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Katherine Wood
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Salmon-Challis National Forest
311 North US Highway 93
Challis, Idaho 83226

SEP 22 2016

Subject: Biological Opinion on the Salmon-Challis National Forest Challis Creek Road Repair Project, Custer County, Idaho (01EIFW00-2016-F-1069)

Dear Ms. Wood:

This letter transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) on effects of the Salmon-Challis National Forests' (Forest) proposed Challis Creek Road Repair Project to the threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat. In a letter dated May 9, 2016, and received by the Service on May 12, 2016, the Forest requested formal consultation under section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Your letter included a biological assessment describing effects of the subject action on bull trout and its habitat.

Through the biological assessment, the Forest determined that the proposed road repair project was likely to adversely affect bull trout and its designated critical habitat. In the enclosed Opinion, the Service finds that effects of the proposed road repair are not likely to jeopardize the coterminous United States population of bull trout, or destroy or adversely modify designated critical habitat.

Please note that if conditions change such that the analysis in the enclosed Opinion is no longer accurate, reinitiation of formal consultation may be necessary provided the Forest retains discretionary Federal involvement or control over the action. If you have any questions regarding this Opinion, please contact Laura Berglund of our office at (208) 237-6975 extension 103.

Sincerely,

Sandra M Fisher

for Gregory M. Hughes
State Supervisor

Enclosure

cc: SCNF, Mackay (Garnett)
NMFS, Salmon (Murphy)

BIOLOGICAL OPINION
FOR THE
CHALLIS CREEK ROAD REPAIR PROJECT
CUSTER COUNTY, IDAHO

01EIFW00-2016-F-1069

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

Supervisor for Sandra J. Fisher

Date 22 September 2016

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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 Salmon-Challis National Forest's (Forest) proposed Challis Creek Road Repair Project in Custer 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]). Your May 9, 2016, request for consultation was received on May 12, 2016.

This Opinion is primarily based on the Forest's *Fish Species Biological Assessment for the Challis Creek Road Repair Project* (USFS 2016, entire), dated May 6, 2016, and other sources of information cited herein. The biological assessment (Assessment) is incorporated by reference in this Opinion.

Consultation History

On August 1, 2014, Forest staff discovered that an intense, localized precipitation event impacted a small drainage in the Challis Creek watershed which had burned in the 2013 Lodgepole Fire. Runoff from this precipitation event generated a debris flow that completely filled the Challis Creek channel causing the stream to leave its channel and flow down the Challis Creek Road for approximately 100 meters. The Forest contacted the Service on August 4, 2014, to initiate emergency consultation and request recommendations on how to proceed with repair work. The Service provided recommendations, and repair work was completed by the Forest on August 13, 2014. Later that day, the area experienced another intense, localized precipitation event which resulted in another debris flow. This debris flow was much larger than the first, and a large section of the Challis Creek Road was obliterated. A substantial amount of work will be required to repair the road. In the May 2016 Assessment, the Forest determined that the proposed action may affect and is likely to adversely affect bull trout and its designated critical habitat.

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.

February 24, 2016	The Forest informs the Service at a Level 1 meeting that a draft biological assessment is being developed for repair of the Challis Creek Road.
March 16, 2016	The Service receives a draft biological assessment for the subject project.
March 23, 2016	The Service provides comments to the Forest on the draft biological assessment.
March 30, 2106	The Forest discusses comments received from the Service and the National Marine Fisheries Service (NMFS) at a Level 1 meeting.

April 22, 2016	The Service receives a revised draft biological assessment for the project.
April 26, 2016	The Service provides additional comments to the Forest on the revised draft biological assessment.
May 5, 2016	The Forest responds to Service comments on the revised draft biological assessment and indicates the clarifications will be addressed in the final biological assessment for the project.
May 12, 2016	The Service receives the final biological assessment and a letter from the Forest requesting formal consultation on the proposed action.

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

[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

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

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 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

Section 7(a)(2) of the Act requires that Federal agencies insure that any action they authorize, fund, or carry out is not likely to destroy or adversely modify designated critical habitat. A final rule revising the regulatory definition of "destruction or adverse modification" was published on February 11, 2016 (81 FR 7214). The final rule became effective on March 14, 2016. The revised definition states:

> "*Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features.*"

The destruction or adverse modification analysis in this Opinion relies on four components:

1. The *Status of Critical Habitat* analysis, which describes the rangewide condition of critical habitat in terms of key components (i.e., essential habitat features, primary constituent

elements, or physical and biological features) that provide for the conservation of the bull trout, the factors responsible for that condition, and the intended value of the critical habitat overall for the conservation/recovery of the bull trout;

2. The *Environmental Baseline* analysis, which analyzes the condition of critical habitat in the action area, the factors responsible for that condition, and the value of the critical habitat in the action area for the conservation/recovery of the bull trout;

3. The *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 the key components of critical habitat that provide for the conservation of the bull trout, and how those impacts are likely to influence the conservation value of affected critical habitat; and

4. The *Cumulative Effects*, which evaluate the effects of future, non-Federal activities that are reasonably certain to occur in the action area on the key components of critical habitat that provide for the conservation of the bull trout and how those impacts are likely to influence the conservation value of the affected 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.

