing bridge or will be moved through Entry and Exit 2 (temporary boat launch to the permanent concrete boat launch; Assessment, Figure A-1). Dewatering will be conducted slowly, with down channel monitoring to ensure at least 60 cubic feet per second (cfs) is maintained in the Norton irrigation canal, which is diverted below the bridge. Enough flow will be maintained to allow for fish passage in

both channels. Once flows are at desired levels between 500 and 975 cfs, the excavator will be walked back down the channel and up the bank at Exit 3.

The Norton irrigation diversion dam may be extended to ensure a minimum of 60 cfs is entering the irrigation canal. The Norton Ditch Company irrigators frequently work on this diversion dam (under the authority of the Norton Ditch Company as part of their regular ditch operations and maintenance). If the Norton Ditch Company has already extended the dam, that activity may not be required as part of the proposed action. However, if the Norton irrigation diversion does require extension as part of the proposed action, then the equipment will enter and exit the stream at Entry and Exit 2 and be walked under the Highway 93 Bridge and down the dry portion of the channel to the Norton irrigation diversion. Clean concrete blocks or rock sacks will be used to extend the Norton irrigation diversion. Entry and Exit 4 may be used to move the diversion materials into place.

Phase II and III may involve dewatering of the work areas around the existing east and west abutments during placement of riprap and concrete pouring. Horseshoe-shaped cofferdams with open ends facing downstream will be placed to avoid contaminating waterways with uncured concrete, and to allow bed excavation and the placement of riprap at proper elevation. If work spans numerous days, block nets will be placed at the bottom of the cofferdams to prevent fish from re-entering work areas overnight. Fully closed cofferdams may be used if necessary to prevent uncured concrete from coming in contact with live water. Cofferdams will be constructed through the use of super sacks filled with washed drainrock that will extend to the banks. Diversion barriers may also be set instream as needed to form a partial dam reducing the stream energy in the areas of disturbance near abutments. Where possible, barriers will extend approximately 5 to 10 feet outside of each area to be disturbed. A turbidity monitor will be onsite during the abutment removal process to ensure that turbidity levels are maintained within the Idaho Department of Environmental Quality (IDEQ) standards (below 50 Nephelometric Turbidity Units [NTUs]).

If a temporary extension of Norton irrigation diversion dam was required, it will be removed by the excavator after the new bridge has been constructed. The excavator will use the dewatered channel, avoiding any wetted areas as much as possible when traveling to and from the Norton irrigation diversion.

Phase IV is the removal of the west channel diversion dam. The excavator will use the same method described for the placement of the west channel diversion dam to remove the west channel diversion dam. The excavator will also reposition any riprap back onto previous bank positions. After the diversion is removed the excavator will be moved back down the east channel and out at Entry and Exit 3.

3. Bridge Deconstruction/Construction

Settling ponds (1- or 2- stage) will be constructed prior to construction of each new abutment. A portion of new riprap may be placed in front of each existing abutment if needed for stabilization. If cofferdams are needed for the construction of the new abutments, they will be placed as described above for dewatering Phases II and III.

The area behind the existing east abutment will be excavated prior to the new east abutment being constructed. Forms will be constructed for the new concrete abutment after the cofferdam is in place (if required). Concrete equipment will be inspected for leaks prior to entering the project site and will be mobilized across the bridge. Concrete could also be delivered via booms positioned above the existing bridge to minimize chances of contaminants entering the waterway. Concrete will be poured for the new east abutment. After the concrete has cured, the forms will be removed. Excavated areas uphill of the new east abutment will be backfilled up to the existing stream flow levels.

The existing bridge will be demolished using a combination of cranes, excavators, hoe-rams, and other similar equipment. The superstructure of the existing bridge (timber deck) will be dismantled in one or two sections, removing the timber one piece at a time. The superstructure will be placed in a temporary staging area or directly into a truck to transport off-site. The existing bridge superstructure will be removed and disposed of off-site. During bridge deconstruction, where possible, measures will be implemented to prevent deconstruction materials from entering the stream. Nets or tarps will be placed to capture material during deconstruction of bridge superstructure if the superstructure is not removed intact. Any debris greater than 6 inches in length or diameter that inadvertently falls into the river will be removed.

The existing east abutment will be removed using the same equipment and criteria as described for superstructure removal. The abutment may be removed through the use of impact hammers, diamond-wire saw cutting, and cutting torches. Blasting will not be used in the removal of the abutments.

The stream channel will be excavated to allow placement of riprap into the streambed and positioning of it against the new east abutment. Approximately 13 yards of streambed will be excavated. As described above for dewatering Phase II and III, diversion barriers will be set in place instream, as needed, to form a partial dam to reduce stream energy in the area to be excavated. Riprap will be placed in the stream at elevations to provide a smooth transition with existing streambed elevations. Riprap will be keyed into the stream channel and banks to prevent scour behind the new abutment.

Approximately 5 yards of material will be excavated from the streambed near the west abutment. Prior to excavation, the existing west abutment will be removed using the methods described for removal of the east abutment. Excavation of the new west abutment will be completed and approximately mid-slope on the new fill slopes on the west approach (near Jesse Creek), a 1 foot wide horizontal terrace will be added to the slope to collect drainage. Concrete forms will be built and concrete poured for the new west abutment. After the concrete cures, the forms will be removed and areas behind the new west abutment will be backfilled. Riprap will be placed in the stream to prevent lateral scour from excavating behind the new abutment. Riprap will be keyed into the banks and streambed to provide a smooth transition with existing upstream and downstream elevations. The total amount of riprap placed during the project is anticipated to be 430 cubic yards (Assessment, p. 7).

After the new abutments have been constructed, the existing bridge superstructure has been removed, and the existing abutments have been removed, the new bridge superstructure will be

installed. After the new bridge superstructure is in place, the access ramps will be constructed and the new bridge deck surfaced.

4. Revegetation and Site Clean Up

The temporary access boat ramp (Entry 2) will be reclaimed through ripping of the surface to loosen soil for planting and revegetation. All equipment will be removed and the site will be cleaned of debris, leaving erosion and sediment control devices in place until revegetation has been established.

All disturbed areas will be reseeded and planted, including: the horizontal 1 foot terrace near the new west abutment; all new side slopes of fill areas; the reclaimed boat ramp; and any of the fording access points where soil is exposed or vegetation was killed. Fill slopes on approaches and on the reclaimed temporary boat ramp will be seeded with dryland native seed mix. Any banks with bare soil left after construction will be planted with native shrubs; these plantings are anticipated in areas surrounding the bridge construction, disturbed areas from fording access, at the bottom of the reclaimed temporary boat ramp, and at the constructed horizontal terrace near Jesse Creek. Seeded areas will be hydromulched to help suppress annual weeds and maintain soil moisture for seedling establishment. Any mature native plants or shrubs that can be salvaged during disturbance will be stockpiled with top soils and used during revegetation. Woody vegetation at stream access points that have been damaged by track equipment will be clipped below damaged points to aid plant recovery. An equal or greater amount of native trees and shrubs will be planted for any that have been removed or killed.

C. Term of Action

The proposed action would begin upon completion of this Opinion and be substantially completed by December 15, 2016, with no instream work occurring prior to September 15, 2016 or after December 15, 2016.

D. Proposed Conservation Measures

The proposed action includes conservation measures intended to reduce the degree of impacts on bull trout and its designated critical habitat, including impacts to water quality caused by sediment or contamination. The Service considers these measures essential to limit impacts to bull trout and its designated critical habitat. If any of these measures are not implemented, there may be effects of the action that were not considered in this Opinion, and reinitiation of consultation may be required. The conservation measures to be implemented as part of the proposed action can be found in the Assessment (pp. 14-17).

II. STATUS OF THE BULL TROUT

This section presents information about the regulatory, biological, and ecological status of bull trout at a rangewide scale that provides context for evaluating the significance of probable effects caused by the proposed action.

A. Regulatory Status

1. Listing Status

The coterminous United States population of bull trout was listed as threatened under the Act on November 1, 1999 (USFWS 1999, p. 58910). The threatened bull trout occurs in the Klamath River Basin of south-central Oregon and in the Jarbidge River in Nevada, north to various coastal rivers of Washington to the Puget Sound and east throughout major rivers within the Columbia River Basin to the St. Mary-Belly River, east of the Continental Divide in northwestern Montana (USFWS 1999, pp. 58910-58916).

The bull trout was initially listed as three separate Distinct Population Segments (DPSs) (USFWS 1999, p. 58910). The preamble to the final listing rule discusses the consolidation of these DPSs, plus two other population segments, into one listed taxon and the application of the jeopardy standard under section 7 of the Act relative to this species (USFWS 1999, p. 58910):

> *"Although this rule consolidates the five bull trout DPSs into one listed taxon, based on conformance with the DPS policy for purposes of consultation under section 7 of the Act, we intend to retain recognition of each DPS in light of available scientific information relating to their uniqueness and significance. Under this approach, these DPSs will be treated as interim recovery units with respect to application of the jeopardy standard until an approved recovery plan is developed. Formal establishment of bull trout recovery units will occur during the recovery planning process."*

Please note that consideration of the interim recovery units for purposes of the jeopardy analysis is done within the context of making the jeopardy determination at the scale of the entire listed species in accordance with Service policy (USFWS 2006). See the analytical framework for the jeopardy determination discussed above that explains the use of recovery units in the jeopardy analysis.

2. Threats

Throughout its range, the bull trout is threatened by the combined effects of habitat degradation, fragmentation, and alterations associated with dewatering, road construction and maintenance, mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment (a process by which aquatic organisms are pulled through a diversion or other device) into diversion channels; and introduced nonnative species (USFWS 1999, p. 58912).

3. Climate Change

Climate change represents a relatively new threat to bull trout. The current change in world climate is trending toward warmer temperatures (Intergovernmental Panel on Climate Change 2007). Because bull trout are dependent on cold water temperatures, changes toward higher average temperatures could effectively reduce its available habitat (Rieman et al. 2007, p. 4).

Rieman et al. (2007, p. 14) found that a change of 0.6° to 5° Celsius (C) could reduce the percent of large habitat patches by 27 to 97 percent across the bull trout's range.

In central Idaho, habitat may be affected less by climate change than other areas of the bull trout's range because of the wide range in elevation of current habitat distribution. Given the broad range of the estimate above for reduction of large habitat patches, it is difficult to reasonably interpret what impact the actual changes to bull trout habitat are likely to have on the survival and recovery of the bull trout throughout its range. Rieman et al. (2007, p. 17) caution that their results cannot be extrapolated directly for management of bull trout without consideration of many other factors. Until better models are developed on which to base an understanding of climate change-related effects on the bull trout, Rieman et al. (2007, p. 17) suggest continuation of bull trout conservation efforts to maximize its resiliency.

B. Survival and Recovery Needs

1. Recovery Planning

Between 2002 and 2004, three separate draft recovery plans were completed. The 2002 draft recovery plan addressed bull trout populations within the Columbia, Saint Mary-Belly, and Klamath River basins (USFWS 2002a, 2002b, 2002c), and included individual chapters for 24 separate recovery units (later referred to as management units). In 2004, draft recovery plans were developed for the Coastal-Puget Sound drainages in western Washington (USFWS 2004a) and for the Jarbidge River in Nevada (USFWS 2004b). Those draft plans were not finalized, but have served to identify recovery actions across the range of the species and to provide a framework for implementing numerous recovery actions by our partner agencies, local working groups, and others with an interest in bull trout conservation (USFWS 2015, p. 2).