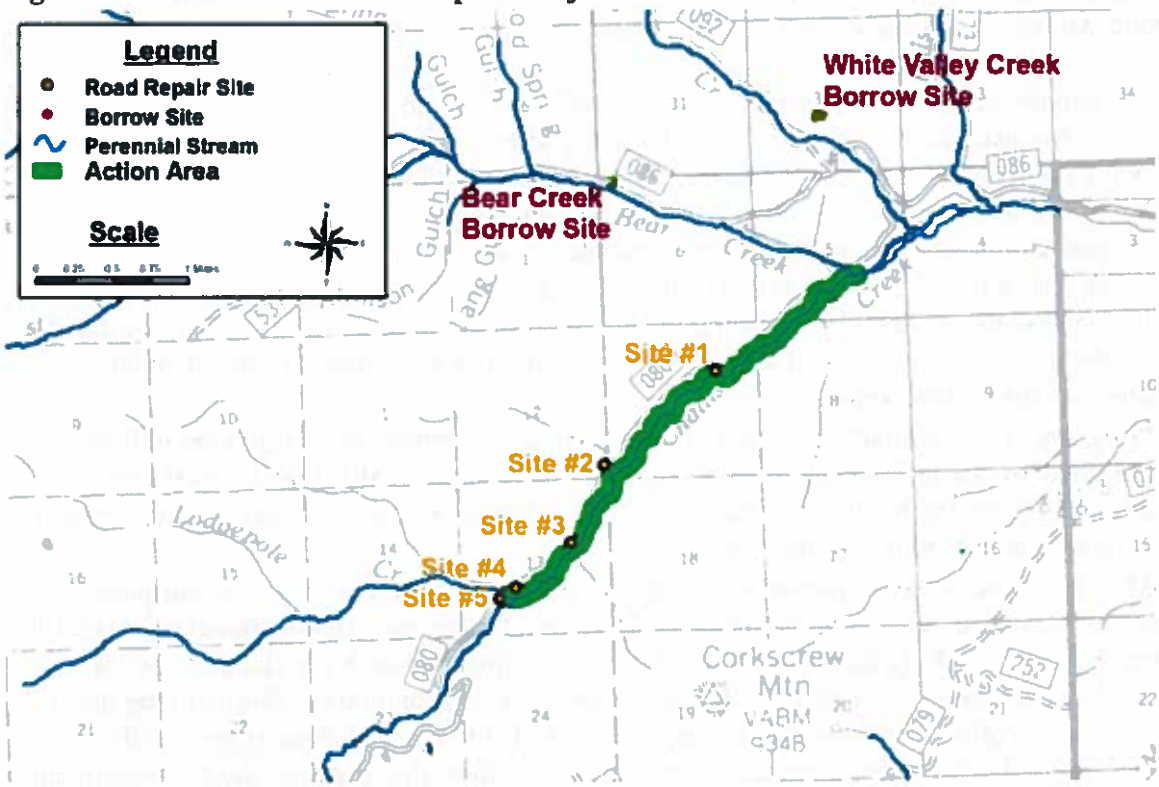
For purposes of making the destruction or adverse modification determination, the Service evaluates if the effects of the proposed Federal action, taken together with cumulative effects, are likely to impair or preclude the capacity of critical habitat in the action area to serve its intended conservation function to an extent that appreciably diminishes the rangewide value of critical habitat for the conservation of the bull trout. The key to making that finding is understanding the value (i.e., role) of the critical habitat in the action area for the conservation/recovery of the bull trout based on the *Environmental Baseline* analysis.

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: 1) Challis Creek between Lodgepole Creek and Bear Creek, 2) Lodgepole Creek from the dewatering points downstream to Challis Creek, 3) each of the unnamed tributaries that cross Site #2, Site #3, and Site #4, from the Challis Creek Road downstream to Challis Creek, 4) the area occupied by the barrow pits, and 5) the area extending from the barrow pits out to the nearest road or 100 feet, whichever is less (Figure 1).

Figure 1. Challis Creek Road Repair Project Action Area



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 Forest proposes to repair five sections of the Challis Creek Road between Bear Creek and Lodgepole Creek that have been damaged by runoff and a debris flow. The damaged segments have a combined length of approximately 1,400 feet of road. A description of the damage at each site, and the work to be completed, is provided below, and described in detail in the Assessment (pp. 1-5).

Site #1: At this site, the debris flow filled the Challis Creek floodplain with a considerable amount of material and created a dam across Challis Creek. Upstream of the dam, a pond formed, inundating approximately 150 feet of the Challis Creek Road. The debris flow also forced Challis Creek below the dam onto the Challis Creek Road, consequently obliterating 750 feet of the road. The obliterated section of road will be reconstructed in the original location at this site. This will be accomplished by constructing a bypass-stream channel, realigning the unnamed tributary with Challis Creek, dewatering the roadway by directing flows into the bypass-stream channel, rebuilding the obliterated roadway, constructing up to seven stream barbs

to protect the roadway, and stabilizing the slopes adjacent to the roadway. Approximately 750 feet of road will be reconstructed and an additional 200 feet of road will be raised.

- The bypass-stream channel will be constructed between the pond and a section of Challis Creek downstream of the pond. The channel will be constructed in the material deposited by the debris flow, and will be 350 feet long, with a bankful width of 20 feet and bankful depth of 2 feet to mimic the natural channel dimensions found in this stream reach. The channel will be constructed in the dry. Natural stream flows will be maintained in Challis Creek below this site during project implementation. Water will be allowed to remain in the bypass-stream channel following the completion of work at this site. Approximately 2,500 cubic yards of material will be excavated and placed adjacent to the channel for later use during road repair.
- The channel of the small unnamed tributary where the debris flow originated will be realigned so that it flows down valley and terminates into Challis Creek in a manner similar to what existed prior to the debris flow. Approximately 100 feet of the unnamed tributary channel will be relocated.
- After the work on the bypass-stream channel and the unnamed tributary is complete, the roadway will be dewatered by directing flows into the bypass-stream channel. This will be done by breaching the last section of the debris flow between the channel and the pond. The area of roadway that will be dewatered is approximately 750 feet long and 15 feet wide. Additionally, approximately 250 feet of side channel downstream of the roadway will also be dewatered. Redirecting flows from the road into the bypass-stream channel will lower the pond, but may not completely eliminate it. It is possible that a portion of the pond will still extend onto the area where the road will be reconstructed. If this occurs, a barrier will be constructed between the work area and the pond.
- Fish are present in Challis Creek and may be present in the section of the roadway that will be dewatered. Measures will be taken to prevent fish stranding and death as the roadway is dewatered. To the extent possible, the roadway will be gradually dewatered, allowing fish present to move downstream into Challis Creek. As dewatering occurs, Forest fisheries staff will walk the area being dewatered looking for fish. Any fish observed will be collected with dip nets, placed in buckets, and released into Challis Creek at least 300 feet below the project site. No electrofishing will be used to collect fish. No water pumping is expected at this site.
- After the roadway is dewatered, the obliterated road will be constructed in its original location. Debris (primarily trees) would be removed from the roadway and left on the floodplain. After the debris is cleared, the new road will be constructed using standard road construction techniques. The new road will be raised an average of 5 feet above the current elevation to prevent stream flows and any future debris flows from impacting the road. Additionally, 200 feet of the existing road on the eastern side of the obliterated road will be raised to connect with the reconstructed obliterated road. The reconstructed road will have a road surface approximately 14 feet wide and a base approximately 24 feet wide (approximately 7 feet wider than the original road). Sides of the roadway likely to be exposed to significant flow would be armored with large rock. Reconstruction of the road will involve placing approximately 2,300 cubic yards of material in the floodplain below the ordinary high water mark, resulting in the loss of 0.15 acre of floodplain beyond what the road originally occupied.

- Up to seven stream barbs will be constructed along the reconstructed road to reduce the impact of stream flows and any future debris flows on the road.
- A culvert will be replaced on the east side of the site to provide drainage associated with a small seep.

Site #2: The Challis Creek Road crosses Bear Creek at this site. The debris flow buried approximately 100 feet of road. Work at this site will involve removing debris and re-grading the roadway, rebuilding the ditches, replacing the existing culvert with a larger culvert, constructing a drainage basin, and stabilizing the slopes adjacent to the roadway. The stream is intermittent/ephemeral at this site and all work will be done when the stream channel is dry.

Site #3: The debris flow and runoff impacted approximately 100 feet of road at this site, burying one section of the road and washing out another section. The road will be repaired by removing debris and re-grading the roadway, rebuilding the ditches, and stabilizing the slopes adjacent to the roadway. The stream is intermittent/ephemeral at this site and all work will be done when the stream channel is dry.

Site #4: The debris flow and runoff impacted approximately 50 feet of road at this site, burying one section of the road and washing out another section. The road will be repaired by removing debris and re-grading the roadway, rebuilding the ditches, and stabilizing the slopes adjacent to the roadway. The stream is intermittent/ephemeral at this site and all work will be done when the stream channel is dry.

Site #5: The Challis Creek Road crosses Lodgepole Creek at this site. The runoff and debris flow caused the stream to spread out across the floodplain, resulting in the formation of multiple channels. Approximately 400 feet of road and a culvert were damaged at this site. The obliterated section of road will be reconstructed in the original location at this site. This will be accomplished by rebuilding the obliterated roadway, removing a buried culvert, and building up to three armored fords.

- The obliterated roadway will be reconstructed in its original location. Debris (primarily trees) will be removed from the roadway and placed adjacent to the road. After the debris is removed, the new road will be constructed using standard road construction techniques. The road will be approximately the same dimensions as the road that existed prior to the runoff events that impacted the road. Sides of the roadway likely to be exposed to significant flow would be armored with large rock.
- The buried culvert will be removed from the roadway at the time the road is reconstructed.
- Up to three hardened fords will be constructed on the road. Because of the unstable nature of the floodplain and the presence of multiple stream channels across the road, the Forest elected to use hardened fords for the stream crossings, instead of culverts. The number of fords constructed will depend on the number of active stream channels present at the time of construction, but the number of fords is not expected to exceed three. The fords will be hardened with large rock to ensure stability and to minimize erosion.
- Stream channels with flowing water that are within the work areas will be dewatered during ford construction, either by use of a temporary bypass channel or a pump and

hose. If a temporary bypass channel is used, it would be constructed in the dry and would be lined to limit sediment production. If a pump and hose is used, the pump would be screened in a manner that meets NMFS pump intake screen criteria. A temporary dam would be placed in Lodgepole Creek. After work is completed, flows would be returned to the natural channel by removing the temporary dam. The sections of stream that will be dewatered will not exceed 200 feet and will have an average width of approximately 5 feet. If three fords are constructed, the total length of channel dewatered would not exceed 600 feet. Natural stream flows will be maintained in Lodgepole Creek below the site during project implementation.

- Fish are present in Lodgepole Creek and may be present in the stream channel or the bypass channel when they are dewatered. Measures will be taken to prevent fish stranding and death when these areas are dewatered. To the extent possible, the stream channel or bypass channel will be gradually dewatered, allowing fish present to move into downstream areas. As dewatering occurs, Forest fisheries staff will walk the area being dewatered looking for fish. Any fish observed will be collected with dip nets, placed in buckets, and released into Lodgepole Creek or Challis Creek at least 300 feet below the project site. No electrofishing will be used to collect fish.

All work at this site is expected to be completed between July 15 and August 15 to protect spawning bull trout and redds. If work at this site cannot be completed by August 15, the work window may be extended provided Forest fisheries staff conducts redd surveys in Lodgepole Creek between the work site and Challis Creek to ensure that bull trout redds are not present in this section of stream. The surveys will be completed each day prior to any work occurring. If any bull trout redds are detected, work will cease and will not resume until the July 15 to August 15 work window the following year.

Borrow pits: Any additional material needed for repair work will come from two borrow pits. The first pit is an established administrative borrow pit on White Valley Creek. The second pit is a new pit in the Bear Creek drainage. This site will be located along the north side of the Sleeping Deer Road and will cover about 1 acre. This borrow pit will be isolated from Bear Creek by the Sleeping Deer Road. Material will generally be hauled from these borrow pits as it is needed for repair work. There will be no long-term stockpiling of material for this project. A small amount of material such as large rock may be stored for a short period of time at a pullout on the Challis Creek Road, located approximately 0.7 mile below Site #1.