The Service released the final bull trout recovery plan in September 2015 (USFWS 2015, entire). The final plan incorporated and built upon new information collected on status of bull trout, factors affecting the species, and ongoing conservation efforts across the range of the species since the draft 2002 and 2004 recovery planning efforts. The 2002 and 2004 draft recovery plans provide life history information, habitat characteristics, reasons for decline, and distribution and abundance of bull trout subpopulations covered by those draft plans. The 2015 final recovery plan, utilizing new information and reanalysis, identified six biologically-based recovery units (USFWS 2015, p. 33). Recovery actions for each of the six recovery units include:

- Protect, restore, and maintain suitable habitat conditions for bull trout;
- Minimize demographic threats to bull trout by restoring connectivity or populations where appropriate to promote diverse life history strategies and conserve genetic diversity;
- Prevent and reduce negative effects of nonnative fishes and other nonnative taxa on bull trout;

- Work with partners to conduct research and monitoring to implement and evaluate bull trout recovery activities, consistent with an adaptive management approach using feedback from implemented, site-specific recovery tasks, and considering the effects of climate change (USFWS 2015, pp. 50-53).

A Recovery Unit Implementation Plan (RUIP) was developed for each unit, and the Service's Bull Trout Recovery Implementation Team is currently developing guidance on implementation of the RUIPs. While the 2015 final recovery plan supersedes and replaces the previous draft recovery plans, the 2002 and 2004 draft recovery plans still provide important information on bull trout status and life history.

Each of the six recovery units consists of one or more core areas. Approximately 109 occupied core areas are recognized across the coterminous United States range of the bull trout. In addition, six historically occupied core areas, and two "research needs areas" are identified (USFWS 2105, p. 34). The occupied core areas can be described as simple or complex, and are composed of one or more local populations. See definitions below.

Core Area: a geographic area within a recovery unit occupied by one or more local bull trout populations. Core areas are functionally similar to a metapopulation, in that bull trout within a core area are much more likely to overlap in their use of rearing, foraging, migratory, and overwintering habitat, and in some cases in their use of spawning habitat, than are bull trout from separate core areas.

- Simple Core Area: a geographic area occupied by one bull trout local population. Simple core areas are small in scope, isolated from other core areas by natural barriers, and may contain unique genes or life history adaptations.

- Complex Core Area: a geographic area containing multiple bull trout local populations. Complex core areas are found in large watersheds, have multiple life history forms, and have migratory connectivity between spawning and rearing habitat and foraging, migrating, and overwintering habitat.

Local Population: a group of bull trout within a core area that spawn within a particular stream or portion of a stream system. A local population is considered to be the smallest group of fish that is known to represent an interacting reproductive unit.

C. Rangewide Status and Distribution

The six biologically-based recovery units of the coterminous United States population of bull trout, each of which is individually necessary to conserve the entire listed entity (USFWS 2015, p. 33), are: (1) Coastal Recovery Unit, (2) Klamath Recovery Unit, (3) Mid-Columbia Recovery Unit, (4) Upper Snake Recovery Unit, (5) Columbia Headwaters Recovery Unit, and (6) Saint Mary Recovery Unit. A summary of the current status of the bull trout within these units is provided below.

1. Coastal Recovery Unit

The Coastal Recovery Unit is divided into three geographic regions in western Oregon and Washington: the Puget Sound, Olympic Peninsula, and the Lower Columbia River. Bull trout in the Coastal Recovery Unit exhibit anadromous, adfluvial, fluvial and resident life history patterns. The anadromous life history form is unique to Puget Sound and Olympic Peninsula regions. This recovery unit contains 21 occupied core areas and 85 local populations, including the Clackamas River core area where bull trout had been extirpated and were reintroduced in 2011. Four historically occupied core areas that could be re-established have been identified. This recovery unit also contains ten shared foraging, migrating, and overwintering (FMO) habitats which are outside core areas and allow for the continued natural population dynamics in which the core areas have evolved. Four core areas within the Coastal Recovery Unit have been identified as current population strongholds: Lower Skagit, Upper Skagit, Quinault River, and Lower Deschutes River. These are the most stable and largest bull trout populations in the recovery unit.

The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, loss of functioning estuarine and nearshore marine habitats, development and related impacts (e.g., flood control, floodplain disconnection, bank armoring, channel straightening, loss of instream habitat complexity), agriculture (e.g., diking, water control structures, draining of wetlands, channelization and the removal of riparian vegetation, livestock grazing), fish passage (e.g., dams, culverts, instream flows) residential development, urbanization, forest management practices (e.g., timber harvest and associated road building activities), connectivity impairment, mining, and the introduction of nonnative species. Conservation measures or recovery actions implemented include relicensing of major hydropower facilities that have provided upstream and downstream fish passage or completely removed dams, land acquisition to conserve bull trout habitat, floodplain restoration, culvert removal, riparian revegetation, levee setbacks, road removal, and projects to protect and restore important nearshore marine habitats.

2. Klamath Recovery Unit

The Klamath Recovery Unit, located in southern Oregon, is the most significantly imperiled recovery unit, having experienced considerable extirpation and geographic contraction of local populations and declining demographic condition, and natural re-colonization is constrained by dispersal barriers and presence of nonnative brook trout (USFWS 2015, p. 39). This recovery unit currently contains three core areas and eight local populations. Nine historic local populations of bull trout have been extirpated, and restoring additional local populations will be necessary to achieve recovery (USFWS 2015, p. B7). All three core areas have been isolated from other bull trout populations for the past 10,000 years.

The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, habitat degradation and fragmentation, past and present land use practices, agricultural water diversions, nonnative species, and past fisheries management practices. Conservation measures or recovery actions implemented include removal of nonnative fish (e.g., brook trout, brown trout, and hybrids), acquiring water rights for instream flows, replacing

diversion structures, installing fish screens, constructing bypass channels, installing riparian fencing, culvert replacement, and habitat restoration.

3. Mid-Columbia Recovery Unit

The Mid-Columbia Recovery Unit is located in eastern Washington, eastern Oregon, and portions of central Idaho. The Mid-Columbia Recovery Unit is divided into four geographic regions: Lower Mid-Columbia, Upper Mid-Columbia, Lower Snake, and Mid-Snake. This recovery unit contains 24 occupied core areas, two historically occupied core areas, one research needs area, and seven FMO habitats. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, agricultural practices (e.g., irrigation, water withdrawals, livestock grazing), fish passage (e.g., dams, culverts), nonnative species, forest management practices, and mining. Conservation measures or recovery actions implemented include road removal, channel restoration, mine reclamation, improved grazing management, removal of fish barriers, and instream flow requirements.

4. Upper Snake Recovery Unit (includes the action area)

The Upper Snake Recovery Unit is located in central Idaho, northern Nevada, and eastern Oregon. The Upper Snake Recovery Unit is divided into seven geographic regions: Salmon River, Boise River, Payette River, Little Lost River, Malheur River, Jarbidge River, and Weiser River. This recovery unit contains 22 core areas and 206 local populations, with almost 60 percent of local populations being present in the Salmon River Geographic Region. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, dams, mining, forest management practices, nonnative species, and agriculture (e.g., water diversions, grazing). Conservation measures or recovery actions implemented include instream habitat restoration, instream flow requirements, screening of irrigation diversions, and riparian restoration.

5. Columbia Headwaters Recovery Unit

The Columbia Headwaters Recovery Unit is located in western Montana, northern Idaho, and the northeastern corner of Washington. The Columbia Headwaters Recovery Unit is divided into five geographic regions: Upper Clark Fork, Lower Clark Fork, Flathead, Kootenai, and Coeur d'Alene. This recovery unit contains 35 bull trout core areas, of which 15 are complex core areas and 20 are simple core areas. The 20 simple core areas are each represented by a single local population, many of which may have persisted for thousands of years despite small populations and their isolation (USFWS 2015, p. D1). Fish passage improvements within the recovery unit have reconnected previously fragmented habitats. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, mining and contamination by heavy metals, nonnative species, modified instream flows, migratory barriers (e.g., dams), habitat fragmentation, forest practices (e.g., logging, roads), agriculture practices (e.g., irrigation, livestock grazing), and residential development. Conservation measures or recovery actions implemented include habitat improvement, fish passage, and removal of nonnative species. Unlike the other recovery units, the Columbia Headwaters Recovery Unit

does not overlap with salmon distribution. Therefore, bull trout within the Columbia Headwaters Recovery Unit do not benefit from the recovery actions for salmon (USFWS 2015, p. D41).

6. Saint Mary Recovery Unit

The Saint Mary Recovery Unit is located in Montana, but is heavily dependent on resources in southern Alberta, Canada. Most of the watershed in this recovery unit is located in Canada. The United States portion includes headwater spawning and rearing habitat and the upper reaches of FMO habitat. This recovery unit contains four core areas and eight local populations. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, the Saint Mary Diversion operated by the Bureau of Reclamation (e.g., entrainment, fish passage, instream flows), and nonnative species. The primary issue precluding bull trout recovery in this recovery unit relates to impacts of water diversions, specifically at the Bureau of Reclamation's Milk River Project.

D. Life History

Bull trout exhibit both resident and migratory life history strategies. Both resident and migratory forms may be found together, and either form may produce offspring exhibiting either resident or migratory behavior. Resident bull trout complete their entire life cycle in the tributary (or nearby) streams in which they spawn and rear. The resident form tends to be smaller than the migratory form at maturity and also produces fewer eggs. Migratory bull trout spawn in tributary streams where juvenile fish rear 1 to 4 years before migrating to either a lake (adfluvial form), a river (fluvial form), or saltwater (anadromous) to rear as subadults or to live as adults. Bull trout normally reach sexual maturity in 4 to 7 years and may live longer than 12 years. Growth varies depending upon life history strategy. Resident adults range from 150 to 300 millimeters (6 to 12 inches) total length, and migratory adults commonly reach 600 millimeters (24 inches) or more. They are iteroparous (they spawn more than once in a lifetime), and both repeat- and alternate-year spawning have been reported, although repeat-spawning frequency and post-spawning mortality are not well documented.

The iteroparous reproductive system of bull trout has important repercussions for the management of this species. Bull trout require two-way passage up and downstream, not only for repeat-spawning, but also for foraging. Most fish ladders, however, were designed specifically for anadromous semelparous salmonids (fishes that spawn once and then die, and therefore require only one-way passage upstream). Therefore, even dams or other barriers with fish passage facilities may be a factor in isolating bull trout populations if they do not provide a downstream passage route.

Additional information about the bull trout's life history can be found in the final listing rule (USFWS 1999).

E. Habitat Characteristics

Bull trout have more specific habitat requirements than most other salmonids. Habitat components that influence bull trout distribution and abundance include water temperature,

cover, channel form and stability, valley form, spawning and rearing substrate, and migratory corridors. Watson and Hillman (1997, p. 247-250) concluded that watersheds must have specific physical characteristics to provide the habitat requirements necessary for bull trout to successfully spawn and rear and that these specific characteristics are not necessarily present throughout these watersheds. Because bull trout exhibit a patchy distribution, even in pristine habitats, fish should not be expected to simultaneously occupy all available habitats.

Migratory corridors link seasonal habitats for all bull trout life histories. The ability to migrate is important to the persistence of bull trout. Migrations facilitate gene flow among local populations when individuals from different local populations interbreed, or stray, to nonnatal streams. Local populations that are extirpated by catastrophic events may also become reestablished by bull trout migrants.