C. Term of Action

The Forest expects project implementation to occur over a three year period, beginning in 2016. On that basis, the Service considers the term of the action to extend to December 31, 2018, provided there are no changes to trigger reinitiation (see Section X) of this consultation.

D. Best Management Practices

In addition to the project design criteria specific to each site (described in the *Proposed Action* section above), the Forest has identified general best management practices (BMPs) to be implemented over the course of the project to minimize adverse impacts to aquatic resources.

No blasting will be allowed for project implementation, and measures will be implemented to prevent introduction of contaminants into the streams and invasive species into the work area (Assessment, p. 5).

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 2002, entire), 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 2004) and for the Jarbidge River in Nevada (USFWS 2004a). 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 2015a, 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 2015b, 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 2015b, 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 (mm; 6 to 12 inches) total length, and migratory adults commonly reach 600 mm (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 59 °Fahrenheit (F)), and spawning habitats are generally characterized by temperatures that drop below 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 35 to 41 °F, whereas optimum water temperatures for rearing range from about 44 to 46 °F (Goetz 1989, pp. 22, 24, 39). In Granite Creek, Idaho, Bonneau and Scarnecchia (1996, pp. 629-630) observed that juvenile bull trout selected the coldest water available in a plunge pool, 46 to 48 °F, within a temperature gradient of 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 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 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 59 °F and less than 10 percent of all salmonids when temperature exceeded 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).

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.

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. Since July 2006, a review of the data in our national Tracking and Integrated Logging System reveals only one opinion did not reach a "not likely to jeopardize" determination. This jeopardy opinion was issued to the Environmental Protection Agency (EPA) for Idaho water quality standards for numeric water quality criteria for toxic pollutants. The EPA is implementing the reasonable and prudent alternatives (RPAs) identified in the opinion to avoid jeopardizing the continued existence of 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 70 biological opinions have been issued across the eight bull trout core areas. Seven of them are broad-scale, program-level opinions. In three of those seven, no take was anticipated or none has occurred. In three of 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 2015c, p. 1). One opinion for Idaho water quality standards concluded that the proposed action would likely jeopardize the coterminous U.S. population of bull trout. The RPAs identified in that opinion are being implemented to avoid jeopardizing the continued existence of the 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 ft) 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 to 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. Just one of the consulted-on actions has resulted in a destruction or adverse modification finding. This opinion was issued to the EPA for Idaho water quality standards for numeric water quality criteria for toxic pollutants. The EPA is implementing the reasonable and prudent alternatives (RPAs) identified in the opinion to avoid destroying or adversely modifying designated critical habitat for the bull trout.

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. Fifteen biological opinions addressing bull trout critical habitat have been issued across these subunits. Fourteen of the 15 Opinions concluded that the proposed actions were not likely to result in destruction or adverse modification of critical habitat. One opinion for Idaho water quality standards concluded that the proposed action would likely destroy or adversely modify designated critical habitat for the bull trout. The RPAs identified in that opinion are being implemented to avoid destruction or adverse modification of bull trout critical habitat.

IV. ENVIRONMENTAL BASELINE FOR THE BULL TROUT AND BULL TROUT 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 Upper Salmon River Core Area

1. Upper Snake Recovery Unit

The action area for this consultation lies entirely within the Upper Salmon River Core Area, one of 22 core areas within the Upper Snake Recovery Unit. 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. The Upper Snake Recovery Unit includes a total of 206 local populations, with almost 60 percent being present in the Salmon River basin (USFWS 2015c, p. E1).

The Salmon River basin contains 10 of the 22 core areas in the Upper Snake Recovery Unit, and most of the core areas contain large bull trout populations and many occupied stream segments

(USFWS 2015c, pp. E1-E2). Although bull trout habitat quantity and quality have been altered through time by influences including past timber harvest, livestock grazing, and mining, and more recently by residential development, the Salmon River basin provides large areas of intact habitat (USFWS 2002a, pp. 31, 44, 48; USFWS 2015c, p. E1). Both wildfire and fire suppression have had effects on bull trout habitat components within the basin (USFWS 2002a, 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 2002a, 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 2002a, 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 2015c, p. E2).

2. Upper Salmon River Core Area

The Upper Salmon River Core Area encompasses 2,410 square miles and extends from the mouth of the Pahsimeroi River to the headwaters in the Sawtooth Mountains, including the mainstem Salmon River and tributaries (USFWS 2002a, p. 13, USFWS 2015c, p. E95). This core area has 3,251 miles of streams and at least 18 local populations (USFWS 2015c, p. E95). Migratory bull trout are present in all or nearly all local populations in this core area (USFWS 2002a, p. 66; USFWS 2015c, p. E95).

In 2005, Idaho Department of Fish and Game (IDFG) reported population numbers for the Upper Salmon River Core Area (IDFG 2005, p. 32) that were based on an extensive modeling effort (IDFG 2005 and High et al. 2008). A corrected table (K. Meyer, IDFG, pers. comm., March 11, 2009) showed an approximate population of 31,461 (± 10,804) bull trout (adults and young) for the core area. Using an assumption that 10 percent of the total number is comprised of adult fish (K. Meyer, IDFG, pers. comm., March 11, 2009), that would suggest an adult population in the core area of approximately 3,100 adults (±1,000). Recent information provided by IDFG indicates an increasing trend in bull trout abundance within this core area (USFWS 2015c, p. E95).

In the 2005 conservation status assessment (USFWS 2005) the Upper Salmon River Core Area final rank was "at potential risk" because of limited and/or declining numbers, range, and/or habitat, even though bull trout may be locally abundant in some portions of the core area. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at potential risk" overall.

The Service has issued 17 biological opinions addressing Federal actions specific to this core area: three for mining operations (Grouse Creek Mine, Honey Girl/Lumberjack Mine, and Thompson Creek Mine Expansion), three for water diversions (East Fork of the Salmon River #13, Lower Canyon of the Salmon River, and Upper Salmon), six for grazing in specific allotments (Morgan Creek-Prairie Basin, Cape Horn, Challis Creek, Herd Creek, Squaw Creek, and Garden Creek), two for bridge replacements (Younger bridge and East Fork Salmon River bridge), and three for restoration projects (East Fork Salmon River Bank Stabilization and Yankee Fork Pond Series 2 and 3). 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 lethal take of 143 bull trout, nonlethal take of 530 bull trout, and 19 to 76 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 take (nonlethal) of 11 bull trout due to entrainment, and subsequent salvage, at a diversion.

Impacts to bull trout habitat from past livestock grazing and water diversions (primarily for agriculture) are prevalent in this core area (USFWS 2002a, pp. 34, 37). Valley bottom roads, and historic mining and logging roads, continue to negatively impact bull trout habitat (USFWS 2002a, p. 42). Road density in this core area is 0.5 mile/square mile (USFWS 2005, p. 49). Historic mining has altered bull trout habitat and negatively impacted water quality in this area. Additionally, private land development associated with patented mining claims is occurring and could lead to further impacts to bull trout habitat (USFWS 2002a, pp. 44-45). Residential and recreational development in this core area has resulted in chemical and nutrient pollutants released into bull trout habitat, filling of flood channels, and diversion of water from bull trout habitat (USFWS 2002a, pp. 48-49).

B. Status of Bull Trout in the Action Area

1. Population Information

Bull trout are present in two streams within the action area, Lodgepole Creek and portions of Challis Creek (Assessment, p. 8). These bull trout belong to the Challis Creek local population, one of the 18 local populations in the Upper Salmon River Core Area (USFWS 2015c, p. E95). The 2015 bull trout recovery plan is silent on the specific role of this bull trout local population in the survival and recovery of the listed species, but the recovery approach identified in the plan is intended to ensure adequate, long-term conservation of genetic diversity, life history features, and broad geographical representation of bull trout populations, while acknowledging that a small number of local population extirpations could occur without preventing recovery of the species (USFWS 2015, p. 45).

The Forest has collected fish density trend information at one site on Challis Creek within the action area. At this site in 2002, total density of all salmonids 70 mm or larger was 11.9 fish/100 square meters (m^2) and the density of bull trout 70 mm or larger was 0.2 fish/100 m^2. In 2015, the total density of all salmonids 70 mm or larger at this site had declined to 1.8 fish/100 m^2 and the density of bull trout 70 mm or larger had declined to 0.0 fish/100 m^2. The Forest indicates that the decline in fish abundance at this site is likely a result of changes to the stream following the Lodgepole Fire. Fish abundance is expected to increase as the watershed recovers from the fire. Bull trout may spawn in Lodgepole Creek, but are not known to spawn in Challis Creek (Assessment, p. 8). It is unknown whether fluvial bull trout occur in the subwatershed; connectivity over much of the subwatershed has been impacted by culverts, irrigation diversions, altered flow regimes, and the Mosquito Flat Dam. Brook trout, a threat to bull trout due to potential competition and hybridization, occur in Challis Creek (Assessment, pp. 33, 36).

2. Habitat Information

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

a. 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, inclusive of conditions in the action area, of those habitat parameters 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] (Appendix 9 in Lee et al. 1997). 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 action area is within the Challis Creek subwatershed. The Forest included a matrix analysis for this subwatershed in the Assessment (pp. 33-36), and it is summarized in Table 2 below.

Because the Matrix of Pathways and Indicators was developed to operate at several spatial scales (Lee et al. 1997, p. 9-9), the Forest selected the six indicators most likely to be impacted by the proposed action as their "focus indicators" to address bull trout habitat conditions at the project scale. The six selected focus indicators are growth and survival, sediment, pool frequency and quality, stream channel width to depth ratio, streambank condition, and floodplain connnectivity. These indicators represent quantifiable attributes of bull trout habitat (related to its survival and recovery needs) that are most likely to reflect the complex relationships between actions, pathways for effects to the bull trout caused by these actions, and the likely effects to the fish (discussed below). Because these indicators are quantifiable, monitoring data can be collected on their status and tracked over time to determine trends. For these reasons, the Service concludes that use of these indicators is a valid method of assessing baseline conditions and the impacts of an action on the bull trout.

Using data on the above indicators, the Forest characterized condition of habitat for the bull trout in the action area (Assessment, pp. 8-9). If stream-specific data were not available, then observational information was used. If one or more of the focus indicators showed a habitat

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).

condition not within the range of condition considered to be appropriate to fully supporting bull trout conservation needs, the Forest presented its professional judgment regarding the most likely cause for that condition. By identifying any known specific habitat limitations, the Forest and the Service can more closely focus their analysis of the proposed action's effects on that component of the bull trout's habitat. In that way a more precise evaluation of potential effects can be made. To assist the reader, the "*Effects of the Proposed Action*" section below is organized by focus indicator.

b. Description of Baseline Conditions

The Matrix of Pathways and Indicators below is a summary of the information contained in the Assessment (pp. 33-36) for the subwatershed that the action area falls within. Shaded rows in the table designate the focus indicators selected by the Forest for assessing effects of the proposed action. Conditions of the subwatershed are included to provide a complete description of the environmental baseline, but because the matrix describes conditions on the subwatershed scale, conditions at the finer scale of the action area may vary from those displayed in the matrix. Conditions of both the action area and the subwatershed are considered in the narrative below.