Cold water temperatures play an important role in determining bull trout habitat, as these fish are primarily found in colder streams (below 15° C and 59° Fahrenheit (F)), and spawning habitats are generally characterized by temperatures that drop below 9° C (48° F) in the fall. Thermal requirements for bull trout appear to differ at different life stages. Spawning areas are often associated with cold-water springs, groundwater infiltration, and the coldest streams in a given watershed. Optimum incubation temperatures for bull trout eggs range from 2° to 4° C (35° to 39° F; Buchanan and Gregory 1997, p. 122), whereas optimum water temperatures for rearing range from about 7° to 8° C (44° to 46° F; Goetz 1989, p. 39). In Granite Creek, Idaho, Bonneau and Scarnecchia (1996, p. 629-630) observed that juvenile bull trout selected the coldest water available in a plunge pool, 8° to 9° C (46° to 48° F), within a temperature gradient of 8° to 15° C (46° to 60° F). In a landscape study relating bull trout distribution to maximum water temperatures, Dunham et al. (2003, pp. 899-900) found that the probability of juvenile bull trout occurrence does not become high (i.e., greater than 75 percent) until maximum temperatures decline to 11° to 12° C (52° to 54° F).

Although bull trout are found primarily in cold streams, occasionally these fish are found in larger, warmer river systems throughout the Columbia River Basin. Factors that can influence bull trout ability to survive in warmer rivers include availability and proximity of cold water patches and food productivity. In the Little Lost River, Idaho, bull trout have been collected in water having temperatures up to 20° C (68° F); however, the trend in the relationship between temperature and species composition shows that bull trout made up less than 50 percent of all salmonids when maximum summer water temperature exceeded 15° C (59° F) and less than 10 percent of all salmonids when temperature exceeded 17° C (63° F; Gamett 1999, pp. 28-29).

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools. Maintaining bull trout habitat requires stability of stream channels and maintenance of natural flow patterns. Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover. These areas are sensitive to activities that directly or indirectly affect stream channel stability and alter natural flow patterns. For example, altered stream flow in the fall may disrupt bull trout during the spawning period, and channel instability may decrease survival of eggs and alevins in the gravel from winter through spring. Increases in fine sediment can reduce egg survival and emergence.

Bull trout typically spawn from August to November during periods of decreasing water temperatures. Preferred spawning habitat consists of low-gradient stream reaches with loose, clean gravel. Redds are often constructed in stream reaches fed by springs or near other sources of cold groundwater. Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992, p. 5), and after hatching, alevins remain in the substrate. Time from egg deposition to emergence of fry may surpass 200 days. Fry normally emerge from early April through May, depending on water temperatures and increasing stream flows.

Migratory forms of the bull trout appear to develop when habitat conditions allow movement between spawning and rearing streams and larger rivers or lakes where foraging opportunities may be enhanced (Frissell 1993, pp. 347-351). Benefits to migratory bull trout include greater growth in the more productive waters of larger streams and lakes, greater fecundity resulting in increased reproductive potential, and dispersing the population across space and time so that spawning streams may be recolonized should local populations suffer a catastrophic loss. In the absence of the migratory bull trout life form, isolated populations cannot be replenished when disturbance makes local habitats temporarily unsuitable, the range of the species is diminished, and the potential for enhanced reproductive capabilities are lost (Rieman and McIntyre 1993, p. 11).

Additional information about the bull trout's habitat requirements can be found in the final listing rule (USFWS 1999, pp. 58911-58912).

F. Diet

Bull trout are opportunistic feeders, with food habits primarily a function of size and life history strategy. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macro zooplankton, mysids, and small fish. Adult migratory bull trout feed on various fish species. Fish growth depends on the quantity and quality of food that is eaten, and as fish grow, their foraging strategy changes in quantity, size, or other characteristics. Bull trout that are 110 millimeters (4.3 inches) long or longer commonly have fish in their diet (Shepard et al. 1984, p. 38), and bull trout of all sizes have been found to eat fish half their length (Beauchamp and Van Tassell 2001, p. 210).

Migration allows bull trout to move to or with a food source, access optimal foraging areas, and exploit a wider variety of prey resources. Migratory bull trout begin growing rapidly once they move to waters with abundant forage that includes fish (Shepard et al. 1984, p. 49). As these fish mature they become larger-bodied predators and are able to travel greater distances in search of prey species of larger size and in greater abundance. In Lake Billy Chinook, as bull trout became increasingly piscivorous with increasing size, the prey species changed from mainly smaller bull trout and rainbow trout for bull trout less than 450 millimeters (17.7 inches) in length to mainly kokanee for bull trout greater in size (Beauchamp and Van Tassell 2001, p. 213).

Additional information on the bull trout's diet can be found in the final listing rule (USFWS 1999).

G. Previously Consulted-on Effects

1. Rangewide

Consulted-on effects are effects that have been analyzed in section 7 consultations and reported in a biological opinion. In 2003, the Service reviewed all of the biological opinions issued by the Region 1 and Region 6 Service offices, from the time of bull trout listing until August 2003; this summed to 137 biological opinions. The Service completed section 7 consultations on many programs and actions that benefit bull trout. While some of the beneficial programs were small-scale actions such as removing passage barriers and installing 'fish friendly' crossing structures, some were large, such as restoring habitat conditions in degraded streams and riparian areas. Three consultations that had broad and long-term benefits to bull trout were consultations on documents that amended Forest Plans and provided standards and guidelines related to federally listed anadromous and native inland fish on National Forest Service lands in Idaho.

The majority of consultations on projects that resulted in adverse effects were for effects that were short-term and very local. Overall, our review showed that we consulted on a wide array of actions which had varying levels of effect and that none were found to appreciably reduce the likelihood of survival and recovery of the bull trout. Furthermore, no actions that have undergone consultation were anticipated to result in the loss of local populations of bull trout. This is still true as of the date of this Opinion.

Between August 2003 and July 2006, the Service issued 198 opinions that included analyses of effects to the bull trout. These opinions also reached "not likely to jeopardize" determinations and the Service concluded that the continued long-term survival and existence of the species had not been appreciably reduced rangewide due to these actions. All opinions issued after July 2006 also reached "not likely to jeopardize" determinations. Since July 2006, a review of the data in our national Tracking and Integrated Logging System reveals this trend is still true to date; no jeopardy opinions have been issued for the bull trout.

2. Eastern Idaho

For this Opinion, the Eastern Idaho Office examined the record for biological opinions issued since 2003 for those action areas that overlap any or all of the following eight bull trout core areas: Upper Salmon River, Pahsimeroi River, Lemhi River, Middle Salmon River-Panther, Little Lost River, Middle Fork Salmon River, Lake Creek, and Opal Creek (USFWS 2016, entire).

Approximately 68 biological opinions have been issued across the eight bull trout core areas. Six of them are broad-scale, program-level opinions. In three of those six, no take was anticipated or none has occurred. In the remaining opinions, varying amounts of lethal and nonlethal take of adult bull trout, juvenile bull trout, and bull trout redds were anticipated. In each of those actions, less take than was anticipated has been detected (USFWS 2016, p. 1). All 68 opinions concluded that the proposed actions would not be likely to jeopardize the coterminous U.S. population of bull trout.

III. STATUS OF BULL TROUT CRITICAL HABITAT

A. Legal Status

Ongoing litigation resulted in the U.S. District Court for the District of Oregon granting the Service a voluntary remand of the 2005 bull trout critical habitat designation. Subsequently, the Service published a final critical habitat designation for the coterminous United States population of the bull trout on October 18, 2010 (70 FR 63898); the rule became effective on November 17, 2010. A justification document was also developed to support the rule and is available on our website (http://www.fws.gov/pacific/bulltrout). The scope of the designation involved the species' coterminous range, which includes the Jarbidge River, Klamath River, Columbia River, Coastal-Puget Sound, and Saint Mary-Belly River population segments.

Rangewide, the Service designated reservoirs/lakes and stream/shoreline miles as bull trout critical habitat (Table 1). Designated bull trout critical habitat is of two primary use types: 1) spawning and rearing, and 2) foraging, migration, and overwintering (FMO).

Table 1. Stream/shoreline distance and reservoir/lake area designated as bull trout critical habitat by state.

State	Stream/Shoreline Miles	Stream/Shoreline Kilometers	Reservoir /Lake Acres	Reservoir/ Lake Hectares
Idaho	8,771.6	14,116.5	170,217.5	68,884.9
Montana	3,056.5	4,918.9	221,470.7	89,626.4
Nevada	71.8	115.6	-	-
Oregon	2,835.9	4,563.9	30,255.5	12,244.0
Oregon/Idaho	107.7	173.3	-	-
Washington	3,793.3	6,104.8	66,308.1	26,834.0
Washington (marine)	753.8	1,213.2	-	-
Washington/Idaho	37.2	59.9	-	-
Washington/Oregon	301.3	484.8	-	-
Total	19,729.0	31,750.8	488,251.7	197,589.2

The 2010 revision increases the amount of designated bull trout critical habitat by approximately 76 percent for miles of stream/shoreline and by approximately 71 percent for acres of lakes and reservoirs compared to the 2005 designation.

This rule also identifies and designates as critical habitat approximately 1,323.7 km (822.5 miles) of streams/shorelines and 6,758.8 ha (16,701.3 acres) of lakes/reservoirs of unoccupied habitat to address bull trout conservation needs in specific geographic areas in several areas not occupied at the time of listing. No unoccupied habitat was included in the 2005 designation. These unoccupied areas were determined by the Service to be essential for restoring functioning migratory bull trout populations based on currently available scientific information. These unoccupied areas often include lower main stem river environments that can provide seasonally important migration habitat for bull trout. This type of habitat is essential in areas where bull

trout habitat and population loss over time necessitates reestablishing bull trout in currently unoccupied habitat areas to achieve recovery.

The final rule continues to exclude some critical habitat segments based on a careful balancing of the benefits of inclusion versus the benefits of exclusion. Critical habitat does not include: 1) waters adjacent to non-Federal lands covered by legally operative incidental take permits for HCPs issued under section 10(a)(1)(B) of the Act, in which bull trout is a covered species on or before the publication of this final rule; 2) waters within or adjacent to Tribal lands subject to certain commitments to conserve bull trout or a conservation program that provides aquatic resource protection and restoration through collaborative efforts, and where the Tribes indicated that inclusion would impair their relationship with the Service; or 3) waters where impacts to national security have been identified (75 FR 63898). Excluded areas are approximately 10 percent of the stream/shoreline miles and 4 percent of the lakes and reservoir acreage of designated critical habitat. Each excluded area is identified in the relevant Critical Habitat Unit (CHU) text, as identified in paragraphs (e)(8) through (e)(41) of the final rule. It is important to note that the exclusion of waterbodies from designated critical habitat does not negate or diminish their importance for bull trout conservation. Because exclusions reflect the often complex pattern of land ownership, designated critical habitat is often fragmented and interspersed with excluded stream segments.

B. Conservation Role and Description of Critical Habitat

The conservation role of bull trout critical habitat is to support viable core area populations (75 FR 63898:63943 [October 18, 2010]). The core areas reflect the metapopulation structure of bull trout and are the closest approximation of a biologically functioning unit for the purposes of recovery planning and risk analyses. CHUs generally encompass one or more core areas and may include FMO areas, outside of core areas, that are important to the survival and recovery of bull trout.

Thirty-two CHUs within the geographical area occupied by the species at the time of listing are designated under the final rule. Twenty-nine of the CHUs contain all of the physical or biological features identified in this final rule and support multiple life-history requirements. Three of the mainstem river units in the Columbia and Snake River basins contain most of the physical or biological features necessary to support the bull trout's particular use of that habitat, other than those physical or biological features associated with breeding habitat.