Table 2. Matrix of Pathways and Indicators for the Challis Creek Subwatershed

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

The Forest indicates fish habitat quality is good in many portions of the subwatershed and the condition of many indicators is likely similar to natural conditions on Forest and Bureau of Land Management (BLM) lands within the subwatershed. However, anthropogenic influences such as

road construction and maintenance, streamflow alterations, and livestock grazing have negatively impacted the quality and quantity of bull trout habitat and reduced the ability of these bull trout populations to recover from disturbance (Assessment, pp. 33-36).

Within the action area, the stream channels, riparian vegetation, and floodplains of Challis Creek and Lodgepole Creek were significantly impacted by the 2013 Lodgepole Fire and the runoff and debris flow events that followed. Anthropogenic influences such as streamflow alterations, road construction and maintenance, and the introduction of brook trout have negatively impacted bull trout and its habitat within the action area (Assessment, p. 8).

Based on depth fine data collected at three locations in Challis Creek, sediment levels in the subwatershed generally meet the objective of 30 percent or less fine sediment (Assessment, p. 34). Within the action area, sediment levels met the objective of 30 percent or less fine sediment prior to the 2013 Lodgepole Fire. Following a moderate sized debris flow in the action area in late summer of 2014, sediment levels exceeded the objective level. The Forest expects the sediment levels to improve as the area recovers from the fire (Assessment, pp. 8-9).

Although pool frequency and quality on private land are largely unknown, pool frequency and quality on Forest and BLM lands in the subwatershed, as well as within the action area, are likely similar to natural conditions (Assessment, pp. 9, 35). Runoff and debris flows following the Lodgepole Fire impacted this indicator within the action area, but conditions are expected to improve as the area recovers from the fire (Assessment, p. 9).

The condition of the width to depth ratio indicator on Forest and BLM lands in the subwatershed is likely similar to natural conditions, but the condition on private land is largely unknown (Assessment, p. 35). Stream width to depth ratio data have not been collected within the action area, but the condition of this indicator is likely similar to natural conditions. Width to depth ratios have been impacted by the runoff and debris flow events following the Lodgepole Fire, but conditions are expected to improve as the area recovers from the fire (Assessment, p. 9).

The resource objective for streambank condition is 80 percent or greater bank stability. Streambank conditions within the subwatershed meet the objective in many areas (Assessment, p. 35). Although runoff and debris flow events following the Lodgepole Fire have impacted streambank stability within the action area, data collected in 2015 indicate streambank stability has declined, but still meets the streambank condition objective.

There is no specific objective for floodplain connectivity; however, streams should exhibit a natural level of connectivity to their floodplains. Floodplain connectivity in the subwatershed and the action area is likely similar to natural conditions, but has been impacted by streamflow alterations and roads. Floodplain connectivity likely increased in the action area due to the runoff and debris flow events following the Lodgepole Fire (Assessment, pp. 9, 35).

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

1. Salmon River Basin Critical Habitat Unit

The action area falls within the Salmon River Basin Critical Habitat Unit (CHU), one of the 32 CHUs in the Upper Snake Recovery Unit (USFWS 2015c, p. E1). The Salmon River Basin CHU encompasses the entire Salmon River basin, extending across central Idaho from the Snake River to the Idaho-Montana border. This 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).

The Salmon River Basin CHU is comprised of ten critical habitat subunits (CHSU). The action area lies entirely within one of these CHSUs, the Upper Salmon River CHSU. The Upper Salmon River CHSU contains many individuals, a large amount of habitat, and few threats. Bull trout populations in this CHSU exhibit resident, fluvial, and adfluvial life history strategies. This CHSU includes 705.6 miles of stream and 3,104.2 acres of lake surface area designated as critical habitat (USFWS 2010, p. 779).

2. Action Area

Within the action area, Challis Creek and Lodgepole Creek are designated critical habitat. The primary habitat function of these streams is as spawning and rearing habitat. The PBFs related to spawning and rearing habitat in the action area include PBFs 1, 3, 4, 5, 6, 7, 8, and 9.

Physical or biological features (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 baseline conditions of the diagnostic pathway/indicators were 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 pages 28 through 32 above. In summary, the baseline as presented in Table 2, indicates that most pathways in the subwatershed are functioning at risk and several pathways are functioning appropriately. No pathways are functioning at unacceptable risk. Condition of PBFs relies on the condition of the associated indicators.

V. EFFECTS OF THE PROPOSED ACTION

A. Direct and Indirect Effects of the Proposed Action

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).

1. Effects of the Proposed Action on Focus Indicators

In the following evaluation, the Service relies on our experience with these types of actions, the Forest's effects analysis in their Assessment, and published scientific literature to assess the effects of the proposed action on the focus indicators of growth and survival, sediment, pool

frequency and quality, stream channel width to depth ratio, streambank condition, and floodplain connectivity.

a. Growth and Survival

Bull trout may be present in the action area and could become stranded as the roadways and stream channels are dewatered at Site #1 and Site #5. Mortality could result because water in small pools warms quickly, loses adequate dissolved oxygen, exposes fish to predation, and dries up or drains away. To prevent stranding, fish could be captured and then handled, subjecting the fish to stress and potential injury.

In-stream and near-stream activities have the potential to displace bull trout in the action area. Where bull trout occurrence and project implementation overlap, the effects to bull trout would be minimal because disturbance would be localized and any fish present would be able to easily move away to other suitable areas. Such movement is likely to be of short duration and is not likely to interfere with normal feeding, breeding, or sheltering behavior of bull trout. Therefore, effects to bull trout from disturbance are considered insignificant.

Any bull trout that do not leave the work areas may be subject to stranding, and subsequent capture and handling. To minimize potential impacts, the proposed action includes measures to prevent fish stranding and death. To the extent possible, dewatering will occur gradually, giving any fish present time to volitionally leave the area. As dewatering occurs, Forest fisheries staff will walk the area being dewatered looking for fish. Any fish observed will be captured with dip nets, placed in buckets, and released into the stream channel at least 300 feet below the project site. No electrofishing will be used to collect fish.

Although no bull trout were found in Challis Creek within the action area in 2015, low numbers of bull trout have previously been found in this area. Approximately 1,000 feet of stream channel will be dewatered at Site #1 and up to 600 feet of stream channel could be dewatered at Site #5. Based on reported bull trout density and length of roadway and stream channel to be affected, the Service estimates that a maximum of 5 bull trout could be stranded and subsequently captured and relocated. The Service anticipates that 1 of these 5 bull trout could be injured or die as a result of capture and handling.

Bull trout are not known to spawn in Challis Creek, but may spawn in Lodgepole Creek. In the event project activities extend beyond August 15 (initiation of bull trout spawning), Forest fisheries staff will conduct redd surveys in Lodgepole Creek between the work site and Challis Creek to ensure that bull trout redds are not present in this section of stream. The surveys will be completed each day prior to any work occurring. If any bull trout redds are detected, work will cease and will not resume until the July 15 to August 15 work window the following year.

The Service concludes the impacts of the proposed action to growth and survival of bull trout will be minimized, but not eliminated. The Service does not anticipate any bull trout redds will be affected by project activities because of the low numbers of bull trout in the action area, lack of spawning in Challis Creek, and implementation of the project design criteria and BMPs.

Although only low numbers of bull trout occur in the action area, the project could result in adverse effects to bull trout through stranding and capture.

b. Sediment

Sediment in the water column can cause negative effects to bull trout by abrading gills and even cause death if sediment concentration is great enough or over a long enough period of time. Sediment settling into the substrate also has the potential to smother eggs in the gravel or change the substrate to being unsuitable for spawning.

Project activities at Site #1 are not expected to introduce additional sediment into the stream, but will remobilize sediment deposited by the debris flow. Most of the sediment generated will occur as a result of water being transferred into the bypass-stream channel. The amount of sediment generated will be minimized by constructing the bypass-stream channel in the dry and gradually moving flows into the channel. The sediment pulse is expected to be of short duration, occurring for only the first few hours after water is transferred into the bypass-stream channel.

At Sites #2, #3, and #4, project activities may generate sediment when stream flows return to the intermittent channels where the work occurred. The Service expects the increased sediment level would be of low intensity and short duration. Sediment from these sites is not anticipated to affect bull trout or its habitat because it is unlikely any sediment from these work areas would enter Challis Creek.

Project activities at Site #1 are expected to generate sediment into Lodgepole Creek, and possibly extend into Challis Creek. The amount of sediment will be minimized because project work will be done in the dry and if a bypass-stream channel is used, it will be lined. Because of these project design criteria, the Service concludes increased sediment will be of low intensity and short duration. Sediment also may be generated when stream flows are returned to the stream channel where fords have been hardened. These sediment pulses are anticipated to be of very low intensity and short duration because only minimal disturbance of stream channels will occur during ford hardening.

Use of the repaired road will introduce some sediment into streams. The amount of sediment introduced into streams by use of the road that existed prior to the debris flows was likely minor (Assessment, p. 11). Because of improved drainage and design features, use of the repaired road could generate less sediment into streams than use of the previously existing road. The Challis Creek Road does provide access to an area popular for dispersed recreation, but there are two other roads that also provide access to the area. Repair of the road is not expected to result in increased use.

c. Pool Frequency and Quality

Although the proposed action has been designed to minimize impacts to pool frequency and quality, there will be minor impacts to this indicator at Site #1 due to construction of the road prism and placement of stream barbs. The newly-constructed road prism may reduce the frequency of pools when the stream flows against it. The stream barbs will create pools, but the

pools will likely be a lower quality than natural pools. Project work at other sites is not anticipated to impact this indicator. The Service concludes affects to bull trout and its habitat via this indicator would be insignificant.

d. Width to Depth Ratio of Stream Channels

The proposed action will result in minor impacts to width to depth ratios at Sites #1 and #5. At Site #1, construction of the road prism and barbs could reduce the width to depth ratio. However, this unnatural constriction may result in minor hydrologic adjustments (i.e., increased scour) downstream, depending on stream flows. At Site #5, the stream will flow through one to three hardened fords following project completion. Width to depth ratios at the fords may be higher than would occur naturally. Only 15 to 20 linear feet of stream would be impacted by the slightly increased width to depth ratios. Impacts to width to depth ratios from project activities will be minor and limited in spatial extent. Consequently, affects to bull trout and its habitat via this indicator would be insignificant.

e. Streambank Condition

The proposed action will result in minor impacts to streambank condition at Sites #1 and #5. At Site #1, construction of the road prism and barbs would artificially stabilize the streambank, inhibiting any subsequent natural changes to streambank condition. At Site #5, the stream will flow through one to three hardened fords following project completion. Artificially stabilized streambanks at the fords would impact 15 to 20 linear feet of stream. Impacts to streambank condition from project activities will be minor and limited in spatial extent. Consequently, affects to bull trout and its habitat via this indicator would be insignificant.

f. Floodplain Connectivity

Impacts to floodplain connectivity from project activities would occur only at Site #1. Raising the road level approximately 5 feet along 950 feet of road, will consequently increase the width of the road base of that section by approximately 7 feet beyond what existed prior to the debris flow. This widening of the road base will result in a loss of approximately 0.15 acre of Challis Creek floodplain. The Challis Creek floodplain between Bear Creek and Lodgepole Creek occupies approximately 80 acres. Therefore, the loss of an additional 0.15 acre of floodplain will constitute the loss of approximately 0.2 percent of the Challis Creek floodplain. The Service anticipates this minor loss of floodplain will normally not affect the function of the stream or riparian area. However, in some circumstances (i.e., high flow events) this loss of floodplain may reduce the ability of Challis Creek to provide bull trout habitat of the appropriate depths, velocities, and structure.