The primary function of individual CHUs is to maintain and support core areas, which 1) contain bull trout populations with the demographic characteristics needed to ensure their persistence and contain the habitat needed to sustain those characteristics (Rieman and McIntyre 1993, p. 19); 2) provide for persistence of strong local populations, in part, by providing habitat conditions that encourage movement of migratory fish (Rieman and McIntyre 1993, pp. 22-23; MBTSG 1998, pp. 48-49); 3) are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations (Hard 1995, pp. 314-315; Healey and Prince 1995, p. 182; Rieman and McIntyre 1993, pp. 22-23; MBTSG 1998, pp. 48-49); and 4) are distributed throughout the historic range of the species to preserve both genetic and phenotypic adaptations

(Hard 1995, pp. 321-322; Rieman and McIntyre 1993, p. 23; Rieman and Allendorf 2001, p. 763; MBTSG 1998, pp. 13-16).

The Olympic Peninsula and Puget Sound CHUs are essential to the conservation of amphidromous bull trout, which are unique to the Coastal RU. These CHUs contain marine nearshore and freshwater habitats, outside of core areas, that are used by bull trout from one or more core areas. These habitats, outside of core areas, contain PBFs that are critical to adult and subadult foraging, overwintering, and migration.

Within the designated critical habitat areas, the PBFs for bull trout are those habitat components that are essential for the primary biological needs of foraging, reproducing, rearing of young, dispersal, genetic exchange, or sheltering. Based on our current knowledge of the life history, biology, and ecology of this species and the characteristics of the habitat necessary to sustain its essential life-history functions, we have determined that the following PBFs are essential for the conservation of bull trout.

(1) Springs, seeps, groundwater sources, and subsurface water connectivity (hyporeic flow) to contribute to water quality and quantity and provide thermal refugia.
(2) Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

(3) An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

(4) Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks, and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.

(5) Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; stream flow; and local groundwater influence.

(6) In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrate, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.

(7) A natural hydrograph, including peak, high, low, and baseflows within the historical and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.

(8) Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

(9) Sufficiently low levels of occurrence of nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

The revised PBF's are similar to those previously in effect under the 2005 designation. The most significant modification is the addition of a ninth PBF to address the presence of nonnative predatory or competitive fish species. Although this PBF applies to both the freshwater and marine environments, currently no nonnative fish species are of concern in the marine environment, though this could change in the future.

Note that only PBFs 2, 3, 4, 5, and 8 apply to marine nearshore waters identified as critical habitat. Also, lakes and reservoirs within the CHUs also contain most of the physical or biological features necessary to support bull trout, with the exception of those associated with PBFs 1 and 6. Additionally, all except PBF 6 apply to FMO habitat designated as critical habitat.
Critical habitat includes the stream channels within the designated stream reaches and has a lateral extent as defined by the bankfull elevation on one bank to the bankfull elevation on the opposite bank. Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain and is reached at a discharge that generally has a recurrence interval of one to two years on the annual flood series. If bankfull elevation is not evident on either bank, the ordinary high-water line must be used to determine the lateral extent of critical habitat. The lateral extent of designated lakes is defined by the perimeter of the waterbody as mapped on standard 1:24,000 scale topographic maps. The Service assumes in many cases this is the full-pool level of the waterbody. In areas where only one side of the waterbody is designated (where only one side is excluded), the mid-line of the waterbody represents the lateral extent of critical habitat.

In marine nearshore areas, the inshore extent of critical habitat is the mean higher high-water (MHHW) line, including the uppermost reach of the saltwater wedge within tidally influenced freshwater heads of estuaries. The MHHW line refers to the average of all the higher high-water heights of the two daily tidal levels. Marine critical habitat extends offshore to the depth of 10 meters (m) (33 feet) relative to the mean lower low-water (MLLW) line (zero tidal level or average of all the lower low-water heights of the two daily tidal levels). This area between the MHHW line and minus 10 m MLLW line (the average extent of the photic zone) is considered the habitat most consistently used by bull trout in marine waters based on known use, forage fish availability, and ongoing migration studies and captures geological and ecological processes important to maintaining these habitats. This area contains essential foraging habitat and migration corridors such as estuaries, bays, inlets, shallow subtidal areas, and intertidal flats.

Adjacent shoreline riparian areas, bluffs, and uplands are not designated as critical habitat. However, it should be recognized that the quality of marine and freshwater habitat along streams, lakes, and shorelines is intrinsically related to the character of these adjacent features and that

human activities that occur outside of the designated critical habitat can have major effects on physical and biological features of the aquatic environment.

Activities that cause adverse effects to critical habitat are evaluated to determine if they are likely to "destroy or adversely modify" critical habitat by no longer serving the intended conservation role for the species or retaining those PBFs that relate to the ability of the area to at least periodically support the species. Activities that may destroy or adversely modify critical habitat are those that alter the PBFs to such an extent that the conservation value of critical habitat is appreciably reduced (75 FR 63898:63943; USFWS 2004, Vol. 1. pp. 140-193, Vol. 2, pp. 69-114). The Service's evaluation must be conducted at the scale of the entire critical habitat area designated, unless otherwise stated in the final critical habitat rule (USFWS and NMFS 1998, pp. 4-39). Thus, adverse modification of bull trout critical habitat is evaluated at the scale of the final designation, which includes the critical habitat designated for the Klamath River, Jarbidge River, Columbia River, Coastal-Puget Sound, and Saint Mary-Belly River population segments. However, we consider all 32 CHUs to contain features or areas essential to the conservation of the bull trout (75 FR 63898:63901, 63944). Therefore, if a proposed action would alter the physical or biological features of critical habitat to an extent that appreciably reduces the conservation function of one or more critical habitat units for bull trout, a finding of adverse modification of the entire designated critical habitat area may be warranted (75 FR 63898:63943).

C. Current Critical Habitat Condition Rangewide

The condition of bull trout critical habitat varies across its range from poor to good. Although, still relatively widely distributed across its historical range, the bull trout occurs in low numbers in many areas, and populations are considered depressed or declining across much of its range (67 FR 71240). This condition reflects the condition of bull trout habitat. The decline of bull trout is primarily due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, impoundments, dams, water diversions, and the introduction of nonnative species (63 FR 31647, June 10, 1998; 64 FR 17112, April 8, 1999).

There is widespread agreement in the scientific literature that many factors related to human activities have impacted bull trout and their habitat, and continue to do so. Among the many factors that contribute to degraded PBFs, those which appear to be particularly significant and have resulted in a legacy of degraded habitat conditions are as follows: 1) fragmentation and isolation of local populations due to the proliferation of dams and water diversions that have eliminated habitat, altered water flow and temperature regimes, and impeded migratory movements (Dunham and Rieman 1999, p. 652; Rieman and McIntyre 1993, p. 7); 2) degradation of spawning and rearing habitat and upper watershed areas, particularly alterations in sedimentation rates and water temperature, resulting from forest and rangeland practices and intensive development of roads (Fraley and Shepard 1989, p. 141; MBTSG 1998, pp. ii - v, 20-45); 3) the introduction and spread of nonnative fish species, particularly brook trout and lake trout, as a result of fish stocking and degraded habitat conditions, which compete with bull trout for limited resources and, in the case of brook trout, hybridize with bull trout (Leary et al. 1993, p. 857; Rieman et al. 2006, pp. 73-76); 4) in the Coastal-Puget Sound region where

amphidromous bull trout occur, degradation of mainstem river FMO habitat, and the degradation and loss of marine nearshore foraging and migration habitat due to urban and residential development; and 5) degradation of FMO habitat resulting from reduced prey base, roads, agriculture, development, and dams.

1. Effects of Climate Change on Bull Trout Critical Habitat

One objective of the final rule was to identify and protect those habitats that provide resiliency for bull trout use in the face of climate change. Over a period of decades, climate change may directly threaten the integrity of the essential physical or biological features described in PBFs 1, 2, 3, 5, 7, 8, and 9. Protecting bull trout strongholds and cold water refugia from disturbance and ensuring connectivity among populations were important considerations in addressing this potential impact. Additionally, climate change may exacerbate habitat degradation impacts both physically (e.g., decreased base flows, increased water temperatures) and biologically (e.g., increased competition with nonnative fishes).

D. Previously Consulted-on Effects for Critical Habitat

1. Rangewide

The Service has formally consulted on the effects to bull trout critical habitat throughout its range. Section 7 consultations include actions that continue to degrade the environmental baseline. However, long-term restoration efforts have also been implemented that provide some improvement in the existing functions within some of the critical habitat units. None of the consulted-on actions have resulted in an adverse modification finding.

2. Eastern Idaho

For this Opinion, the Eastern Idaho Office examined the record for biological opinions issued since 2010 for those action areas that overlap any or all of the following bull trout critical habitat units or subunits: Upper Salmon River, Pahsimeroi River, Lemhi River, Middle Salmon River-Panther, Little Lost River, Middle Fork Salmon River, Lake Creek, and Opal Creek. Fourteen biological opinions addressing bull trout critical habitat have been issued across these subunits. All 14 Opinions concluded that the proposed actions were not likely to result in destruction or adverse modification of critical habitat.

III. ENVIRONMENTAL BASELINE FOR THE BULL TROUT AND BULLTROUT DESIGNATED CRITICAL HABITAT

The preamble to the implementing regulations for section 7 (USFWS 1986, p. 19932) contemplates that the evaluation of ". . . the present environment in which the species or critical habitat exists, as well as the environment that will exist when the action is completed, in terms of the totality of factors affecting the species or critical habitat . . . will serve as the baseline for determining the effects of the action on the species or critical habitat." The regulations at 50 CFR 402.02 define the environmental baseline to include "the past and present impacts of all Federal, State, or private actions and other human activities in the action area that have already

undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process." The analysis presented in this section supplements the above *Status of the Species* evaluations by focusing on the current condition of the bull trout in the action area, the factors responsible for that condition, inclusive of the factors cited above in the regulatory definition of the environmental baseline, and the role the action area plays in the survival and recovery of the bull trout. Relevant factors on lands surrounding the action area that are influencing the condition of the bull trout were also considered in completing the status and baseline evaluations herein.

A. Status of Bull Trout in the Action Area

The action area for this consultation lies entirely within the Salmon River basin, one of the seven geographic regions within the Upper Snake Recovery Unit (USFWS 2015, p. 41). The Upper Snake Recovery Unit encompasses portions of central Idaho, northern Nevada, and eastern Oregon, and includes the Salmon River, Malheur River, Jarbidge River, Little Lost River, Boise River, Payette River, and Weiser River drainages (USFWS 2015, p. E1). The Upper Snake Recovery Unit contains 22 bull trout core areas and a total of 206 local populations (USFWS 2015, p. E1).

1. Population Information

The Salmon River basin contains 10 of the 22 core areas in the Upper Snake Recovery Unit and 123 of the 206 local populations. Connectivity within the Salmon River core areas is mostly intact. Most core areas in the basin contain large bull trout populations and many occupied stream segments. The Salmon River basin supports adfluvial, fluvial, and resident populations of bull trout (USFWS 2015, pp. E1-E2). The action area for this consultation lies within the Middle Salmon River-Panther core area, one of the largest core areas in the Salmon River basin.

Middle Salmon River-Panther Core Area
This core area encompasses 557,450 hectares (1,377,500 acres) and includes the Salmon River and Panther Creek drainages that extend from the confluence of the main Salmon River with the Lemhi River, to its confluence with the Middle Fork Salmon River (USFWS 2002b, p. 13; USFWS 2015, p. E92). This core area has 3758 kilometers (2,335 miles) of streams (USFWS 2005, p. 83) and at least 19 local populations (USFWS 2015, p.E92). Migratory bull trout may persist in some of these local populations, but most populations appear to exhibit resident life history expression (USFWS 2002b, p. 66; USFWS 2015, p. E92).

In 2005, IDFG reported population numbers for the Middle Salmon River-Panther Core Area (IDFG 2005, p. 32) that were based on an extensive modeling effort (IDFG 2005; High et al. 2008). A corrected table (Meyer 2009, *in litt*) showed an approximate population of 72,732 (± 24,772) bull trout (adults and young) for the core area. Using an assumption that 10 percent of the total number is comprised of adult fish (Meyer 2009, pers. comm.), that would suggest an adult population in the core area of approximately 7,300 adults (±2,500). More recent information provided by IDFG indicates a stable trend in bull trout abundance within this core area (USFWS 2015, p. E92).

In the 2005 conservation status assessment (USFWS 2005) the Middle Salmon River-Panther Core Area final rank was "at risk". While not the most imperiled (at high risk), the core area was considered at risk because of very limited and/or declining numbers, range, and/or habitat, making bull trout in this core area vulnerable to extirpation. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at risk" overall.

The Service has issued 19 biological opinions addressing Federal actions specific to this core area: 4 for water diversions (Otter Creek, Lower Salmon River, Middle Salmon River, and Blackbird Mine diversions and settling basins), 2 for mining operations (Idaho Cobalt Mine, and Beartrack Mine), 2 for ongoing activities at a watershed-level, including grazing, (Panther Creek Ongoing Activities and the BLM Travel Plan), 10 for grazing in specific allotments (Indian Ridge, Fourth of July Creek, South Fork Williams Creek, Deer-Iron, Carmen Creek, Morgan Creek-Prairie Basin, North Basin, Hat Creek, Cow Creek, and Forney Allotments), and 1 for emergency wildfire response (Mustang Fire). Each of these opinions found that the actions analyzed were not likely to jeopardize the coterminous U.S. population of bull trout. The aggregate amount or extent of take of bull trout and bull trout redds caused by these Federal actions is estimated by the Service to be at the scale of 164 to 214 bull trout (mostly juveniles), and includes both lethal and nonlethal take, and 92 to 257 bull trout redds. Take of redds was anticipated to result from livestock trampling, while take of adult and juvenile bull trout was anticipated to result from entrainment or stranding at water diversions. Surveys conducted from 2010 to date have not found any take of bull trout redds caused by the actions addressed in the opinions. Limited surveys have found no take of bull trout due to entrainment at a diversion.

Action Area

The action area encompasses a portion of the Salmon River which provides FMO habitat for fluvial bull trout (USFWS 2015, p. E92). Adult fluvial bull trout move from the Salmon River to tributaries in the spring and spend the summer in colder waters closer to fall spawning habitat (Assessment, p. 24). Spawning occurs in headwater reaches of tributaries to the Salmon River from mid-August through mid-October (Assessment, p. 24). After adults spawn they return to the Salmon River. Juveniles can migrate from their rearing areas in the tributaries in the spring, but most stay in the tributaries for 2 or more years. In general, the Salmon River may provide incidental rearing habitat, but it is unlikely juvenile bull trout use habitat within the action area.

Site-specific information on bull trout use of the Salmon River is lacking. No specific bull trout density data is available for the action area and estimates are difficult to make because of the many environmental and biological factors that affect fish density. Generally, lower densities of bull trout are found in FMO habitat, while higher densities are found in spawning and rearing habitat.

2. Habitat Information

Bull trout habitat quantity and quality in the Salmon River basin have been altered through time by influences including past timber harvest, livestock grazing, and mining, and more recently by residential development (USFWS 2002b, pp. 31, 44, 48; USFWS 2015, p. E1). Both wildfire and fire suppression have had effects on bull trout habitat components within the basin (USFWS 2002b, p. 33). Road densities in the Salmon River basin are relatively low, with 64 percent of

the basin having no roads or low road density (USFWS 2002b, pp. 40-41). Bull trout and its habitat can be negatively affected by water diversions. Over 770 known diversions exist in the Salmon River basin (USFWS 2002b, pp. 36-37), but there are no major dams in the Salmon River basin, and connectivity within Salmon River core areas is mostly intact (USFWS 2015, p. E2).

Middle Salmon River–Panther Core Area

Impacts to bull trout habitat from past livestock grazing and water diversions (primarily for agriculture) are prevalent in this core area (USFWS 2002b, pp. 34, 37). Although portions of the Middle Salmon River–Panther Core Area are within wilderness or other designated roadless areas, roads have been established in the floodplains of some streams, resulting in increased peak flows, reduced off-channel habitat, and elevated sediment loads (USFWS 2002b, pp. 41-42). Reported road density of this core area is 0.7 mile/square mile (USFWS 2005, p. 49). Past mining activities have impacted stream channel conditions and water quality. Ongoing release of contaminants to some streams is a concern (USFWS 2002b, p. 46).

Action Area

The Assessment used focus indicators (discussed below) to establish a baseline condition for the bull trout and its habitat in the action area. That information will be summarized in this section of the Opinion.

Establishment of Baseline Conditions for Bull Trout

As mentioned above in the *Status of the Species* section, the survival and recovery needs of the bull trout can be described generally as cold stream temperatures, clean water quality, complex channel characteristics, and large patches of habitat that are well connected. Therefore, to determine the overall effect of a proposed action on the bull trout for purposes of a jeopardy analysis, it is logical to try and ascertain how, and to what extent, those basic needs are likely to be impacted by a proposed action. But first, a baseline condition of those habitat parameters, inclusive of conditions in the action area, needs to be described to form the context for evaluating the potential impacts of the proposed action on bull trout.

One tool that was developed to assist in describing the condition of watersheds and streams on which bull trout depends is entitled *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* [2] (Lee et al. 1997, Appendix 9). It is commonly referred to as the "Matrix of Pathways and Indicators" and, at its most basic level, is a table which identifies the important elements or indicators of a bull trout's habitat. Using this table assists in consistent organization and assessment of current conditions and in judging how those indicators may be impacted by a proposed action (Lee et al. 1997, p. 9-6). The matrix analysis for the Salmon River in the action area can be found on page 31 of the Assessment and below in Table 2.

Description of Baseline Conditions

Fish habitat conditions of the Salmon River 6th field hydrologic unit code (HUC) have been modified by historical and ongoing activities including livestock grazing, road construction, and

2 This document was adapted from a National Marine Fisheries Service document called *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996).

agricultural conversion of floodplains and associated irrigation practices. Because the matrix describes conditions at the 6th field HUC scale, conditions at the finer scale of the action area may vary from those displayed in the matrix.

Table 2. Matrix of Pathways and Indicators for the Salmon River in the Action Area

Pathway	Indicators	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
Subpopulation Characteristics	Abundance			X
	Growth and Survival			X
	Life History Diversity and Isolation		X	
	Persistence/Genetic Integrity			X
Water Quality	Temperature		X	
	Sediment	Unknown		
	Chemical Contaminants/Nutrients		X	
Habitat Access	Physical Barriers	X		
Habitat Elements	Substrate Embeddedness	Unknown		
	Large Woody Debris	Unknown		
	Pool Frequency and Quality	Unknown		
	Off-channel Habitat	Unknown		
	Refugia		X	
Channel Condition and Dynamics	Width:Depth Ratio	Unknown		
	Streambank Condition		X	
	Floodplain Connectivity		X	
Flow/Hydrology	Peak/Base Flows		X	
	Drainage Networks		X	
Watershed Conditions	Road Density/Location	X		
	Disturbance History	X		
	Riparian Habitat Conservation Area		X	
	Disturbance Regime	X		
Integration of Species and Habitat Conditions	Habitat Quality and Connectivity		X	

Limiting Factors
Limiting factors for bull trout in the Salmon River 6th field HUC include streambank erosion causing increased sedimentation and higher substrate embeddedness, irrigation withdrawals which create unnaturally low seasonal flows and reduce fish growth and survival, elevated water temperatures, and degraded riparian habitat.

C. Status of Bull Trout Designated Critical Habitat in the Action Area

The action area is entirely within the Salmon River Basin Critical Habitat Units (CHU; 75 FR 63935), one of the 32 CHU in the Upper Snake Recovery Unit (USFWS 2015, p. E1). This CHU encompasses the entire Salmon River basin, extending across central Idaho from the Snake River to the Idaho-Montana border. The Salmon River Basin CHU is the largest CHU in the Upper Snake Recovery Unit, and includes 4,583.5 miles of stream and 4,160.6 acres of lake and reservoir surface area designated as critical habitat. Large portions of this CHU occur within the Frank Church River of No Return Wilderness. The Salmon River Basin CHU contains the largest populations of bull trout in the Upper Snake Recovery Unit. Bull trout populations in this CHU exhibit adfluvial, fluvial, and resident life history strategies (USFWS 2010, p. 673).

Middle Salmon River-Panther
The action area is located in the Middle Salmon River-Panther critical habitat subunit (CHSU), 1 of the 10 CHSUs found within the Salmon River basin CHU. This CHSU contains many individuals, a large amount of habitat, and moderate threat level. The Middle Salmon River-Panther CHSU provides a migratory corridor between multiple CHSUs, and bull trout populations in this CHSU exhibit both resident and fluvial life history strategies. Designated critical habitat in this CHSU includes 615.6 miles of stream (USFWS 2010, p. 745).

PBFs are used to describe habitat features that are essential to the conservation of the bull trout. Table 3 below displays the PBFs and associated diagnostic pathway/indicators that relate to each PBF. The condition of the diagnostic pathway/indicators is presented above in Table 2.

Table 3. Pathways/indicators PBF cross walk

Diagnostic Pathway/indicator	PBF 1 – Springs, seeps, groundwater	PBF 2 – Migratory habitats	PBF 3 – Abundant food base	PBF 4 – Complex habitats	PBF 5 – Water Temperature	PBF 6 – Substrate features	PBF 7 – Natural hydrograph	PBF 8 – Water quality and quantity	PBF 9 – Predators and competition
Water Quality									
Temperature		x	x		x			x	
Sediment		x	x			x		x	
Contaminants	x	x	x					x	
Habitat Access									
Physical Barriers	x	x	x						x
Habitat Elements									
Embeddedness	x		x			x			
LWD				x		x			
Pool Frequency			x	x		x			
Large Pools				x	x				
OffChannel Habitat				x					
Refugia		x			x				x
Channel									
Width Depth		x		x	x				
Streambank	x			x	x	x			
Floodplain Connect	x		x	x	x		x	x	
Flow/Hydrology									
Peak/Base Flows	x	x			x		x	x	
Drainage Network	x						x	x	
Watershed									
Road Density	x				x		x		
Disturb. History				x			x	x	x
Riparian Area	x		x	x	x		x		
Disturb. Regime				x			x	x	

Factors affecting the environmental baseline of bull trout critical habitat in the action area are similar to those described for bull trout populations and habitat in the action area. See the *Status of Bull Trout in the Action Area* section above. In summary, the baseline as presented in Table 2 indicates that the pathways for the action area are mostly functioning at risk. The only pathways functioning appropriately are habitat access and watershed conditions. The pathway for subpopulation characteristics is functioning at unacceptable risk. The condition of PBFs relies on the condition of the associated indicators.

Specific information on instream conditions in the action area is not available, but riparian habitat within the floodplain is fragmented and has been impacted by human activity, including extensive clearing for residential and agricultural use. As a result, PBF 3 (food base) is likely impaired. The Salmon River in the action area lacks undercut banks, large wood, and side channels (PBF 4), and the west bank of the river is steep and armored with riprap. This segment of the Salmon River contains numerous diversions for irrigation, so PBF 7 (natural hydrograph) is likely impaired. This portion of the Salmon River is on Idaho's 303 (d) list of water quality impaired streams; thus, PBF 8 (water quality) is impaired. Finally, brook trout are present in the Salmon River; therefore, PBF 9 (nonnative species) is likely impaired as well.

IV. EFFECTS OF THE PROPOSED ACTION

A. Direct and Indirect Effects of the Proposed Action to Bull Trout

The implementing regulations for section 7 define "effects of the action" as "the direct and indirect effects of an action on the species together with the effects of other activities that are interrelated or interdependent with that action, which will be added to the environmental baseline" (USFWS 1986, p. 19958). "Indirect effects" are caused by or result from the agency action, are later in time, but are still reasonably certain to occur (USFWS 1986, p. 19958).

In the following evaluation, the Service in part relied upon the effects analysis in the Assessment, which is based on a series of assumptions about bull trout presence and distribution in the action area, likely timing of spawning, foraging, and migration. Because of the construct of these assumptions, the analysis is more likely to result in an overestimate, rather than underestimate, of the impacts of the proposed action on bull trout. When examining the potential impacts to a species that is listed as threatened under the Act, and there is substantial imprecision or uncertainty in some of the information, using assumptions that are more likely to overestimate, rather than underestimate, effects is a reasonably cautious and prudent approach for assessing impacts to populations of that species. Absent the consideration of the full potential of effects, detrimental impacts to the species can go unrecognized (National Research Council 1995, p. 167). The Service also relied on the published scientific literature to analyze the information presented in the Assessment and the anticipated impacts of the proposed action.

Below the Service discusses the effects to bull trout that are likely to result from implementation of the project. The Service uses a narrative explaining how each mechanism of the proposed action can impact bull trout, along with studies or information that further supports the explanation. The Service presents a brief discussion of how the mechanism might be present during the proposed action and how substantial the effects from the mechanism to bull trout are likely to be. Finally, the Service will summarize how those effects impact bull trout at an individual scale and at a local population scale. Potential mechanisms for impacts could occur from changes to sediment and turbidity, water quality (non-sediment), dewatering, fording (crushing), noise and vibrations, and changes to riparian vegetation.

1. Sediment and Turbidity Effects

General

Sediment is a very important stressor to salmonids and can affect them in both direct and indirect ways. The potential negative impacts of increased sediment on bull trout and other salmonids have been well documented and are dependent on the timing, concentration, and duration of exposure (Newcomb and MacDonald 1991; Newcomb and Jensen 1996; Bash *et al.* 2001).

Newcomb and Jensen (1996) and Bash *et al.* (2001) provide syntheses of the research that has been conducted on the effects of suspended sediment on the physical condition of salmonids. Newcomb and Jensen (1996) used their syntheses of field and laboratory data on effects from sediment to develop a dose response model and described 14 severity levels of effects, ranging from "no behavioral effects" (severity level 0) to greater than 80 percent mortality (severity level

14). This range is divided into four major categories: "nil effect," "behavioral effects," "sublethal effects," and "lethal and Para lethal effects." Bash *et al.* (2001) helps us further refine the categories by describing whether the effect is behavioral, physiological, or habitat-based.

For example, Newcomb and Jensen (1996) report that suspended sediment concentrations of 500 milligrams per liter (mg/l) for 3 hours caused signs of sublethal stress in adult steelhead, which we would also expect for bull trout. If suspended sediment concentrations reach 3,000 mg/l it may cause moderate physiological stress (Newcomb and Jensen 1996), and could result in gill trauma and/or temporary adverse changes in blood physiology such as elevated blood sugars, plasma glucose, or plasma cortisol (Bash *et al.* 2001). Lethal effects can occur if suspended sediment concentrations reach 22,026 mg/l at any one time, or remain at concentrations of 3,000 mg/l for 3 hours (Newcomb and Jensen 1996).

The IDEQ adopted turbidity criteria of 50 NTU for protection of cold water biota (Bash *et al.* 2001, p. 67). That NTU level was based on data from Lloyd *et al.* (1987) suggesting that salmonids reacted negatively by beginning to move away from areas when the turbidity reaches 50 NTU.

There are several difficulties in using this information to try and anticipate what amount of sediment in the water column is likely to be produced by a project and what impacts they might cause to fish. First, field turbidity monitoring uses turbidimeters that recorded data in NTUs while Newcomb and Jensen's data is in mg/l. Second, turbidity as a result of projects is not consistent and can be present in short intense bursts or at lower levels over long periods of time.

While there is a relationship between suspended solids measured in mg/l and NTUs, the relationship is highly variable because of differences in many factors including water temperature and particle size. While developing Total Maximum Daily Load (TMDL) criteria for the Umatilla River Basin, the State of Oregon used regression analysis to express the suspended solids in mg/l that represented 30 NTU for 14 watersheds (Oregon Department of Environmental Quality 2001, p. A6-3). Values ranged from 60 to 110 mg/l for the target value of 30 NTUs. If a similar relationship existed with Newcomb and Jensen's data, their 3-hour lethal range of 3,000 mg/l could equate to an NTU reading of between 833 and 1,500, which is a very wide potential range of values.

Increasing suspended sediment in rivers and streams during low-flow periods, when background levels of sediment in the stream system are generally very low or absent, has greater potential to affect fish. Bash *et al.* (2001) reported that background mucus levels of fish are lower during sediment inputs. This is in contrast to sediments that may be mobilized during the first high flow events following a construction activity, when background sediment levels are higher. Additional suspended sediment associated with a project is expected to move through the water column, becoming deposited on the substrate in areas of lower velocity, including pools or slackwaters. Higher flows within the year following project implementation are expected to remobilize sediments, carrying them further downstream to be deposited. Eventually most sediments mobilized during project implementation will be carried downstream to larger streams, rivers, or water bodies within the watershed. Because high flows that remobilize project-related

sediments are expected to occur when background sediment levels are naturally elevated, they are expected to have less potential for effects to bull trout.

Sediment introduced into streams can adversely affect fish at an individual physical level and adversely affect fish populations. Deposition of silt on spawning beds can fill interstitial spaces in spawning areas with sediment (Phillip et al. 1975; Myers and Swanson 1996; and Wood and Armitage 1997) impeding water flow, reducing dissolved oxygen levels, and restricting waste removal which reduces the survival of fish embryos (Chapman 1988; Bjornn and Reiser 1991). Additionally, sedimentation directly decreases the amount of substrate suitable for invertebrates, which in turn reduces food for fish. Sediment can also reduce health of instream plants, reducing cover fish and making them more vulnerable to predation (Waters 1995).

Project Specific

Project activities are anticipated to result in temporary turbidity peaks in exceedance of 50 NTUs, but not more than 62 NTUs. This is expected to occur particularly during replacement of the excavated streambed and native materials. Turbidity plumes are not anticipated to extend more than 1,000 feet downstream. This is based on estimates used by the NMFS for other recent bridge replacement or maintenance projects on the Salmon River or its tributaries (Assessment, p. 33). The majority of project activities are anticipated to be below the 50 NTU threshold (Assessment, p. 33). The anticipated turbidity peak of no more than 62 NTUs is based on the turbidity peak generated during a 9 foot trench excavation on the Clark Fork River in Montana. A peak of 62 NTUs above background was observed immediately downstream of the work site during excavation and dissipated almost immediately when excavation ceased.

When considering the use of diversions and cofferdams (so that work can take place in the dry), the river channel being largely made up of rock and cobble, the relatively large body of water where the disturbance will occur, and the relatively small work area that will be instream, the Service would expect the sediment plume released into the river to be similar to recent bridge projects on the Salmon River. Additionally, the conservation measures being applied as part of the proposed action, including settling ponds and sediment barriers, should also decrease the amount of sediment produced. Because the proposed action will be implemented over several months, we estimate that sediment plumes will be localized and of short duration, allowing fish to find suitable habitat nearby. Several sediment plumes are anticipated during the course of the project. The Service's description of the area expected to be affected by sediment (3,330 feet of river channel) is partially based on the projected extent of sediment plumes, as sediment from ground disturbance has been noted this far downstream (Assessment, p. 33).

Within the action area, we expect that sporadic suspended sediment concentrations, of no greater than 62 NTUs, resulting from project work will result in effects to bull trout from the project footprint to 1,000 feet downstream (Assessment, p. 33). Sediment effects are expected to be insignificant at greater than 1,000 feet below the project footprint. Bull trout are expected to avoid sediment plumes of greater than 50 NTUs (Bash *et al.* 2001). Therefore, the effects to bull trout, during the period between maximum observed turbidity and the return to pre-project levels, are expected to be behavioral, including avoidance and potential effects to feeding rates. For example, it is very probable that any fish inhabiting the action area will suffer mild to

moderate alarm reactions, short-term abandonment of the site and possible loss of habitat structures in the footprint of the project.

There is a potential that not all bull trout will avoid the suspended sediment from the proposed action. If bull trout do not avoid the sediment plumes, physiological effects could occur. Short-term sediment plumes of 60 NTUs have resulted in gill flaring even after the turbidity dropped to between 30 and 20 NTUs. Bash *et al.* (2001) also documented increases in plasma glucose levels in adult sockeye when exposed to increased sediment levels. A change in a fish's plasma glucose is an indicator that the fish is experiencing some level of stress. Such stress my affect physiological systems, reduce growth, increase disease incidence, and reduce the ability to tolerate additional stressors. If we use the Umatilla data mentioned earlier, we find that the expected turbidity peak resulting from the proposed action (62 NTUs) would equate to 120 to 223 mg/l. Newcomb and Jenson (1996), suggested this level of suspended sediment would cause bull trout that do not avoid the sediment plume to have minor physiological stress, increased rates of coughing and respiration, and potential gill trauma.

The proposed action has the potential to move construction sediments after natural flow levels in each channel are restored. Secondary hydrological effects may result from changes in stream flow patterns and turbulent actions from the use of diversions and coffer dams. By increasing stream volumes and velocities in the east channel and in the immediate vicinity of the diversions, existing instream sediment may be mobilized and suspended in the water column. The mobilization of these sediments may cause fish behavioral effects as previously discussed. Because of the short term nature of sediment plumes and low level of turbidity, it is highly unlikely that substrate embeddedness or habitat for benthic invertebrates will be impacted. The small scale of the project and temporary effects are not anticipated to have any long lasting measurable effects on fish or food sources. The increase in the channel width, resulting from project implementation, may have long term benefits by reducing sedimentation during scour at high water events and improving water quality.

The abandonment and reclamation of the temporary dirt surface boat ramp may reduce stream sediment input. It is likely that the dirt surface may be introducing sediment input to the stream during runoff events or when vehicles track mud into the waterway. Eliminating the boat ramp may have a minor beneficial impact to water quality.

2. Water Quality (non-sediment) Effects

General

Several potential chemical contaminants are associated with equipment and construction techniques used for the proposed action. Petroleum-based contaminants such as fuels, oil and hydraulic fluids contain poly-cyclic aromatic hydrocarbons which can cause chronic sublethal effects to aquatic organisms (Neff 1985, p. 420). Fuels and petroleum products are moderately to highly toxic to salmonids depending on concentrations and exposure time. Free oil and emulsions can adhere to gills and interfere with respiration, and heavy concentrations of oil can suffocate fish. Evaporation, sedimentation, microbial degradation and hydrology act to determine the fate of fuels entering fresh water. Ethylene glycol (the primary ingredient in antifreeze) has been shown to result in sublethal effects to rainbow trout at concentrations of

20,400 mg/l (Staples 2001, p. 377). Brake fluid is also a mixture of glycols and glycol ethers, and has about the same toxicity as antifreeze.

Project Specific
Instream equipment has the potential to degrade water quality in the event of petroleum chemical leaks, or antifreeze leaks. Impacts to water quality through chemical contamination could affect bull trout. Any equipment leaks or spills in the terrestrial project area have the potential to leach into subsurface water or be transferred into the channel through runoff. Several conservation measures will minimize potential for the introduction of petroleum products into the waterway. Equipment will be inspected prior to arriving onsite and throughout the duration of operations to detect and repair any leaks. Refueling will occur through the use of a 100 gallon fueling vehicle that will only be near waterways during refueling operations. In the event that the existing bridge is not able to be used for the fuel truck to access Island Park, a long hose will be strung across the bridge. A spill containment kit will be onsite and at the ready in the event of any chemical spill. The Spill Containment Plan (Assessment, Appendix C) will ensure that any spilled chemical contaminants will be contained and disposed of properly.

Uncured and dry concrete are highly alkaline substances that can have adverse effects on aquatic life. It is anticipated that the water drawdown in the west channel will enable all concrete work to be done above water level. In the event that it is not possible to work above the water level or if there is a threat of uncured concrete entering waterway, cofferdams will be constructed as necessary. By keeping concrete booms/delivery equipment over the existing bridge when pouring the east abutment, any spills or leaks from equipment would be confined to the bridge deck. All new concrete will be allowed to cure fully before it is exposed to live water. Because of the measures discussed above to prevent mechanical fluids and concrete from entering waterway, effects from non-sediment contaminants are anticipated to be discountable.

3. Dewatering Effects

General
Fish that become trapped in areas of water that are disconnected from larger bodies of water can die. Mortality is caused because water in small pools warms quickly, loses adequate dissolved oxygen, exposes fish to predators, and dries up or drains away.

Project Specific
Bull trout may become stranded during the drawdown period within the cofferdams for the removal and installation of abutments. The area dewatered behind each of the abutment cofferdams will be approximately 800 square feet. The project is not anticipated to strand or entrain bull trout because the cofferdams used are expected to be open-ended and dewatering will be completed slowly in coordination with permitted IDFG personnel. Fish are expected to leave the area during dewatering before becoming stranded. Additionally, the dewatered areas are relatively small and the likelihood of a fish being in the dewatering area is low. In the unlikely event that salvage is needed, IDFG employees will salvage the fish. Effects from salvage of bull trout by IDFG biologists as part of this project have been analyzed at a programmatic level and are not discussed further.

Mechanical injury from pumping operations (if needed) will be minimized by adhering to NMFS 2008 fish screening standards and criteria, as specified in the conservation measures (Assessment, p. 17).

4. Fording, Crushing, and Impact Related Effects

General
Fording may result in increases in turbidity and impacts to riparian vegetation, and could potentially crush fish. Placement of objects such as rocks, sandbags, etc. into fish-bearing streams can disorient, injure, or kill fish. Any fish that inhabit the project area, and does not react quickly to avoid construction events which place objects suddenly in the river, can be hit or crushed. This is particularly likely for fish that are hiding or resting in pools next to the bank, under overhanging banks, or rocks.

Project Specific
Equipment fording effects include increases in turbidity (discussed above), effects to riparian vegetation, and effects from noise (discussed below). When equipment fords the stream there is a potential that individual fish may be killed or injured through crushing. There is also potential to crush or impact a fish during placement of cofferdams and placement of riprap. It is anticipated that bull trout would avoid the project area because of the noise and activity associated with project work. Adult fish migrating through the area would likely flee and avoid crushing from equipment. Juvenile fish are more likely to flee only short distances and use interstitial spaces for security. Consequently, they may flee and hold in areas where they are still in danger. However, it is highly unlikely juvenile bull trout will be present in the action area, because of the distance from suitable spawning habitat, the lack of instream cover in the action area, the conservation measures reducing stream flow, and the low numbers of adult bull trout expected in the action area.

Given the low water level, the limited area of impact (equipment moved "in the dry" whenever possible), and the low density of bull trout in the action area, the probability of bull trout exposed to risk of crushing or impact is expected to be discountable. This conclusion is contrary to the conclusion made in the Assessment; however, to be injured, fish would have to be present in the project area, and at the site of fording, or cofferdam or riprap placement, and be unable to avoid being struck. Considering the lack of bull trout spawning and rearing habitat in the action area and the Salmon River, and the dewatering of the channel, there is not a reasonable likelihood that bull trout will be present and therefore crushed by project activities. As discussed below, displacement and avoidance could occur from many project activities, further reducing the likelihood of a bull trout being crushed.

5. Noise Effects

General
Heavy equipment operation instream and on streambanks will create noise and vibration disturbances. NMFS has suggested a sound threshold of less than 150 dB root mean square (RMS) as a limit to behavioral effects on fish. Thus, sounds less than 150 dB RMS are assumed to have no behavioral effect on listed fish.

Project Specific
The action area is in the center of the City of Salmon and adjacent to the Highway 93 Bridge. The action area likely experiences ambient noise levels from traffic and other equipment of 50 to 70 dB (Assessment p. 36). Demolishing the existing abutments and running heavy equipment will produce a temporary increase in noise. The Assessment (p. 36) estimates that typical bridge construction equipment (e.g., backhoe, compressor, jackhammers, scraper, concrete pump, and trucks) noise production ranges from 74 to 89 dB at 50 feet. Hoe-rams used for removing existing concrete abutments may be as loud as 90 dB at 50 feet (Assessment, p. 36). These noises are in the air and cannot be compared against the 150 dB RMS disturbance threshold for underwater noise. It is unknown if the expected dB levels will cause fish to temporarily move away from the disturbance or if fish will remain present. It is not anticipated that short-term movements caused by noise of construction equipment will result in effects substantially different than those typically experienced by fish in their natural environment. Further, it is highly likely that after dewatering from the west channel the existing abutments will be above water level during removal procedures, thus lessening the potential for effects from noise. The expected noise levels and level of disturbance caused by construction equipment will be minimal and may have minor effects of fish behavior, but are unlikely to result in significant alterations to normal bull trout breeding, feeding, or sheltering behavior.

6. Riparian Vegetation

General
The disturbance of riparian vegetation can have negative impacts to water quality by reducing streambank stability and increasing the chance of sedimentation into waterways. The removal of vegetation can also lead to increased channel exposure to sunlight and temperature increases.

Project Specific
The existing channel shading is poor in the action area because of the highly disturbed nature of the channel and recreational impacts to vegetation. Vegetation will be altered or removed in order to place the new bridge abutments and bridge, and when the river channel is getting recontoured. Very little vegetation will actually be affected and most of that will be in the uplands, away from the river. No more than two nonnative mature trees will be removed in the vicinity of the bridge construction (Assessment, Appendix A). Some native shrubs may be removed during construction of the horizontal terrace near Jesse Creek; however, they will be replaced with native species once bridge construction is complete. The excavator will likely crush and injure, but not kill, any shrubs present at fording areas. Any impacts to bull trout from vegetation loss or damage will be short term due to the revegetation of disturbed areas through planting and through natural plant recovery. As a result of the reclamation of the temporary boat ramp, overall vegetation cover in the project area will see a net increase once plants are established. Vegetation is anticipated to recover sediment filtering abilities within 1 to 2 years after project completion. Due to the small scale of changes in vegetation cover, it is likely that the negative impacts to any bull trout using the area will be insignificant.

7. Displacement and Avoidance Related Effects

General
Fish that are near construction activity in a river may be repeatedly disturbed by the activity and flush from the disturbance. In the process of flushing they can become more exposed to predators, injure themselves in low water areas, or become disoriented and stressed. In the longer term, fish that have established territories in habitat specific areas in a river become knowledgeable about all the features in that area. If displaced, they may have to search out new areas for feeding, hiding, or favorable water quality. In the time it takes them to do that, they can be subjected to a greater risk of predation, competition with other fish, greater stress and decreased physical condition.

Project Specific
The installation of the sediment barriers, use of impact hammers, installing cofferdams, placement of riprap, recontouring the river channel, and replanting of vegetation are likely to disturb and displace bull trout in the action area. Some disturbance, as in replanting vegetation, will be short term (hours). However, some actions will occur for an extended period of time and there will be some type of disturbance through the whole construction period (September through December). For example, the exclusion of fish from the area inside the cofferdams will continue until the cofferdams are removed following construction of each new abutment. Fish that used these areas prior to the construction will be displaced for that period.

Bull trout within 30 feet of all in-water work are likely to be exposed to and experience the effects from displacement and avoidance. Individual work tasks can be a short term but fairly intense disturbance (impact hammers, if used) or long-term low intensity (displacement from cofferdam areas). We expect bull trout within 30 feet of construction activity will be adversely affected due to the cumulative effects of disturbance produced by these actions; however, we do not expect the effects to significantly impair essential breeding, feeding, or sheltering behavior. Potential effects are expected to be temporary, sublethal, without injury, and affected bull trout are expected to recover quickly once displacement is over.

B. Summary of Anticipated Effects to Bull Trout from the Proposed Action

1. Effects at an Individual Fish Scale

It is likely only low numbers of bull trout use the action area because of the warmer water temperatures, lack of deep pools and instream cover, and poor quality of riparian habitat. Any bull trout using the action area could be exposed to the effects addressed above from the proposed action. Given the multiple stages of the construction and multiple month term of the action, it is possible that individual fish might be subject to impacts from several different stages. However, only effects from increases in suspended sediment are expected to lead to injury.

2. Effects at the Local Population and Core Area Scales

The action area does not contain a local population. Although the Jesse Creek and Carmen Creek local populations are near the action area, both local populations are substantially isolated

from the Salmon River because of impassable barriers and do not support fluvial bull trout. Bull trout use the action area mainly as a corridor for migration to spawning areas in mainstem tributaries. Because of the warmer water temperatures, lack of instream cover, and distance from any spawning areas, the Salmon River in the action area is unlikely to support juvenile bull trout rearing.

No lethal impacts to bull trout from the proposed action are anticipated. Nonlethal impacts to bull trout in the action area are unlikely to be discernable at a local population or core area scale because the effects would be limited in time and space and affect only a small portion of the core area and fluvial bull trout population.

C. Effects of Interrelated or Interdependent Actions to Bull Trout

The implementing regulations of section 7 define interrelated actions as those that are a part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. The Service has not identified any actions that are interrelated or interdependent with the proposed action; the bridge replacement is not intended to increase use of the area, but rather make existing travel conditions safer.

D. Direct and Indirect Effects of the Proposed Action to Bull Trout Critical Habitat

Within the action area, the Salmon River is designated FMO habitat for bull trout. As described above, the physical and biological features (PBF) are those bull trout critical habitat components that are essential for the primary biological needs of foraging, reproducing, and rearing of the young, dispersal, genetic exchange, or sheltering. The proposed action may affect PBFs 2, 3, 4, 5, and 8 associated with migration habitats, food base, complex river environments, and water quality and quantity. The proposed action will not affect PBFs 1, 6, 7, or 9. Only the PBFs which may be affected by the proposed action are discussed further. While the Assessment identifies PBF 6 as potentially being impacted by the proposed action, bull trout are not known to rear in the action area or during the term of the proposed action. As such, PBF 6 is not expected to be impacted by the proposed action and is not addressed further.

PBF 2: Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, over-wintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

Migratory habitat may be impacted by work area isolation, disturbance, noise, and turbidity. The cofferdams placed around each of the old abutments will reduce the available migration habitat; however, they will not restrict the entire channel width and habitat, and will leave a migration corridor available at all times. Construction activities will cause noise, disturbance, and reduced water quality due to increases in suspended sediment, and will overlap the times that bull trout may be migrating through the action area. The Service concludes this PBF will be adversely affected temporarily and intermittently throughout the term of the proposed action. Following

project completion, the Service expects this PBF will return to pre-project condition, or improve due to removal of the old abutments which constrict the stream.

PBF 3: An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

There will be temporary increases in suspended sediment/turbidity, minor effects to stream bank conditions from riprap placement, and a slight reduction in riparian vegetation, which may impact macroinvertebrates and allochthonous inputs, thus the food base for bull trout. Temporarily dewatering portions of the river channel to allow demolition and construction of the abutments will reduce the channel area available for foraging and could also affect the prey base. However, given the size of the river, the small area that will be affected by increased turbidity, project features designed to minimize turbidity and sediment, and the amount of remaining riparian vegetation that will provide for the availability of terrestrial insects, the Service concludes that implementation of the proposed action is likely to be compatible with maintaining the current condition of this PBF in the action area.

PBF 4: Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large woody debris, side channels, pools, undercut banks, and unembedded substrates to provide a variety of depths, gradients, velocities, and structure.

Removal of the existing abutments, which constrict the stream channel, will have a positive effect on river habitat by removing structures that likely alter the velocities, widths, gradients, and streambanks. There will be temporary increases in suspended sediment/turbidity and minor effects to streambank conditions and riparian vegetation which will not be significant enough to impair this PBF. Due to the size of the river, the minor increases in sediment, and amount of unaffected sources for macroinvertebrates, the proposed action is expected to maintain or improve the condition of this PBF.

PBF 5: Water temperatures ranging from 2° to 15° C (36° to 59° F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

Although some native shrubs may be damaged and two nonnative trees and some native shrubs may be removed, they will be replaced with native species in disturbed areas at the horizontal terrace near Jesse Creek and the boat launch, resulting in more vegetation than prior to project activities. As such, the Service concluded the proposed action is compatible with maintaining or improving the condition of this PBF.

PBF 8: Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

Water quality within the action area will be temporarily affected due to increases in sediment/turbidity, particularly during replacement of the excavated stream bed and native materials. Adverse effects to this PBF would be short term. The Service expects the condition of this PBF would be maintained in the long term.

E. Summary of Effects to Bull Trout Designated Critical Habitat from the Proposed Action

Project activities will have temporary adverse effects to PBF 2 and 8 of designated bull trout critical habitat as a result of placement of cofferdams and diversion structures, fording of the river by heavy equipment, and other construction activities. These activities will increase turbidity and produce noise reducing the quality of habitat for bull trout. The portion of the Salmon River enclosed within the cofferdams will reduce its capacity to provide fully effective migratory habitat. Construction activities may, at times, impede daytime movement of bull trout, as they will likely avoid being in or moving through the area. Sediment plumes can also cause partial barriers as fish are reluctant to move through them. Effects to PBFs 2 and 8 will be localized to the action area. The volume of sediment produced or becoming suspended as a result of project activities is not sufficient to have a measureable effect on substrate embeddedness or macroinvertebrate production down river from the action area.

Although adverse effects to PBFs are expected, we do not anticipate the proposed action will reduce the functionality of designated critical habitat for bull trout in or near the action area nor overall for the designated critical habitat unit.

F. Effects of Interrelated or Interdependent Actions to Bull Trout Designated Critical Habitat

The implementing regulations of section 7 define interrelated actions as those that are a part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. The Service has not identified any actions that are interrelated or interdependent with the proposed action.

V. CUMULATIVE EFFECTS

The implementing regulations for section 7 define cumulative effects to include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. No cumulative effects have been identified in this consultation.

VI. CONCLUSION

A. Bull Trout

After reviewing the current status of the bull trout, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the Corps' proposed issuance of a 404 permit for the replacement of the Island Park Bridge in Idaho is not likely to jeopardize the coterminous U.S. population of the bull trout. The Service's rationale for this determination is presented below.

Implementation of the proposed action will result in adverse effects to bull trout in the action area due to exposure to multiple turbidity pulses. Effects of turbidity pulses to bull trout will be minimized, but not eliminated, by project design features and BMPs. Most, if not all, bull trout present, are expected to experience behavioral effects (avoidance of the area). Effects to bull trout in the action area from increased sediment and turbidity pulses resulting from the placement of riprap, replacement of excavated streambed and native material, and abutment installation and removal is expected to be short-term in nature. These bull trout are likely to find nearby suitable habitat. If bull trout do not avoid the sediment plumes, the Service anticipates minor physiological effects resulting in injury, but not death, would occur.

Only low numbers of bull trout are expected to be in the action area because bull trout densities in foraging and migratory habitat are low relative to densities in other habitats and quality bull trout habitat is lacking within the Salmon River running through the project area. While we do not expect large numbers of bull trout to be present in the action area, an individual or as many as a few could be present at any time during project activities. Because of the low number of bull trout likely to be in the action area and the expected low severity of adverse effects, the Service finds the level of impact is unlikely to appreciably reduce the viability of this fluvial bull trout population.

The Service concludes the anticipated level of effect caused by the proposed action, taking into account the environmental baseline in the action area, will not reduce appreciably the likelihood of both survival and recovery of bull trout in the wild. The proposed action is likely to have adverse effects to small numbers of bull trout, but these effects are not likely to significantly change numbers and distribution of bull trout in the action area, the core area, or any local populations within the core area. Habitat quality and quantity for the bull trout are likely to be maintained or improved under the proposed action because of the expected low severity of adverse effects, and the improved stream channel conditions likely to result from removing the channel constriction caused by the existing bridge.

B. Bull Trout Designated Critical Habitat

After reviewing the current status of the designated critical habitat for bull trout, the environmental baseline for the action area, the effects of the proposed action, and any cumulative effects, it is the Service's biological opinion that the Corps' proposed Island Park Bridge replacement project is not likely to result in destruction or adverse modification of designated critical habitat for bull trout. The Service's rationale is presented below.

Although some PBFs of designated critical habitat are likely to be adversely affected by the proposed action (specifically PBFs 2 and 8), we expect these effects to be temporary in duration and limited in spatial extent. Installation and removal of the cofferdams, fording with heavy equipment, placement and removal of diversion structures, excavation and replacement of streambed and native materials, and removal of the old bridge abutments, are expected to affect designated critical habitat because turbidity will be increased. In addition, the cofferdams and project related noise will likely reduce the effectiveness of the Salmon River to provide unimpeded movement of bull trout through the action area. We also expect project design features and BMPs to minimize these adverse effects.

Given the amount of critical habitat in the Salmon River, the significance and extent of effects from the proposed action will be minimal and confined to a small area. Impacts to designated critical habitat will not affect the functionality or conservation value of the Salmon River Basin Critical Habitat Unit. Habitat quality and quantity for the bull trout in the action area are likely to be maintained or improved under the proposed action because of the project design and conservation measures implemented as part of the proposed action. For the above reasons, the Service concludes that the anticipated level of effects caused by the proposed action to bull trout habitat, over the term of the proposed action, taking into account past impacts in the action area, is likely to maintain the capability of the critical habitat to support bull trout and serve its intended conservation role for the species. If the adverse effects of the proposed action are not substantial within the action area, then they are unlikely to be discernible at the designated critical habitat rangewide scale.

VII. INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering.

Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement. The measures described below are non-discretionary, and must be undertaken by the Forest so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply.

A. Amount or Extent of Take Anticipated

Based on the results presented in the *Effects of the Action* analysis above, the Service finds that incidental take of the bull trout is likely to occur in the form of injury caused by suspended

sediment levels of no more than 62 NTUs over background occurring intermittently in the Salmon River within the action area.

Injury to bull trout could occur when suspended sediment levels increase and bull trout cannot avoid the sediment plume. The Service determined that the number of bull trout in the action area would be low because this portion of the Salmon River is used by bull trout for migration and foraging, and the action area lacks quality bull trout habitat. The Service expects most bull trout in the action area would avoid sediment plumes and move to similar habitat nearby, thereby avoiding the potential for injury.
Because specific information on the number of bull trout in the action area is lacking, the Service is unable to estimate a specific amount of incidental take of bull trout. As discussed above, although the Service finds that only a low level of take would occur, the potential for take cannot be eliminated. Because the available information is insufficient for the Service to quantify the amount of take anticipated, we describe the expected extent of take as the amount of bull trout habitat affected by increased levels of suspended sediment.

In the *Effects of the Action* section above, the Service concludes 1,000 feet of the Salmon River downstream of the project site would be affected by increased levels of suspended sediment (up to 62 NTU above background). If suspended sediment levels exceed 62 NTU above background levels within the action area as a result of the proposed action, or there is any increase above background of suspended sediment levels more than 1,000 feet downstream of the project site, take is exceeded. If take is exceeded, all project activities will cease and the Corps will immediately contact the Service to determine if reinitiation of consultation is required.

B. Effect of the Take

In the accompanying Biological Opinion, the Service determined that this level of anticipated take is not likely to jeopardize the coterminous United States population of the bull trout.

C. Reasonable and Prudent Measures

The Service finds that compliance with the conservation measures and BMPs, as outlined in the Assessment for the proposed action, is essential to minimizing the impacts of incidental take of the bull trout in the action area. The Service would require these management actions as reasonable and prudent measures if they had not been included as part of the proposed action.

The Service also finds that the following Reasonable and Prudent Measure is necessary and appropriate to minimize the impacts of incidental take of the bull trout reasonably certain to be caused by the proposed action.

Reasonable and Prudent Measure 1 – Minimize the potential for incidental take resulting from project-related sediment effects.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions which implement the reasonable and prudent measure described above and outlines required reporting/monitoring requirements. These terms and conditions are not discretionary.

Term and Condition 1 to implement Reasonable and Prudent Measure 1:

The Corps shall monitor turbidity within the project site and 1,000 feet from project activity to ensure that incidental take is not exceeded. The Corps shall conduct monitoring and reporting of turbidity as follows:

- The Corps shall use an appropriate and regularly calibrated turbidimeter.
- Background turbidity levels will be collected at an undisturbed area approximately 100 feet upstream from in-water disturbance prior to expected sediment pulses.
- Turbidity samples will be taken every 30 minutes and immediately downstream from the point of sediment discharge during pulses (in a safe location, considering risks of injury from construction related activity). To minimize impacts of turbidity on bull trout, project activities will cease immediately when turbidity levels exceed 50 NTUs over background for 60 consecutive minutes until the turbidity level falls below 50 NTU.
- Visual observations will be made approximately 1,000 feet downstream of generated plumes and if turbidity is observed extending beyond 1,000 feet, work producing plumes will be stopped and delayed until turbidity levels subside and appropriate measures are implemented.
- The Corps shall submit a post-project report within 6 weeks of project completion. The report will include the project name, starting and ending dates for the work completed, and results of turbidity monitoring. Turbidity monitoring results should specify the type and location of the project activity that caused a sediment plume, the distance from the activity that monitoring was conducted, the turbidity level, and the extent of time that the 50 NTU above background sediment level was exceeded. The report shall be submitted to the Team Leader of the Service's Eastern Idaho Field Office in Chubbuck, Idaho. If the anticipated 62 NTU above background turbidity level is exceeded, the Corps shall immediately notify the Service.

Term and Condition 2 to implement Reasonable and Prudent Measure 1:

Remove the diversion structures slowly and rewater the west channel slowly and in a controlled manner to limit the intensity, duration, and extent of the turbidity plumes.

VIII. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to

minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery programs, or to develop new information on listed species.

Remove the cofferdams from the downstream end to the upstream end and in a controlled and slow fashion to limit the intensity, duration, and extent of the turbidity plumes.

The Service recommends monitoring for bull trout presence in the Salmon River within the action area to support the Service's assumptions of bull trout presence in the action area.

IX. REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the Corps' proposal to issue a 404 permit authorizing the Island Park Bridge replacement in Lemhi County, Idaho. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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