2. Effects of the Proposed Action on Bull Trout Critical Habitat

During project implementation, impacts to critical habitat will be minor, short term, and temporary. The Service does not anticipate any effects to PBFs 1 (springs, seeps, groundwater), 5 (water temperature), 7 (natural hydrograph), or 9 (nonnative species) from the proposed action. The Service concludes that sediment pulses during project implementation could have minor,

short term effects on PBFs 3 (food base), 6 (spawning substrate), and 8 (water quality and quantity). Because the short term effects will be minimal, the current condition of these PBFs will be maintained over the long term.

The reconstructed roadway will alter the condition of critical habitat due to the armoring of the sides of the roadway, placement of stream barbs, and the increased footprint of the repaired road. The Service anticipates PBF 4 (complex habitats) will be affected by the loss of pool frequency and quality when the stream flows against the armored sides of the roadway and the stream barbs. Additionally, the Service concludes the loss of 0.15 acre of floodplain habitat would adversely affect PBF 4 by decreasing the ability of the stream system to provide bull trout habitat of the appropriate depths, velocities, and structure.

B. Effects of Interrelated or Interdependent Actions

The implementing regulations for 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. No interrelated or interdependent actions have been identified in this consultation.

VI. 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 Biological 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.

VII. 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 Forest's proposed repair of the Challis Creek Road 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.

Project design criteria and BMPs will minimize adverse effects of the proposed action to bull trout and its habitat. Project design criteria will minimize, but not eliminate, stranding of bull trout in dewatered areas. Up to five bull trout are likely to be stranded, and subsequently captured and handled. The Service expects most of these bull trout will not be lost from the local population, but one bull trout is likely to be injured or die as a result of capture and handling. The Service concludes that the anticipated level of effects caused by the proposed road repair to bull trout over the term of the proposed action is likely to be compatible with sustaining the viability of the Challis Creek local population of the bull trout. Because the proposed action is likely to sustain the viability of the Challis Creek local population, effects of the project are not

likely to be measureable to the Upper Salmon River Core Area, Upper Snake Recovery Unit, or coterminous U.S. population of bull trout.

B. Designated Critical Habitat

After reviewing the current status of designated critical habitat for 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 Forest's proposed repair of the Challis Creek Road in Idaho is not likely to result in the destruction or adverse modification of designated critical habitat for bull trout. The Service's rationale for this determination is presented below.

Most effects of the proposed action to critical habitat will be temporary, short term, and minor. Although the permanent loss of 0.15 acre of floodplain habitat is expected to reduce the ability of Challis Creek to provide bull trout habitat of the appropriate depths, velocities, and structure in some circumstances, these impacts will affect only a very small portion of Challis Creek. The Service concludes the anticipated level of effect is likely to maintain the capability of the critical habitat to support existing bull trout populations. If the proposed action is likely to maintain the functionality of critical habitat in Challis Creek and Lodgepole Creek, then the effects of the project are not likely to be substantial within the Upper Salmon River Critical Habitat Subunit and Salmon River Basin Critical Habitat Unit, and are unlikely to be discernible at the designated critical habitat rangewide scale.

VIII. 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 five bull trout is likely to occur in the form of take caused by capture and

handling during fish salvage. One of these five bull trout is likely to be subject to take in the form of injury or mortality.

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 the following Reasonable and Prudent Measures are 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 – The Forest shall minimize the potential for bull trout injury or mortality during capture and handling.

Reasonable and Prudent Measure 2 – The Forest shall complete monitoring and reporting to confirm that incidental take has not been exceeded.

D. Terms and Conditions

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

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

All bull trout collected at sites being dewatered shall be placed and transported to relocation areas in buckets of cold water. Aerators shall be used in the buckets, or the water in the buckets shall be replaced every 15 minutes with cold clear water.

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

The Forest shall conduct monitoring and reporting of incidental take as follows. By March 1 of each year for the term of the proposed action, the Forest shall submit a completed form (see Appendix A) summarizing the progress of the action and its impact on the bull trout to the Service. The form shall be submitted to the Team Leader of the Eastern Idaho Field Office in Chubbuck, Idaho, each year until the project is completed.

IX. 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.

The Service recommends the Forest investigate means of minimizing brook trout presence in bull trout spawning and rearing habitat in the Challis Creek subwatershed.

The Service recommends the Forest continue monitoring bull trout populations in Challis Creek and Lodgepole Creek.

X. REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the Forest's proposal to repair the Challis Creek Road in Custer 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.

XI. LITERATURE CITED

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Personal Communications

Meyer, Kevin. March, 11, 2009. Principal Fisheries Research Biologist, Idaho Department of Fish and Game. Email message as follow-up to phone conversation regarding published article and bull trout population numbers in the Salmon River Core areas.

APPENDIX A

Annual Monitoring Report Form for Actions covered under the Service's Biological Opinion for Challis Creek Road Repair Project (01EIFW00-2016-F-1069).

Please submit to the Team Leader of the Service's Eastern Idaho Field Office, 4425 Burley Dr., Suite A, Chubbuck, Idaho 83202; telephone (208) 237-6975. Please include name and contact information in case additional information is needed.

1. Did anything change during the implementation of this project that was not consistent with the proposed action as expressed in the biological assessment?

2. Did anything change at this project that potentially changed the impacts to bull trout in a way different than those described in the biological assessment and the Service's biological opinion?

3. How many bull trout were salvaged by biologists? (Please report it by individual event e.g., dewatering Site #1, etc.).

4. Please report the condition of the bull trout salvaged (e.g., relocated, mortality, relocated with apparent injury, etc.).

Responsible Official:

Date:

Contact Information: