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JUL 17 2018

Keith Lannom
Forest Supervisor
Payette National Forest
500 North Mission Street
McCall, Idaho 83638

Subject: Payette National Forest Snow-free Season Travel Management Plan—Valley, Adams, Washington, and Idaho Counties, Idaho—Biological Opinion
In Reply Refer To: 01EIFW00-2018-F-0661

Dear Mr. Lannom:

Enclosed is the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) on the effects of the continued implementation of the Payette National Forest's (Forest) Snow-free Season Travel Management Plan (Travel Plan) on bull trout (*Salvelinus confluentus*), bull trout designated critical habitat, and northern Idaho ground squirrel (*Urocitellus brunneus*). On March 26, 2018, the Service received a letter and information from the Forest supplementing the February 14, 2018 Biological Assessment (Assessment) for the Snow-free Season Travel Management Plan pursuant to section 7(a)(2) of the Endangered Species Act, as amended (Act) (16 U.S.C. 1531 *et seq.*), and consultation was initiated at that time. The Forest has also determined that the proposed ongoing action is not likely to adversely affect Canada lynx (*Lynx canadensis*), and concurrence with this determination is included in the attached Opinion.

The enclosed Opinion is based primarily on our review of the proposed ongoing action, as described in the Assessment, and the anticipated effects of the action on listed species. The Opinion concludes that the proposed ongoing action will not jeopardize the survival and recovery of the northern Idaho ground squirrel or the bull trout, nor will it result in destruction or adverse modification of bull trout critical habitat. A complete record of this consultation is on file at our office.

Thank you for your continued interest in the conservation of threatened and endangered species. Please contact Allyson Turner at (208) 685-6952 if you have questions concerning this Opinion.

Sincerely,

for Gregory M. Hughes
State Supervisor

Enclosure

cc: NOAA, Boise (Sandow)
Payette NF, McCall (Nalder, Galloway)

BIOLOGICAL OPINION
FOR THE
PAYETTE NATIONAL FOREST SNOW-FREE SEASON TRAVEL MANAGEMENT PLAN

01EIFW00-2018-F-0661

U.S. FISH AND WILDLIFE SERVICE
IDAHO FISH AND WILDLIFE OFFICE
BOISE, IDAHO

for Gregory M. Hughes
State Supervisor

Date JUL 17 2018

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1. BACKGROUND AND CONSULTATION HISTORY

1.1 Introduction

The U.S. Fish and Wildlife Service (Service) has prepared this Biological Opinion (Opinion) of the effects of the continued implementation of the Payette National Forest's (Forest) Snow-free Season Travel Management Plan (Travel Plan) on bull trout (*Salvelinus confluentus*), bull trout designated critical habitat, and northern Idaho ground squirrel (*Urocitellus brunneus*). In a letter dated February 12, 2018 and received on February 14, 2018, the Forest requested formal consultation with the Service under section 7 of the Endangered Species Act (Act) of 1973, as amended, for its proposed ongoing action. The Biological Assessment (Assessment) received on February 14, 2018 was further supplemented on March 26, 2018, as described below in Section 1.2. The Forest determined that the proposed ongoing action is likely to adversely affect bull trout, its designated critical habitat, and northern Idaho ground squirrel (NIDGS) and is not likely to adversely affect Canada lynx (*Lynx canadensis*). The Service agrees with your determinations and has concluded that the proposed ongoing action is not likely to jeopardize the continued existence of bull trout or the NIDGS, nor is it likely to it result in destruction or adverse modification of designated bull trout critical habitat.

1.2 Consultation History

Previous Consultation History

The following are previous consultations associated with the proposed ongoing action (effects from these actions are incorporated in the environmental baseline discussed in section 2.4, below).

- Travel Plan Consultations for Summer Travel (completed in 2009 – Reference #s 14420-2009-F-0060, 14420-2009-F-0060, 14420-2009-F-0060, 14420-2009-F-0061, 14420-2009-F-0062, 14420-2009-F-0063, 14420-2009-F-0064, 14420-2009-F-0065, and 14420-2009-F-0065[USFWS 2009b-h])

  These formal consultations assessed effects from implementing the Forest's 2007 Travel Plan. The primary action was to restrict motor vehicle use to designated roads and trails within all areas open to cross-country travel. These consultations did not include an analysis of bull trout critical habitat because it was not yet designated. The consultations occurred Forest-wide but was divided into seven Opinions batched with other activities in corresponding watersheds, including road maintenance and trail maintenance.

- Stream Crossing Programmatic (completed June 15, 2012 – 01EIFW00-2012-F-0015)

  This formal consultation assessed effects from implementing actions that would restore or promote aquatic organism passage. Activities included crossing removal and associated channel rehabilitation with the purpose of improving habitat conditions and maintenance during flood events. Activities also included road and trail relocation and associated decommissioning related to crossing replacement for Bureau of Land Management and Forest Service actions in Idaho.

Current Consultation History

Significant events that occurred during the current consultation are summarized below.

- December 8, 2010 – The Forest reinitiated consultation with the Service on the 2007 Travel Plan (and all other activities in their watershed Biological Assessments) because that consultation did not include an assessment of the effects of the Travel Plan on bull trout critical habitat (bull trout critical habitat was not designated on the Forest until November 17, 2010 (75 FR 63898)).
- June 11, 2012 – The Service requested more information from the Forest on designated bull trout critical habitat to complete reinitiation of consultation on the watershed Biological Assessments.
- January 5, 2017 – The Service received a letter from the Forest with a proposed timeline for completion of the subject consultation.
- February 14 and March 13, 2017 – The Forest Level 1 team with representatives from the Forest, the Service, and the National Marine Fisheries Service (NMFS) discussed the proposed ongoing action for the Forest's Travel Plan consultation at in-person meetings.
- November 29, 2017 – The Service received a draft Biological Assessment from the Forest.
- December 22, 2017 – The Service provided comments to the Forest on the draft Biological Assessment.
- January 9, 2018 – The Service provided additional comments to the Forest on the draft Biological Assessment.
- February 14, 2018 – The Service received a final Biological Assessment from the Forest.
- March 8, 2018 – A conference call occurred with representatives from the Service, the Forest, NMFS, Department of Justice (DOJ), and agency council to discuss additional information required for the Biological Assessment.
- March 14, 2018 – The Service sent a letter to the Forest stopping the clock on consultation until the information needed and agreed to in the March 8, 2018 conference was received.
- March 26, 2018 – The Service received all of the requested and required supplemental information on the subject project from the Forest.
- April 3, 2018 – The Service sent a letter to the Forest acknowledging that all of the required information has been received, and development of a Biological Opinion will begin.
- June 28, 2018 – The Service sent a draft terms and conditions from this Biological Opinion to the Forest.

1.3 Informal Consultation

Effects of the Forest's Snow-free Season Travel Management Plan on Canada lynx are expected to be insignificant. The Service concurs with your determination that the Travel Plan may affect, but is not likely to adversely affect the Canada lynx. Our concurrence is based on the following rationales presented in your Assessment (USFS 2018).

1) Effects to lynx from summer travel are expected to be insignificant because the majority of habitat on the forest is secondary habitat (i.e., no core areas have been designated on the Forest) and lynx are believed to be rare on the Forest. Because Forest roads are typically gravel roads with low speed limits (i.e., less than 35 miles per hour), disturbance effects to lynx are expected to be negligible.

2) No changes to the miles of roads and trails or road densities in lynx habitat will occur.

3) All other potential effects to lynx through implementation of the Forest's Travel Plan (e.g., road-side brushing, fragmentation, or vehicular collisions) are considered insignificant or discountable.

2. BIOLOGICAL OPINION

2.1 Description of the Proposed Action

This section describes the geographic area affected by the proposed ongoing action (action area), the proposed ongoing action itself, and any measures already occurring that may avoid, minimize, or mitigate adverse effects of the proposed ongoing action on bull trout, bull trout critical habitat, or NIDGS. 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 C.F.R. § 402.02. 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." 50 C.F.R. § 402.02.

2.1.1 Action Area

The proposed ongoing action includes the entire Payette National Forest, and the land area consists of approximately 2.3 million acres of federally managed lands. The Payette National Forest is located in central, western Idaho, in parts of Valley, Idaho, Adams, and Washington counties. The action area is anywhere on the Forest where effects to bull trout, its critical habitat, or the NIDGS may be realized as a result of the subject project. The Forest is comprised of seven watersheds that contain bull trout and those are: 1) Brownlee, 2) Deep Creek, 3) the Weiser River, 4) the Little Salmon River, 5) the Main Salmon River, 6) the South Fork Salmon River, and 7) the Middle Fork Salmon River. Of these seven watersheds, the NIDGS is only known to occur in Brownlee, the Weiser River, and the Little Salmon River watersheds.

The action area lies within numerous bull trout core areas in the Upper Snake and Mid-Columbia Recovery Units.

Figure 1 depicts all of the authorized roads and trails on the Forest and areas where site specific travel decisions have occurred in addition to the 2007 Travel Management Plan.

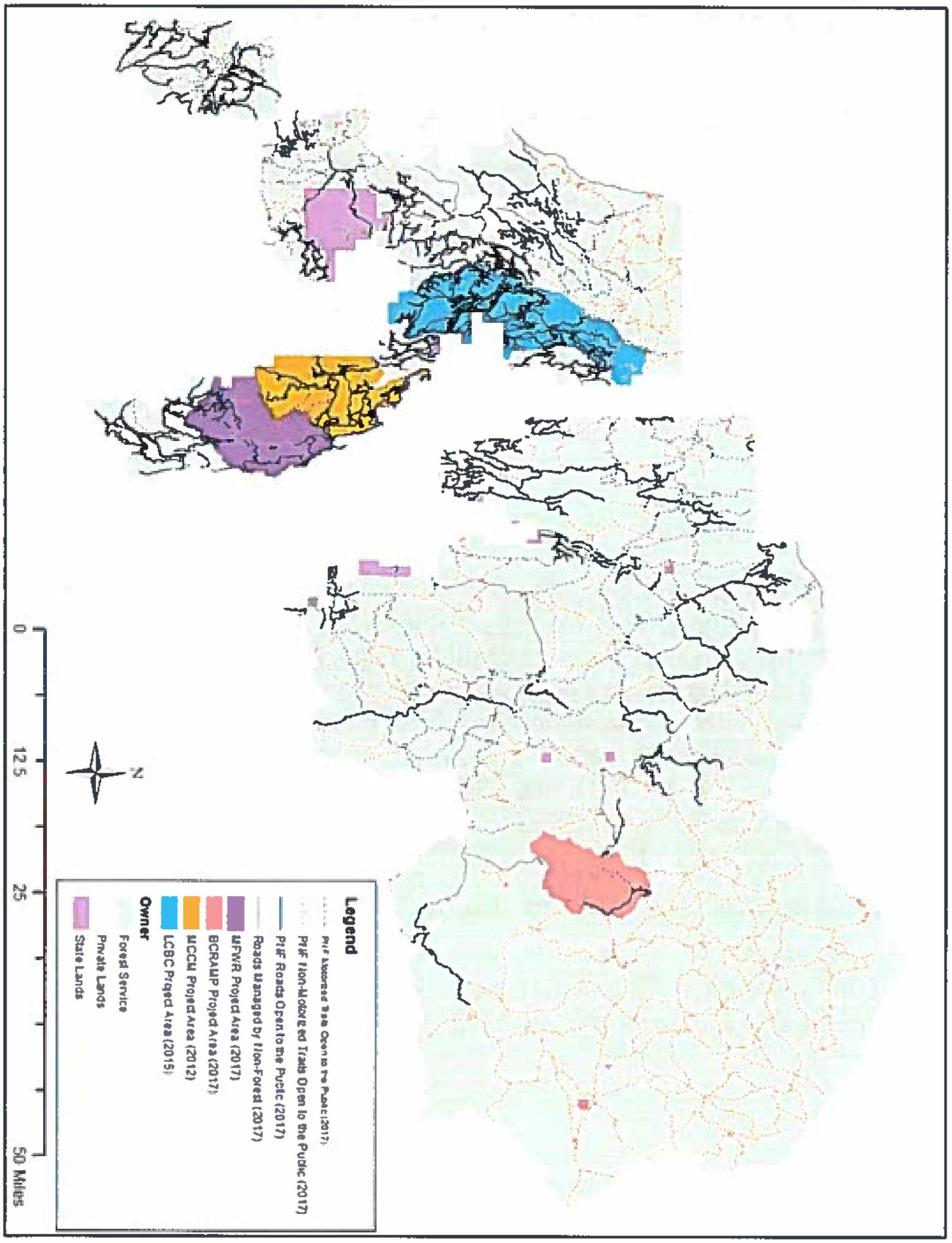

Figure 1. Action Area – The action area includes the entire Payette National Forest, and this map depicts all of the authorized roads and trails on the Forest[1].

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[1] This figure was created by the Forest and cannot be altered. For the reader's understanding, the following acronyms are defined as follows. PNF = Payette National Forest, MFWR= Middle Fork Weiser River, BCRAMP = Big Creek Restoration and Access Management Plan, MCCM = Mill Creek Council Mountain, and LCBC = Lost Creek Boulder Creek.

2.1.2 Proposed Ongoing Action

Overall Description of the Proposed Action

The proposed ongoing action is the continued implementation of the Payette National Forest's Snow-free Season Travel Management Plan as described in the 2007 Travel Plan and updated with three separate, site-specific travel decisions on the Forest. This proposed ongoing action includes the continued use of approximately 2,261.5 miles of motorized roads/trails and 1,274.7 miles of non-motorized trails (Table 1). In 2007, the Forest completed a forest-wide final environmental impact statement for designation of roads, trails, and areas of motor vehicle use. The proposed ongoing action includes the continued use of existing designated roads and both motorized and non-motorized trails. Motor vehicles are defined to include all types of passenger and commercial vehicles, all-terrain vehicles (ATVs), utility terrain vehicles, and motorcycles/dirt bikes. The proposed ongoing action does not include adding or eliminating designated system roads or trails on the Forest. Future actions to construct new routes, reconstruct existing routes, reroute existing roads or trails and/or decommission routes would be covered under respective future consultations.

Motor vehicle use on National Forest System (NFS) land is controlled by the 2005 Travel Management Rule, which requires that roads, trails, and areas where motor vehicle use is allowed be designated on the annual Motor Vehicle Use Map (MVUM). Temporary closures or restrictions may be placed on designated routes to protect public safety or for resource protection by issuance of special orders. Otherwise, changes to the designated system for motor vehicle use may only be made by following the administrative process under the travel management rule to revise the MVUM. The MVUM also displays routes that the Forest does not have jurisdiction over and cannot make public access changes to, such as roads with easements under the Forest Road and Trail Act or State/Federal highways.

Table 1. 2017 Motor Vehicle Use Map (MVUM) routes summary (motorized and non-motorized)

Motorized Access	**Miles**
Roads Open to All Vehicles	1,117.7
Roads Open to Highway Legal Vehicles	25.4
Seasonal Road Designations	491.2
Trails Open to All Vehicles	2.4
Trails Open to Vehicles 50" or Less in Width	99.2
Trails Open to Motorcycles Only	505.1
Special Designations – Trails Open to Vehicles 70" or Less in Width	10.3
Seasonal Motorized Trail Designations	10.2
Motorized Total	**2,261.5**
Non-Motorized Access	
Non-Motorized Trails Open to the Public	1,274.7

Limited off-route motorized access for dispersed camping is permissible within 300 feet of designated roads and 100 feet of designated motorized trails in most areas. The MVUM identifies where motor vehicles can travel off authorized routes for dispersed camping purposes with a symbol. Some areas are closed to all motorized travel off designated routes, including dispersed camping, due to sensitive resource protection needs. Within those areas, motorized access for dispersed camping is restricted to designated sites (signed with a tent symbol). Table 2 summarizes the amount of road and trail mileage available for access to dispersed camping.

Table 2. Designations for motor vehicle use for dispersed camping summary.

Motorized Access for Dispersed Camping	Miles (Acres)
Access 300 feet from a road	1,404.6 (95,527)
Access 100 feet from a trail	617.0 (14,572)

Non-motorize travel can occur on and off all routes located on Forest lands unless there is an administrative closure (emergency) temporarily restricting access. Maintained and designated trails are available for hikers, bicyclists (except if there is a restriction or prohibition of mechanized vehicles), and horseback riders. Use by motorized wheelchair is allowed when feasible within the defined trail-bed. There are 1,274.7 miles of non-motorized trails and 627.2 miles of motorized trails as part of the ongoing proposed action (Table 1).

Project Design Features

Project design features (PDFs) are measures included as part of the ongoing proposed action to protect Forest resources, and include the following:

- The Forest will continue to support programs and publications that provide information, education, and training on travel access.
- The Forest will follow national direction for signing and maps. The Forest Service plans to develop a standard national format for MVUMs. These maps will be available at local Forest Service offices and, as soon as practicable, on Forest Service web sites. The Forest Service plans to issue additional travel management guidance in its sign standards handbook to ensure consistent messages and use of standard interagency symbols.
- The Forest will continue maintenance on routes designated for motor vehicle use or non-motorized use. The schedule will be dependent on the amount of use, resource needs, and climatic conditions.
- The Forest will continue to inventory, plan, and replace existing fish barriers from road and trail crossings in bull trout, Chinook salmon, or steelhead habitat.
- The Forest will continue to inventory, plan, and replace existing fords (i.e., low-water stream crossing in which vehicles, livestock, or hikers move through the water to cross the stream) on road and trail crossings in bull trout, Chinook salmon, or steelhead habitat, prioritizing crossings in spawning areas.
- The Forest will continue to actively manage motor vehicle use for access to dispersed camping areas to minimize existing or new impacts to riparian conservation areas (RCAs) and

NIDGS habitat. If the monitoring shows increasing negative impacts, actions will be taken to reduce or eliminate those.

a) Dispersed sites and access routes will be routinely visited and monitored by recreation program employees who work in the area.
b) Sites with unacceptable resource impacts may be reduced in size, converted to walk-in sites, relocated, or closed. Specifically, sites within RCAs that are affecting large woody debris recruitment, stream shade, sediment delivery to streams, or resulting in increased potential for harassment of spawning bull trout, Chinook salmon, or steelhead will be closed or relocated further away from stream channels.
c) Special orders may be issued to temporarily close areas or restrict use for resource protection, and revisions to the MVUM may be considered on a site-specific basis where mitigation does not appear to be feasible.

The Forest will continue to inventory, enforce, monitor, and develop plans to deal with unauthorized motor vehicle use.

Actions Already Completed as Part of the Forest's 2007 Travel Plan

Many of the discrete actions described in the Forest's 2007 Travel Plan have been completed, and these completed actions are appropriately considered in this Opinion as part of the environmental baseline, and not part of the proposed ongoing action. Completed actions are by definition no longer proposed and the agencies no longer have discretion over completed actions. A description of these completed actions is provided in the following paragraphs.

Following the decision to implement the 2007 Travel Plan, the Forest identified existing non-system routes, which were ground verified, mapped, and inventoried. Through that process, the Forest identified routes that were not open to motorized uses that were suitable for decommissioning, conversion to non-motorized uses only (i.e., hiking, mountain biking, and equestrian travel), and potential obliteration. The Forest prohibited cross-country travel by motor vehicles on 510,930 acres, designated 506.7 miles of trail for two-wheel motor vehicle use, designated 108 miles of trail for motor vehicles less than 60 inches in width, designated 7.4 miles of trail for motor vehicles greater than 60 inches in width, designated 1,114.3 miles of roads open to motor vehicle use without seasonal restrictions, and designated 508.7 miles of roads open to seasonal motor vehicle use.

Since 2007, several decisions have been made, with corresponding section 7 consultation under the Act, that have changed the motor vehicle use designations from the 2007 Travel Plan. The Mill Creek Council Mountain Landscape Restoration Project (2012), Lost Creek Boulder Creek Landscape Restoration Project (2015), Big Creek Restoration and Access Management Project (2017), and Middle Fork Weiser Landscape Restoration Project (2017) have made localized changes to the designated system. Additionally, there have been numerous smaller projects that have made minor changes, mostly reducing designations.

Interrelated and Interdependent Actions

Interrelated and interdependent actions to the proposed ongoing action are road and trail maintenance and general recreation across the Forest because these routes provide access to the

Forest and maintenance is needed to retain their drivability. These interrelated and interdependent actions are discussed below in the effects section (2.5.4). Restoration activities at stream crossings are also considered interrelated and interdependent to the proposed ongoing action, but because the 2012 Opinion (USFWS 2012) is still valid, the effects from these activities are addressed in the baseline section below.

2.2 Analytical Framework for the Jeopardy Determination

2.2.1 Jeopardy Determination

In accordance with policy and regulation, the Service determines whether the proposed ongoing action jeopardizes the continued existence of the NIDGS or bull trout by examining four components:

1. The *Status of the Species*, which evaluates the species' rangewide condition, the factors responsible for that condition, and its survival and recovery needs.
2. The *Environmental Baseline*, which includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects 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 this consultation.
3. The *Effects of the Action*, which are the direct and indirect effects of the proposed action on NIDGS or bull trout, together with the effects of other activities that are interrelated or interdependent with the proposed action.
4. *Cumulative Effects*, which evaluates the effects of future State or private activities, not Federal activities, that are reasonably certain to occur within the action area on NIDGS or bull trout.

The jeopardy determination is made by evaluating the effects of the proposed ongoing action in the context of the current statuses of bull trout and NIDGS, taken together with cumulative effects, to determine if implementation of the proposed ongoing action would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of the species in the wild by reducing the reproduction, numbers, or distribution of that species.

Recovery Units (RUs) for the bull trout were defined in the final *Recovery Plan for the Coterminous United States Population of [the] Bull Trout* (USFWS 2015a, entire). Pursuant to Service policy, when a proposed Federal action impairs or precludes the capacity of a RU 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 Opinion should describe how the proposed action affects not only the capability of the RU, but the relationship of the RU to both the survival and recovery of the listed species as a whole.

The jeopardy analysis for the bull trout in this Opinion considers the relationship of the action area and affected core areas (discussed below under the *Status of the Species* section, section 2.3) to the RU and the relationship of the RU to both the survival and recovery of the bull trout as a whole as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Within the above context, the Service also considers how the effects of the proposed ongoing action and any cumulative effects impact bull trout local and core area populations in determining the aggregate effect to the RU(s). Generally, if the environmental baseline, taken together with the effects of a proposed action and the cumulative effects, are likely to impair the viability of a core area population(s), such an effect is likely to impair the survival and recovery function assigned to a RU(s) and may represent jeopardy to the species (USFWS 2005a, 70 FR 56258).

2.2.2 Adverse Modification Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of "destruction or adverse modification of critical habitat" was published on February 11, 2016 (USFWS and NMFS 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 Biological Opinion relies on four components:

1. The *Status of Critical Habitat*, which describes the range-wide condition of designated critical habitat for the bull trout in terms of the key components of the critical habitat 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*, which analyzes the condition of the 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 listed species.
3. The *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated and interdependent activities on the key components of critical habitat that provide for the conservation of the listed species, and how those impacts are likely to influence the value of the affected critical habitat units for the conservation/recovery of the listed species.
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 listed species and how those impacts are likely to influence the value of the affected critical habitat units for the conservation/recovery of the listed species.

For purposes of making the destruction or adverse modification determination, the effects of the proposed Federal action, together with any cumulative effects, are evaluated to determine if the value of the critical habitat rangewide for the conservation/recovery of the listed species would remain functional or would retain the current ability for the key components of the critical habitat that provide for the conservation of the listed species to be functionally re-established in areas of currently unsuitable but capable habitat.

Note: Past designations of critical habitat have used the terms "primary constituent elements" (PCEs), "physical or biological features" (PBFs), or "essential features" to characterize the key components of critical habitat that provide for the conservation of the listed species. The new critical habitat regulations (USFWS and NMFS 2016, 81 FR 7214) discontinue use of the terms "PCEs" or "essential features" and rely exclusively on use of the term PBFs for that purpose because that term is contained in the statute. To be consistent with that shift in terminology and in recognition that the terms PBFs, PCEs, and essential habit features are synonymous in meaning, we are only referring to PBFs herein. Therefore, if a past critical habitat designation defined essential habitat features or PCEs, they will be referred to as PBFs in this document. This does not change the approach outlined above for conducting the "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features.

2.3 Status of the Species and Critical Habitat

This section presents information about the regulatory, biological and ecological status of the bull trout and its critical habitat that provides context for evaluating the significance of probable effects caused by the proposed ongoing action.

2.3.1 Bull Trout

2.3.1.1 Listing Status

The coterminous United States population of the bull trout was listed as threatened on November 1, 1999 (USFWS 1999, 64 FR 58910-58933). The threatened bull trout occurs in the Klamath River Basin of south-central Oregon; the Jarbidge River in Nevada; the Willamette River Basin in Oregon; Pacific Coast drainages of Washington, including Puget Sound; major rivers within the Columbia River Basin in Idaho, Oregon, Washington, and Montana; and the Saint Mary-Belly River, east of the Continental Divide in northwestern Montana (Bond 1992; Brewin and Brewin 1997; Cavender 1978; Howell and Buchanan 1992; Leary and Allendorf 1997; USFWS 1999, 64 FR 58910).

The final listing rule for the United States coterminous population of the bull trout discusses the consolidation of five Distinct Population Segments (DPSs) into one listed taxon and the application of the jeopardy standard under section 7 of the Act relative to this species (USFWS 1999, 64 FR 58930). The final listing rule also established five interim recovery units for each of these DPSs for the purposes of consultation and recovery.

The 2010 final bull trout critical habitat rule (USFWS 2010a, 75 FR 63898-64070) identified six draft RUs based on new information that confirmed they were needed to ensure a resilient, redundant, and representative distribution of bull trout populations throughout the range of the listed entity. The final bull trout recovery plan formalized these six RUs (USFWS 2015a, entire). The final recovery units replace the previous five interim RUs and will be used in the application of the jeopardy standard for section 7 consultation procedures.

2.3.1.2 Reasons for Listing and Emerging Threats

Reasons for Listing and Threats Identified in the Recovery Plan

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, grazing, the blockage of migratory corridors by dams or other diversion structures, poor water quality; entrainment (a process by which aquatic organisms are pulled through a diversion or other device) into diversion channels; and introduced non-native species (USFWS 1999, 64 FR 58910). Poaching and incidental mortality of bull trout during other targeted fisheries are additional threats.

Since the time of coterminous listing of the species (64 FR 58910) and designation of its critical habitat (USFWS 2004a, 69 FR 59996; USFWS 2005a, 70 FR 56212; USFWS 2010a, 75 FR 63898), a great deal of new information has been collected on the status of bull trout. The Service's Science Team Report (Whitesel et al. 2004), the bull trout core areas templates (USFWS 2005a; USFWS 2009a), Conservation Status Assessment (USFWS 2005b), and 5-year reviews (USFWS 2008; USFWS 2015h) have provided additional information about threats and status. The final recovery plan lists many other documents and meetings that compiled information about the status of bull trout (USFWS 2015a). As did the prior 5-year review (2008), the 2015 5-year status review maintains the listing status as threatened based on the information compiled in the final bull trout recovery plan (USFWS 2015a) and the Recovery Unit Implementation Plans (RUIPs) (USFWS 2015b-g).

When first listed, the status of bull trout and its threats were reported by the Service at subpopulation scales. In 2002 and 2004, the draft recovery plans (USFWS 2002a; USFWS 2004a; USFWS 2004b) included detailed information on threats at the RU scale (i.e., similar to subbasin or regional watersheds), thus incorporating the metapopulation concept with core areas and local populations. In the 5-year reviews, the Service established threats categories (i.e., dams, forest management, grazing, agricultural practices, transportation networks, mining, development and urbanization, fisheries management, small populations, limited habitat, and wild fire) (USFWS 2008; USFWS 2015h). In the final recovery plan, threats and recovery actions are described for all 109 core areas for the species, forage/migration and overwintering (FMO) areas, historical core areas, and research needs areas in each of the six RUs (USFWS 2015a). Primary threats are described in three broad categories: Habitat, Demographic, and Nonnative Fish for all recovery areas within the coterminously listed range of the species.

The 2015 5-year status review references the final recovery plan and the RUIPs and incorporates by reference the threats described therein (USFWS 2015h). Although significant recovery actions have been implemented since the time of listing, the 5-year review concluded that the listing status should remain as "threatened" (USFWS 2015h).

New or Emerging Threats

The recovery plan (USFWS 2015a) describes new or emerging threats such as climate change and other threats that were not addressed when bull trout were listed. The recovery plan and

RUIPs summarize the threat of climate change and acknowledge that some bull trout local populations and core areas may not persist into the future due to anthropogenic effects such as climate change. The recovery plan further states that use of best available information will ensure future conservation efforts that offer the greatest long-term benefit to sustain bull trout and their required cold water habitats (USFWS 2015a).

Mote et al. (2014) summarized climate change effects in the Pacific Northwest to include rising air temperature, changes in the timing of streamflow related to changing snowmelt, increases in extreme precipitation events, lower summer stream flows, and other changes. A warming trend in the mountains of western North America is expected to decrease snowpack, hasten spring runoff, reduce summer stream flows, and increase summer water temperatures (Poff et al. 2002; Koopman et al. 2009; Point Reyes Bird Observatory 2011). Lower flows as a result of smaller snowpack could reduce habitat, which might adversely affect bull trout reproduction and survival. Warmer water temperatures could lead to physiological stress and could also benefit nonnative fishes that prey on or compete with bull trout. Increases in the number and size of forest fires could also result from climate change (Westerling et al. 2006) and could adversely affect watershed function by resulting in faster runoff, lower base flows during the summer and fall, and increased sedimentation rates. Lower flows also may result in increased groundwater withdrawal for agricultural purposes and resultant reduced water availability in certain stream reaches occupied by bull trout (USFWS 2015c).

Although all salmonids are likely to be affected by climate change, bull trout are especially vulnerable given that spawning and rearing are constrained by their location in upper watersheds and the requirement for cold water temperatures (Rieman et al. 2007). Climate change is expected to reduce the extent of cold water habitat (Isaak et al. 2015, Figure 7), and increase competition with other fish species (lake trout (*Salvelinus namaycush*), brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), and northern pike (*Esox lucius*)) for resources in remaining suitable habitat. Several authors project that brook trout, a fish species that competes for resources with and predates on the bull trout, will continue increasing their range in several areas (an upward shift in elevation) due to the effects from climate change (e.g., warmer water temperatures) (Wenger et al. 2011, Figure 2a; Isaak et al. 2014).

2.3.1.3 Species Description

Bull trout, member of the family Salmonidae, are char native to the Pacific Northwest and western Canada. The bull trout and the closely related Dolly Varden (*Salvelinus malma*) were not officially recognized as separate species until 1980 (Robins et al. 1980). Bull trout historically occurred in major river drainages in the Pacific Northwest from the southern limits in the McCloud River in northern California (now extirpated (Rode 1990)), Klamath River basin of south central Oregon, and the Jarbidge River in Nevada to the headwaters of the Yukon River in the Northwest Territories, Canada (Cavender 1978; Bond 1992). To the west, the bull trout's current range includes Puget Sound, coastal rivers of British Columbia, Canada, and southeast Alaska (Bond 1992). East of the Continental Divide bull trout are found in the headwaters of the Saskatchewan River in Alberta and the MacKenzie River system in Alberta and British Columbia (Cavender 1978; Brewin and Brewin 1997). Bull trout are wide spread throughout the Columbia River basin, including its headwaters in Montana and Canada.

2.3.1.4 Life History

Bull trout exhibit resident and migratory life history strategies throughout much of the current range (Rieman and McIntyre 1993). Resident bull trout complete their entire life cycle in the streams where they spawn and rear. Migratory bull trout spawn and rear in streams for 1 to 4 years before migrating to either a lake (adfluvial), river (fluvial), or, in certain coastal areas, to saltwater (anadromous) where they reach maturity (Fraley and Shepard 1989; Goetz 1989). Resident and migratory forms often occur together and it is suspected that individual bull trout may give rise to offspring exhibiting both resident and migratory behavior (Rieman and McIntyre 1993).

Bull trout have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). Watson and Hillman (1997) concluded that watersheds must have specific physical characteristics to provide habitat requirements for bull trout to successfully spawn and rear. They also concluded that these characteristics are not necessarily ubiquitous throughout these watersheds, thus resulting in patchy distributions even in pristine habitats.

Bull trout are found primarily in colder streams, although individual fish are migratory in larger, warmer river systems throughout the range (Fraley and Shepard 1989; Rieman and McIntyre 1993; Rieman and McIntyre 1995; Buchanan and Gregory 1997; Rieman et al. 1997). Water temperature above 15°C (59°F) is believed to limit bull trout distribution, which may partially explain the patchy distribution within a watershed (Fraley and Shepard 1989; Rieman and McIntyre 1995). Spawning areas are often associated with cold water springs, groundwater infiltration, and the coldest streams in a given watershed (Pratt 1992; Rieman and McIntyre 1993; Rieman et al. 1997). Goetz (1989) suggested optimum water temperatures for rearing of less than 10°C (50°F) and optimum water temperatures for egg incubation of 2 to 4°C (35 to 39°F).

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools (Goetz 1989; Pratt 1992; Thomas 1992; Rich 1996; Sexauer and James 1997; Watson and Hillman 1997). Jakober (1995) observed bull trout overwintering in deep beaver ponds or pools containing large woody debris in the Bitterroot River drainage, Montana, and suggested that suitable winter habitat may be more restrictive than summer habitat. Bull trout prefer relatively stable channel and water flow conditions (Rieman and McIntyre 1993). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Sexauer and James 1997).

The size and age of bull trout at maturity depend upon life history strategy. Growth of resident fish is generally slower than migratory fish; resident fish tend to be smaller at maturity and less fecund (Goetz 1989). Bull trout normally reach sexual maturity in 4 to 7 years and live as long as 12 years. Bull trout are iteroparous (they spawn more than once in a lifetime), and both repeat- and alternate-year spawning has been reported, although repeat-spawning frequency and post-spawning mortality are not well documented (Leathe and Graham 19825; Fraley and Shepard 1989; Pratt 1992; Rieman and McIntyre 1996).

Bull trout typically spawn from August to November during periods of decreasing water temperatures. Migratory bull trout frequently begin spawning migrations as early as April, and have been known to move upstream as far as 250 kilometers (km) (155 miles (mi)) to spawning grounds (Fraley and Shepard 1989). Depending on water temperature, incubation is normally

100 to 145 days (Pratt 1992) and, after hatching, fry remain in the substrate. Time from egg deposition to emergence may exceed 200 days. Fry normally emerge from early April through May depending upon water temperatures and increasing stream flows (Pratt 1992).

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 (fishes that spawn once and then die, and therefore require only one-way passage upstream) salmonids. 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.

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 and small fish (Boag 1987; Goetz 1989; Donald and Alger 1993). Adult migratory bull trout are primarily piscivores, known to feed on various fish species (Fraley and Shepard 1989; Donald and Alger 1993).

2.3.1.5 Population Structure and Dynamics

Population Structure

As indicated above, 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 (Rieman and McIntyre 1993). 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 (Goetz 1989). Migratory bull trout spawn in tributary streams where juvenile fish rear 1 to 4 years before migrating to either a lake (adfluvial form), river (fluvial form) (Fraley and Shepard 1989; Goetz 1989), or saltwater (anadromous form) to rear as subadults and to live as adults (Brenkman and Corbett 2005; McPhail and Baxter 1996). Bull trout normally reach sexual maturity in 4 to 7 years and may live longer than 12 years. Repeat- and alternate-year spawning has been reported, although repeat-spawning frequency and post-spawning mortality are not well documented (Fraley and Shepard 1989; Leathe and Graham 1982; Pratt 1992; Rieman and McIntyre 1996).

Bull trout are naturally migratory, which allows them to capitalize on temporally abundant food resources and larger downstream habitats. Resident forms may develop where barriers (either natural or manmade) occur or where foraging, migrating, or overwintering habitats for migratory fish are minimized (Brenkman and Corbett 2005; Goetz et al. 2004; Starcevich et al. 2012; Barrows et al. 2016). For example, multiple life history forms (e.g., resident and fluvial) and multiple migration patterns have been noted in the Grande Ronde River (Baxter 2002) and Wenatchee River (Ringel et al. 2014). Parts of these river systems have retained habitat conditions that allow free movement between spawning and rearing (SR) areas and the mainstem rivers. Such multiple life history strategies help to maintain the stability and persistence of bull trout populations to environmental changes.

Benefits of connected habitat to migratory bull trout include greater growth in the more productive waters of larger streams, lakes, and marine waters; 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 (Frissell 1999; MBTSG 1998; Rieman and McIntyre 1993). In the absence of the migratory bull trout life form, isolated populations cannot be replenished when disturbances make local habitats temporarily unsuitable. Therefore, the range of the species is diminished, and the potential for a greater reproductive contribution from larger size fish with higher fecundity is lost (Rieman and McIntyre 1993).

Whitesel et al. (2004) noted that although there are multiple resources that contribute to the subject, Spruell et al. (2003) best summarized genetic information on bull trout population structure. Spruell et al. (2003) analyzed 1,847 bull trout from 65 sampling locations, four located in three coastal drainages (Klamath, Queets, and Skagit Rivers), one in the Saskatchewan River drainage (Belly River), and 60 scattered throughout the Columbia River Basin. They concluded that there is a consistent pattern among genetic studies of bull trout, regardless of whether examining allozymes, mitochondrial DNA, or most recently microsatellite loci. Typically, the genetic pattern shows relatively little genetic variation within populations, but substantial divergence among populations. Microsatellite loci analysis supports the existence of at least three major genetically differentiated groups (or evolutionary lineages) of bull trout (Spruell et al. 2003). They were characterized as:

i. "Coastal," including the Deschutes River and all of the Columbia River drainage downstream, as well as most coastal streams in Washington, Oregon, and British Columbia. A compelling case also exists that the Klamath Basin represents a unique evolutionary lineage within the coastal group.
ii. "Snake River," which also included the John Day, Umatilla, and Walla Walla rivers. Despite close proximity of the John Day and Deschutes Rivers, a striking level of divergence between bull trout in these two systems was observed.
iii. "Upper Columbia River," which includes the entire basin in Montana and northern Idaho. A tentative assignment was made by Spruell et al. (2003) of the Saskatchewan River drainage populations (east of the continental divide), grouping them with the upper Columbia River group.

Spruell et al. (2003) noted that within the major assemblages, populations were further subdivided, primarily at the level of major river basins. Taylor et al. (1999) surveyed bull trout populations, primarily from Canada, and found a major divergence between inland and coastal populations. Costello et al. (2003) suggested the patterns reflected the existence of two glacial refugia, consistent with the conclusions of Spruell et al. (2003) and the biogeographic analysis of Haas and McPhail (2001). Both Taylor et al. (1999) and Spruell et al. (2003) concluded that the Deschutes River represented the most upstream limit of the coastal lineage in the Columbia River Basin.

More recently, the Service identified additional genetic units within the coastal and interior lineages (Ardren et al. 2011). Based on a recommendation in the Service's 5-year review of the species' status (USFWS 2008), the Service reanalyzed the 27 RUs identified in the 2002 draft bull trout recovery plan (USFWS 2002a) by utilizing, in part, information from previous genetic studies and new information from additional analysis (Ardren et al. 2011). In this examination, the Service applied relevant factors from the joint Service and NMFS DPS policy (USFWS and NMFS 1996, 61 FR 4722-4725) and subsequently identified six draft RUs that contain assemblages of core areas that retain genetic and ecological integrity across the range of bull trout in the coterminous United States. These six recovery units were used to inform designation of critical habitat for bull trout by providing a context for deciding what habitats are essential for recovery (USFWS 2010a, 75 FR 63898). These six RUs, which were identified in the final bull trout recovery plan (USFWS 2015a) and described further in the RUIPs (USFWS 2015b-g) include: Coastal, Klamath, Mid-Columbia, Columbia Headwaters, Saint Mary, and Upper Snake.

Population Dynamics

Although bull trout are widely distributed over a large geographic area, they exhibit a patchy distribution, even in pristine habitats (Rieman and McIntyre 1993). Increased habitat fragmentation reduces the amount of available habitat and increases isolation from other populations of the same species (Saunders et al. 1991). Burkey (1989) concluded that when species are isolated by fragmented habitats, low rates of population growth are typical in local populations and their probability of extinction is directly related to the degree of isolation and fragmentation. Without sufficient immigration, growth for local populations may be low and probability of extinction high (Burkey 1989).

A metapopulation is an interacting network of local populations with varying frequencies of migration and gene flow among them (Meefe and Carroll 1994). For inland bull trout, metapopulation theory is likely most applicable at the watershed scale where habitat consists of discrete patches or collections of habitat capable of supporting local populations; local populations are for the most part independent and represent discrete reproductive units; and long-term, low-rate dispersal patterns among component populations influences the persistence of at least some of the local populations (Rieman and Dunham 2000). Ideally, multiple local populations distributed throughout a watershed provide a mechanism for spreading risk because the simultaneous loss of all local populations is unlikely. However, habitat alteration, primarily through the construction of impoundments, dams, and water diversions has fragmented habitats, eliminated migratory corridors, and in many cases isolated bull trout in the headwaters of tributaries (Rieman and Clayton 1997; Dunham and Rieman 1999; Spruell et al. 1999; Rieman and Dunham 2000).

Human-induced factors as well as natural factors affecting bull trout distribution have likely limited the expression of the metapopulation concept for bull trout to patches of habitat within the overall distribution of the species (Dunham and Rieman 1999). However, despite the theoretical fit, the relatively recent and brief time period during which bull trout investigations have taken place does not provide certainty as to whether a metapopulation dynamic is occurring (e.g., a balance between local extirpations and recolonizations) across the range of the bull trout or whether the persistence of bull trout in large or closely interconnected habitat patches (Dunham and Rieman 1999) is simply reflective of a general deterministic trend towards extinction of the species where the larger or interconnected patches are relics of historically wider distribution (Rieman and Dunham 2000). Research does, however, provide genetic evidence for the presence of a metapopulation process for bull trout, at least in the Boise River Basin of Idaho (Whiteley et al. 2003). Whitesel et al. (2004) summarizes metapopulation models and their applicability to bull trout.

2.3.1.6 Status and Distribution

The following is a summary of the description and current status of the bull trout within the six RUs (shown in Figure 2, below). A comprehensive discussion is found in the Service's 2015 recovery plan for the bull trout (USFWS 2015a) and the 2015 RUIPs (USFWS 2015b-g). Each of these RUs is necessary to maintain the bull trout's distribution, as well as its genetic and phenotypic diversity, all of which are important to ensure the species' resilience to changing environmental conditions.

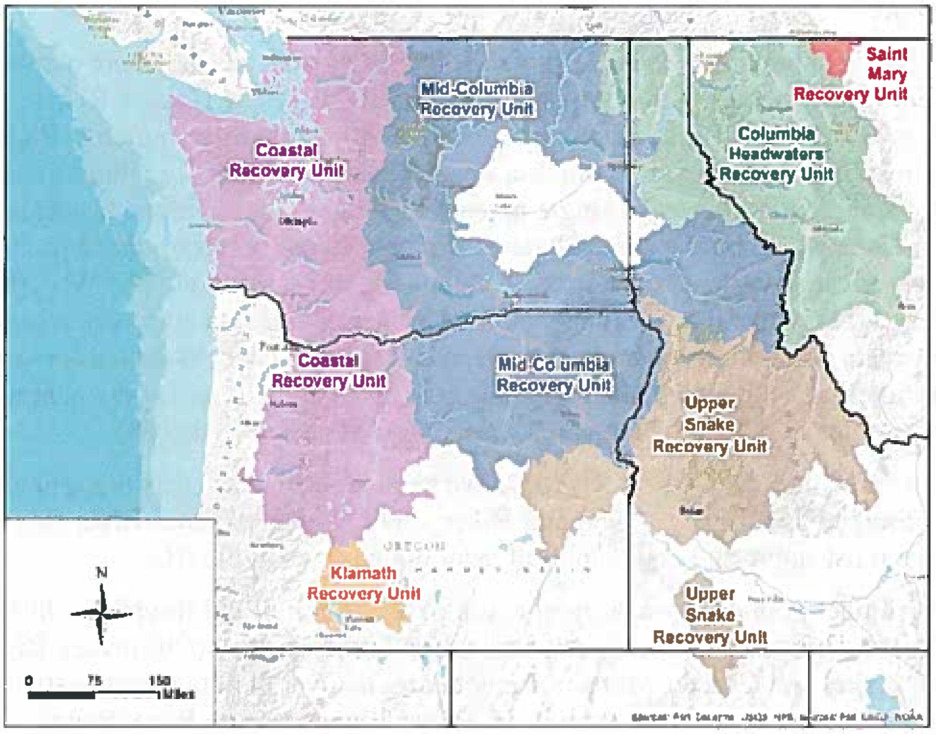

Figure 2. Map showing the location of the six bull trout Recovery Units.

Upper Snake Recovery Unit (site of the proposed ongoing action)

The Upper Snake RUIP describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015f). The Upper Snake RU is located in central Idaho, northern Nevada, and eastern Oregon. The Upper Snake RU is divided into seven geographic regions: Salmon River, Boise River (the South Fork Boise River is part of the action area), Payette River, Little Lost River, Malheur River, Jarbidge River, and Weiser River. This RU contains 22 core areas and 207 local populations (USFWS 2015a), with almost 60 percent being present in the Salmon River Region.

The population trends for the 22 core areas in the Upper Snake RU are summarized in Table E-2 of the Upper Snake RUIP (USFWS 2015f): six are classified as increasing, two are stable; two are likely stable; three are unknown, but likely stable; two are unknown, but likely decreasing; and, seven are unknown. Only the Anderson Ranch core area occurs within the action area for this project and, based on a 2014 Idaho Department of Fish and Game (IDFG) paper (Meyer et al. 2014), it appears that populations within Anderson Ranch are increasing.

The current condition of the bull trout in this RU is attributed to the adverse effects of climate change, dams, mining, forest management practices, nonnative species, and agriculture (e.g., water diversions, grazing). Of the 22 occupied core areas, 13 (59 percent) have no identified primary threats (USFWS 2015f).

Conservation measures or recovery actions implemented include in-stream habitat restoration, in-stream flow requirements, screening of irrigation diversions, and riparian restoration. For more details on conservation actions in this RU, as well as conservation actions for bull trout in general, see section 2.3.1.7 below.

Coastal Recovery Unit

The Coastal RUIP describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015b). The Coastal RU is located within western Oregon and Washington. The RU is divided into three regions: Puget Sound, Olympic Peninsula, and the Lower Columbia River Regions. This RU contains 20 core areas comprising 84 local populations and a single potential local population in the historical Clackamas River core area where bull trout had been extirpated and were reintroduced in 2011, and identified four historically occupied core areas that could be re-established (USFWS 2015a; USFWS 2015b). Core areas within Puget Sound and the Olympic Peninsula currently support the only anadromous local populations of bull trout. This RU also contains 10 shared foraging, migration, and overwintering habitats which are outside core areas and allows for the continued natural population dynamics in which the core areas have evolved (USFWS 2015b).

There are four core areas within the Coastal RU that have been identified as current population strongholds: Lower Skagit, Upper Skagit, Quinault River, and Lower Deschutes River (USFWS 2015a). These are the most stable and abundant bull trout populations in the RU.

Most core areas in the Puget Sound region support a mix of anadromous and fluvial life history forms, with at least two core areas containing a natural adfluvial life history (Chilliwack River core area [Chilliwack Lake] and Chester Morse Lake core area). Overall demographic status of core areas generally improves as you move from south Puget Sound to north Puget Sound. Although comprehensive trend data are lacking, the current condition of core areas within the Puget Sound region are likely stable overall, although some at depressed abundances. Most core areas in this region still have significant amounts of headwater habitat within protected and relatively pristine areas (e.g., North Cascades National Park, Mount Rainier National Park, Skagit Valley Provincial Park, Manning Provincial Park, and various wilderness or recreation areas).

Within the Olympic Peninsula region, demographic status of core areas is poorest in Hood Canal and Strait of Juan de Fuca, while core areas along the Pacific Coast of Washington likely have the best demographic status in this region. The connectivity between core areas in these disjunct regions is believed to be naturally low due to the geographic distance between them. Internal connectivity is currently poor within the Skokomish River core area (Hood Canal) and is being restored in the Elwha River core area (Strait of Juan de Fuca). Most core areas in this region still have their headwater habitats within relatively protected areas (Olympic National Park and wilderness areas).

Across the Lower Columbia River region, status is highly variable, with one relative stronghold (Lower Deschutes core area) existing on the Oregon side of the Columbia River. The Lower Columbia River region also contains three watersheds (North Santiam River, Upper Deschutes River, and White Salmon River) that could potentially become re-established core areas within the Coastal Recovery Unit. Adult abundances within the majority of core areas in this region are relatively low, generally 300 or fewer individuals.

The current condition of the bull trout in this RU 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 in-stream 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, in-stream flows) residential development, urbanization, forest management practices (e.g., timber harvest and associated road building activities), connectivity impairment, mining, and the introduction of non-native species.

The recovery plan identifies three categories of primary threats[2]: Habitat (upland/riparian land management, in-stream impacts, water quality), demographic (connectivity impairment, fisheries management, small population size), and nonnatives (nonnative fishes). Of the 20 core areas in the Coastal RU, only one (5 percent), the Lower Deschutes River, has no primary threats identified (USFWS 2015b, Table A-1).

Conservation measures or recovery actions implemented in this RU include relicensing of major hydropower facilities that have provided upstream and downstream fish passage or complete removal of 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. For more information on conservation actions see section 2.3.1.7 below.

Klamath Recovery Unit

The Klamath RUIP describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015c). The Klamath RU is located in southern Oregon and northwestern California. This RU is the most significantly imperiled RU, 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 2015a). This RU currently contains three core areas and eight local populations (USFWS 2015a; USFWS 2015c). Nine historical local populations of bull trout have become extirpated (USFWS 2015c). All three core areas have been isolated from other bull trout populations for the past 10,000 years (USFWS 2015c).

The current condition of the bull trout in this RU 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. Identified primary threats for all three core areas include upland/riparian land management, connectivity impairment, small population size, and nonnative fishes (USFWS 2015c).

Conservation measures or recovery actions implemented include removal of nonnative fish (e.g., brook trout, brown trout, and hybrids), acquiring water rights for in-stream flows, replacing diversion structures, installing fish screens, constructing bypass channels, installing riparian

[2] Primary Threats are factors known or likely (i.e., non-speculative) to negatively impact bull trout populations at the core area level, and accordingly require actions to assure bull trout persistence to a degree necessary that bull trout will not be at risk of extirpation within that core area in the foreseeable future (4 to 10 bull trout generations, approximately 50 years).

fencing, culvert replacement, and habitat restoration. For more information on conservation actions see section 2.3.1.7 below.

Mid-Columbia Recovery Unit (site of the proposed ongoing action)

The Mid-Columbia RUIP describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015d). The Mid-Columbia RU is located within eastern Washington, eastern Oregon, and portions of central Idaho. The Mid-Columbia RU is divided into four geographic regions: Lower Mid-Columbia, Upper Mid-Columbia, Lower Snake, and Mid-Snake Geographic Regions. This RU contains 24 occupied core areas comprising 142 local populations, two historically occupied core areas, one research needs area, and seven overwintering habitats (USFWS 2015a; USFWS 2015d).

The current demographic status of bull trout in the Mid-Columbia Recovery Unit is highly variable at both the RU and geographic region scale. Some core areas, such as the Umatilla, Asotin, and Powder Rivers, contain populations so depressed they are likely suffering from the deleterious effects of small population size. Conversely, strongholds do exist within the RU, predominantly in the Lower Snake geographic area. Populations in the Imnaha, Little Minam, Clearwater, and Wenaha Rivers are likely some of the most abundant. These populations are all completely or partially within the bounds of protected wilderness areas and have some of the most intact habitat in the RU. Status in some core areas is relatively unknown, but all indications in these core areas suggest population trends are declining, particularly in the core areas of the John Day Basin. More detailed description of bull trout distribution, trends, and survey data within individual core areas is provided in Appendix II of the RUIP (USFWS 2015d).

The current condition of the bull trout in this RU 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. Of the 24 occupied core areas, six (25 percent) have no identified primary threats (USFWS 2015d, Table C-2).

Conservation measures or recovery actions implemented include road removal, channel restoration, mine reclamation, improved grazing management, removal of fish barriers, and in-stream flow requirements. For more information on conservation actions see section 2.3.1.7 below.

Columbia Headwaters Recovery Unit

The Columbia Headwaters RUIP describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015e). The Columbia Headwaters RU is located in western Montana, northern Idaho, and the northeastern corner of Washington. The RU is divided into five geographic regions: Upper Clark Fork, Lower Clark Fork, Flathead, Kootenai, and Coeur d'Alene Geographic Regions (USFWS 2015e). This RU contains 35 bull trout core areas; 15 of which are complex core areas as they represent larger interconnected habitats and 20 simple core areas as they are isolated headwater lakes with single local populations. 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 isolated existence (USFWS 2015e). Fish passage improvements within the RU have reconnected some previously fragmented habitats (USFWS 2015e), while others remain fragmented. Unlike the other RUs in Washington, Idaho, and Oregon, the Columbia Headwaters

RU does not have any anadromous fish overlap. Therefore, bull trout within the Columbia Headwaters RU do not benefit from the recovery actions for salmon (USFWS 2015e).

Conclusions from the 2008 5-year review (USFWS 2008, Table 1) were that 13 of the Columbia Headwaters RU core areas were at High Risk (37.1 percent), 12 were considered At Risk (34.3 percent), 9 were considered at Potential Risk (25.7 percent), and only 1 core area (Lake Koocanusa; 2.9 percent) was considered at Low Risk. Simple core areas were generally more inherently at risk than complex core areas under the model due to limited demographic capacity and single local populations. While this analysis was conducted nearly a decade ago, little has changed in regard to individual core area status in the interim (USFWS 2015e).

The current condition of the bull trout in this RU is attributed to the adverse effects of climate change, mostly historical mining and contamination by heavy metals, expanding populations of nonnative fish predators and competitors, modified in-stream flows, migratory barriers (e.g., dams), habitat fragmentation, forest practices (e.g., logging, roads), agriculture practices (e.g., irrigation, livestock grazing), and residential development. Of the 34 occupied core areas, nine (26 percent) have no identified primary threats (USFWS 2015e, Table D-2).

Conservation measures or recovery actions implemented include habitat improvement, fish passage, and removal of nonnative species. For more information on conservation actions see section 2.3.1.7 below.

Saint Mary Recovery Unit

The Saint Mary RUIP describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015g). The Saint Mary RU is located in Montana but is heavily linked to downstream resources in southern Alberta, Canada. Most of the Saskatchewan River watershed which the Saint Mary flows into is located in Canada. The United States portion includes headwater spawning and rearing habitat and the upper reaches of overwintering habitat. This RU contains four core areas (Saint Mary River, Slide Lake, Cracker Lake, and Red Eagle Lake), and seven local populations (USFWS 2015g) in the U.S. headwaters.

Current status of bull trout in the Saint Mary River complex core area (U.S.) is considered strong. The three simple core areas (Slide Lake, Cracker Lake, and Red Eagle Lake) appear to be self-sustaining and fluctuating within known historical population demographic bounds.[3]

The current condition of the bull trout in this RU is attributed primarily to the outdated design and operations of the Saint Mary Diversion operated by the Bureau of Reclamation (e.g., entrainment, fish passage, in-stream flows), and, to a lesser extent habitat impacts from development and nonnative species. Of the four core areas, the three simple core areas (all lakes) have no identified primary threats (USFWS 2015g, Table F-1).

[3] The NatureServe status assessment tool ranks this RU as imperiled (Figure 3).

Status Summary

The Service applied the NatureServe status assessment tool[4] to evaluate the tentative status of the six RUs. The tool rated the Klamath RU as the least robust, most vulnerable RU and the Upper Snake RU the most robust and least vulnerable RU, with others at intermediate values (Figure 3).

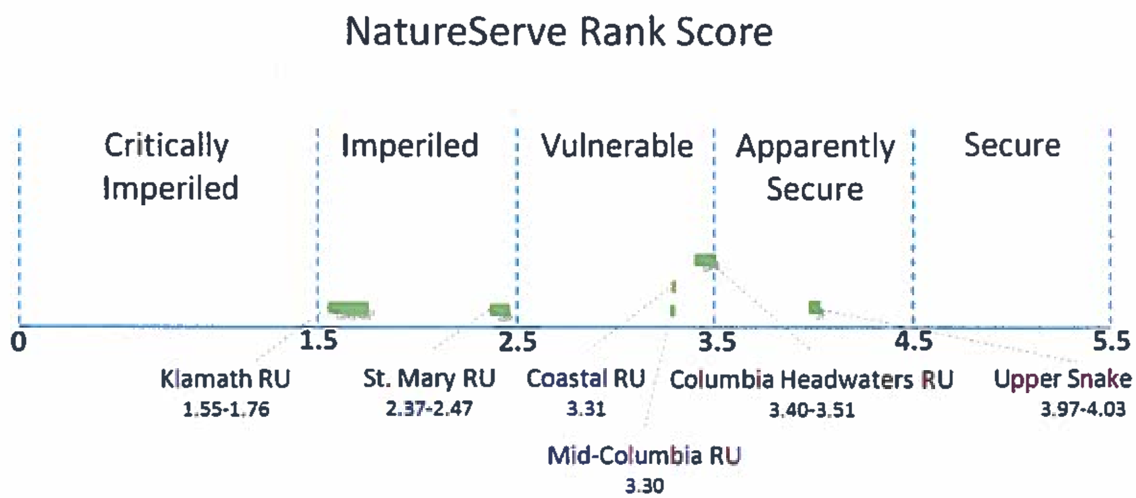

Figure 3. NatureServe status assessment tool scores for each of the six bull trout RUs. The Klamath RU is considered the least robust and most vulnerable, and the Upper Snake RU the most robust and least vulnerable (from USFWS 2015a, Figure 2).

2.3.1.7 Conservation Needs

The 2015 recovery plan for bull trout established the primary strategy for recovery of bull trout in the coterminous United States: (1) conserve bull trout so that they are geographically widespread across representative habitats and demographically stable in six RUs; (2) effectively manage and ameliorate the primary threats in each of six RUs at the core area scale such that bull trout are not likely to become endangered in the foreseeable future; (3) build upon the numerous and ongoing conservation actions implemented on behalf of bull trout since their listing in 1999, and improve our understanding of how various threat factors potentially affect the species; (4) use that information to work cooperatively with our partners to design, fund, prioritize, and implement effective conservation actions in those areas that offer the greatest long-term benefit to sustain bull trout and where recovery can be achieved; and (5) apply adaptive management principles to implementing the bull trout recovery program to account for new information (USFWS 2015a).

Information presented in prior draft recovery plans published in 2002 and 2004 (USFWS 2002a, entire; USFWS 2004b; USFWS 2004c) provided information that identified recovery actions across the range of the species and provided a framework for implementing numerous recovery

[4] This tool consists of a spreadsheet that generates conservation status rank scores for species or other biodiversity elements (e.g., bull trout RUs) based on user inputs of status and threats (see USFWS 2015, p. 8 and Faber-Langendoen et al. 2012, entire, for more details on this status assessment tool).

actions by our partner agencies, local working groups, and others with an interest in bull trout conservation. Many recovery actions were completed prior to finalizing the RP in 2015.

The 2015 recovery plan (USFWS 2015a) integrates new information collected since the 1999 listing regarding bull trout life history, distribution, demographics, conservation successes, etc., and integrates and updates previous bull trout recovery planning efforts across the coterminous range of the bull trout.

The Service has developed a recovery approach that: (1) focuses on the identification of and effective management of known and remaining threat factors to bull trout in each core area; (2) acknowledges that some extant bull trout core area habitats will likely change (and may be lost) over time; and (3) identifies and focuses recovery actions in those areas where success is likely to meet our goal of ensuring the certainty of conservation of genetic diversity, life history features, and broad geographical representation of remaining bull trout populations so that the protections of the Act are no longer necessary (USFWS 2015a).

To implement the recovery strategy, the 2015 recovery plan establishes four categories of recovery actions for each of the six RUs (USFWS 2015a):

1. Protect, restore, and maintain suitable habitat conditions for bull trout.
2. Minimize demographic threats to bull trout by restoring connectivity or populations where appropriate to promote diverse life history strategies and conserve genetic diversity.
3. Prevent and reduce negative effects of nonnative fishes and other nonnative taxa on bull trout.
4. 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.

Bull trout recovery is based on a geographical hierarchical approach. Bull trout are listed as a single DPS within a five-state area in the coterminous United States (Idaho, Montana, Nevada, Oregon, and Washington). As described above, the single DPS is subdivided into six biological-based RUs: (1) Coastal Recovery Unit; (2) Klamath Recovery Unit; (3) Mid-Columbia Recovery Unit; (4) Columbia Headwaters Recovery Unit (5) Upper Snake Recovery Unit; and (6) Saint Mary Recovery Unit (USFWS 2015a). A viable RU should demonstrate that the three primary principles of biodiversity have been met: representation (conserving the genetic makeup of the species); resiliency (ensuring that each population is sufficiently large to withstand stochastic events); and redundancy (ensuring a sufficient number of populations to withstand catastrophic events) (USFWS 2015a).

Each of the six recovery units contain multiple bull trout core areas, 109 in total, which are non-overlapping watershed-based polygons, and each core area includes one or more local populations. A core area is a combination of core habitat (i.e., habitat that could supply all elements for the long-term security of bull trout) and a core population (a group of one or more local bull trout populations that exist within core habitat) and constitutes the basic unit on which to gauge recovery within a recovery unit. Core areas require both habitat and bull trout to function, and the number (replication) and characteristics of local populations inhabiting a core area provide a relative indication of the core area's likelihood to persist. A core area represents the closest approximation of a biologically functioning unit for bull trout. Core areas are presumed to reflect the metapopulation structure of bull trout.

Currently there are 109 occupied bull trout core areas, which comprise 611 local populations (USFWS 2015a). There are also six core areas where bull trout historically occurred but are now extirpated, and an identified research need is to survey these areas where bull trout were known to occur historically, but their current presence and use of the area are uncertain (USFWS 2015a).

Core areas can be further described as complex or simple (USFWS 2015a). Complex core areas contain multiple local bull trout populations, are found in large watersheds, have multiple life history forms, and have migratory connectivity between spawning and rearing habitat and overwintering habitat. Simple core areas are those that contain one bull trout local population. Simple core areas are small in scope, isolated from other core areas by natural barriers, and may contain unique genetic or life history adaptations.

A local population is a group of bull trout that spawn within a particular stream or portion of a stream system (USFWS 2015a). A local population is considered to be the smallest group of fish that is known to represent an interacting reproductive unit. For most waters where specific information is lacking, a local population may be represented by a single headwater tributary or complex of headwater tributaries. Gene flow may occur between local populations (e.g., those within a core population), but is assumed to be infrequent compared with that among individuals within a local population.

Recovery Plan – Specific to Action Area

The bull trout recovery plan was completed in September 2015 and the Upper Snake and Mid-Columbia RUIPs were completed in June 2016. For the action area, continued population monitoring was the only specific recovery action identified in the Upper Snake RU but myriad actions were identified in the Mid-Columbia RU for the Pine, Wildhorse, and Indian Creek Core Area to address (1) in-stream impacts; (2) passage issues and entrainment; (3) dewatering and temperature barriers; (4) nonnative fishes; and (3) demographic research, monitoring, and evaluation. In addition, some examples of conservation measures included in both RUIPs for the action area identified were (1) reduce general sediment production; (2) reduce effects from historical and current grazing; (3) identify passage barriers; (4) implement brook trout removal; (5) protect, restore, and maintain suitable habitat conditions for bull trout; (6) coordinate bull trout recovery with listed anadromous fish species recovery; (7) increase information and outreach to anglers; and (8) monitor historical mine site contamination and clean up mine waste.

2.3.1.8 Federal, State, and Tribal Conservation Actions Since Listing

Since our listing of bull trout in 1999, numerous conservation measures that contribute to the conservation and recovery of bull trout have been and continue to be implemented across its range in the coterminous United States. These measures are being undertaken by a wide variety of local and regional partnerships, including State fish and game agencies, State and Federal land management and water resource agencies, Tribal governments, power companies, watershed working groups, water users, ranchers, and landowners.

In many cases, these bull trout conservation measures incorporate or are closely interrelated with work being done for recovery of salmon and steelhead, which are affected by many of the same threats. These include removal of migration barriers (culvert removal or redesign at stream crossings, fish ladder construction, dam removal, etc.) to allow access to spawning or FMO habitat; screening of water diversions to prevent entrainment into unsuitable habitat in irrigation systems; habitat improvement (riparian revegetation or fencing, placement of coarse woody debris in streams) to improve spawning suitability, habitat complexity, and water temperature; in-stream flow enhancement to allow effective passage at appropriate seasonal times and prevent channel dewatering; and water quality improvement (decommissioning roads, implementing best management practices for grazing or logging, setting pesticide use guidelines) to minimize impacts from sedimentation, agricultural chemicals, or warm temperatures.

At sites that are vulnerable to development, protection of land through fee title acquisition or conservation easements is important to prevent adverse impacts or allow conservation actions to be implemented. In several bull trout core areas, fisheries management to manage or suppress non-native species (particularly brown trout, brook trout, lake trout, and northern pike) is ongoing and has been identified as important in addressing effects of non-native fish competition, predation, or hybridization.

A more comprehensive overview of conservation successes since 1999, described for each recovery unit, is found in the Summary of Bull Trout Conservation Successes and Actions since 1999 (available at http://www.fws.gov/pacific/ecoservices/endangered/recovery/documents/USFWS_2013_summary_of_conservation_successes.pdf.

2.3.2 Bull Trout Critical Habitat

2.3.2.1 Legal Status

Ongoing litigation resulted in the United States District Court for the District of Oregon granting the Service a voluntary remand of the 2005 critical habitat designation. Subsequently the Service published a proposed critical habitat rule on January 14, 2010 (USFWS 2010b, 75 FR 2260) and a final rule on October 18, 2010 (USFWS 2010a, 75 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 within the Coastal, Klamath, Mid-Columbia, Columbia Headwaters, Upper Snake, and St. Mary recovery units.[5]

Rangewide, the Service designated reservoirs/lakes and stream/shoreline miles in 32 critical habitat units (CHU) as bull trout critical habitat (see Table 3). Designated bull trout critical habitat is of two primary use types: (1) spawning and rearing; and (2) foraging, migrating, and overwintering.

Compared to the 2005 designation, the final rule 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.

[5] The adverse modification analysis does not rely on recovery units.

This rule also identifies and designates as critical habitat approximately 1,323.7 km (822.5 mi) of streams/shorelines and 6,758.8 hectares (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.

Table 3. 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**

These unoccupied areas were determined by the Service to be essential for restoring functioning migratory bull trout populations based on currently available scientific information. Theseunoccupied areas often include lower mainstem 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 critical habitat 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 habitat conservation plans 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 (USFWS 2010a, 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 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.

2.3.2.2 Conservation Role and Description of Critical Habitat

The conservation role of bull trout critical habitat is to support viable core area populations (USFWS 2010a, 75 FR 63943). 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 overwintering areas, outside of core areas, that are important to the survival and recovery of bull trout.

As previously noted, 32 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 (PBFs) necessary to support the bull trout's particular use of that habitat, other than those associated with PBFs 5 and 6, which relate to breeding habitat (see list below).

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); (2) provide for persistence of strong local populations, in part, by providing habitat conditions that encourage movement of migratory fish (MBTSG 1998; Rieman and McIntyre 1993); (3) are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations (MBTSG 1998; Rieman and McIntyre 1993); and (4) are distributed throughout the historical range of the species to preserve both genetic and phenotypic adaptations (MBTSG 1998; Rieman and Allendorf 2001; Rieman and McIntyre 1993).

The Olympic Peninsula and Puget Sound CHUs are essential to the conservation of amphidromous (fish that migrate from fresh to salt water or from salt to fresh water at some stage of the life cycle other than for breeding) bull trout, which are unique to the Coastal-Puget Sound population segment. 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, migrating, and overwintering.

In determining which areas to propose as critical habitat, the Service considered the PBFs that are essential to the conservation of bull trout and that may require special management considerations or protection. These features are the PBFs laid out in the appropriate quantity and spatial arrangement for conservation of the species. The PBFs of designated bull trout critical habitat are:

1. Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) 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; streamflow; 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 substrates, 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 base flows within historical and seasonal ranges or, if flows are controlled, minimal flow departures 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 (*Sander vitreus*), northern pike, smallmouth bass (*Micropterus dolomieu*)); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

2.3.2.3 Current Rangewide Condition of Bull Trout Critical Habitat

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 (USFWS 2002b, 67 FR 71240). The condition of bull trout reflects the condition of bull trout habitat.

The primary land and water management activities impacting the PBFs essential to the conservation of bull trout include timber harvest and road building, agriculture and agricultural diversions, livestock grazing, dams, mining, urbanization and residential development, and nonnative species presence or introduction (USFWS 2010b, 75 FR 2282).

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; Rieman and McIntyre 1993).
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; MBTSG 1998).
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; Rieman et al. 2006).
4. In the Coastal-Puget Sound region where amphidromous bull trout occur, degradation of mainstem river overwintering habitat, and the degradation and loss of marine nearshore foraging and migration habitat due to urban and residential development.
5. Degradation of overwintering habitat resulting from reduced prey base, roads, agriculture, development, and dams.

The bull trout critical habitat final rule also aimed 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 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).

2.3.3 Northern Idaho Ground Squirrel

The northern Idaho ground squirrel (*Urocitellus brunneus*; NIDGS) was listed as threatened on April 5, 2000 (65 FR 17779). On July 28, 2003, the Service approved a recovery plan for this species (USFWS 2003) that provides direction for recovery of the species, including population sizes and criteria for a minimum number of viable metapopulations.

A 5-year review of the current classification for NIDGS under the Act was completed in 2017 (81 FR 7571-7573). Although several conservation actions have been implemented or updated by the U.S. Forest Service, IDFG, and U.S. Geological Survey since the last 5-year review, the recent review determined that the threats identified in the previous status review remained the same and that NIDGS were not secure from the threats, particularly the primary threat of loss of suitable habitat, mainly to meadow invasion by conifers. Development of private lands within their limited range also continues to be a threat.

In 2012, NIDGS was identified as a distinct species (Hoisington-Lopez et al. 2012). The northern Idaho ground squirrel in now recognized as *Urocitellus brunneus*, while its former subspecies, southern Idaho ground squirrel, is recognized as *Urocitellus endemicus*. The Service revised the taxonomy of the species in 2015 (80 FR 35860).

The recovery area covers 12 primary and 5 secondary existing and potential metapopulation sites. Land ownership defines which category (primary or secondary) each site is in, but the exact boundaries of these sites will be determined and are expected to change as new information becomes available (USFWS 2003). Primary metapopulation sites are typically on lands administered by the Forest Service with some State of Idaho and private lands included. Secondary metapopulation sites are primarily on private lands that could be useful in the recovery of the subspecies if landowners are willing to participate in this conservation effort. To date, one habitat conservation plan with a private landowner for this species was completed in November 2007 (USFWS 2007).

Consultation under section 7 of the Act is required for activities on Federal, State, county, or private lands that may impact the survival and recovery of the northern Idaho ground squirrel, if such activities are funded, authorized, carried out, or permitted by a Federal agency. The Forest is listed by the Service as one of the agencies involved with this species under section 7 of the Act.

2.3.3.1 Species Description

The NIDGS belongs to the small-eared group of true ground squirrels. Yensen (1991) described the NIDGS as taxonomically distinct from the southern Idaho species (*U. endemicus*) based on morphology, fur, and apparent life-history differences, including biogeographical evidence of separation. The northern Idaho species occurs only in west-central Idaho in Adams and Valley counties. It has a reddish brown back with faint light spots and a cream-colored belly. The back of the legs, top of the nose, and underside of the base of the tail are all reddish brown. Ear pinnae project slightly above the crown of the head (Yensen and Sherman 2003). The NIDGS can be distinguished from the other species, the southern Idaho ground squirrel, and other small-eared ground squirrels, by its smaller size and rustier fur color.

2.3.3.2 Life History

The NIDGS occupies dry (or xeric) meadows surrounded by *Pinus ponderosa* (ponderosa pine) or *Pseudotsuga menziesii* (Douglas fir) (Yensen 1991). Xeric meadows have shallow soils (Dyni and Yensen 1996). However, NIDGS sites need to be deep enough to accommodate nest burrows greater than 1 meter (3.3 feet) deep (Yensen et al. 1991; Yensen and Sherman 1997); dry vegetation sites with shallow soils of less than 50 centimeters (19.5 inches) depth above bedrock are used for auxiliary burrow systems (Yensen et al. 1991). NIDGS often dig burrows under logs, rocks, or other objects.

Although Columbian ground squirrels (*U. columbianus*) overlap in distribution with the NIDGS (Dyni and Yensen 1996), Columbian ground squirrels prefer moister areas with deeper soils. Sherman and Yensen (1994) reported that the segregation of the two species is due to competitive exclusion as opposed to differing habitat requirements.

The NIDGS emerges in late March or early April and is active above ground until July or early August (Yensen 1991). Emergence during this period begins with adult males, followed by adult females, and then yearlings. The NIDGS becomes reproductively active within the first 2 weeks of emergence (Yensen 1991). Females and males are sexually mature the first spring after birth. Females produce one litter per year of between two and seven pups, depending on fitness. Males and females do not live together or near their mates, and females do not cooperate with close kin to defend burrows or rear young (Sherman and Gavin 1997). Females that survive the first winter live, on average, nearly twice as long as males (3.2 years for females and 1.7 years for males). Estimates of maximum longevity indicate that males may live up to 5 years and females up to or greater than 7 years (Sherman and Runge 2002). Males normally die at a younger age, typically from mortality associated with reproductive behavior. During the mating period, males move considerable distances in search of receptive females and often fight with other males for copulations, thereby exposing themselves to predation by raptors, such as prairie falcons (*Falco mexicanus*), goshawks (*Accipiter gentilis*), and red-tailed hawks (*Buteo jamaicensis*). Significantly more males die or disappear during the 2-week mating period than during the rest of the 12- to 14-week period of above-ground activity (Sherman and Yensen 1994). Seasonal torpor or hibernation generally occurs in early to mid-July for adult males and females, and late July to early August for juveniles (Sherman and Gavin 1997).

2.3.3.3 Population Dynamics

As a result of the factors described in the Life History section, and due to the small sizes of the remaining population sites, the NIGS may have little resilience to naturally occurring events. Small populations are often vulnerable to climatic fluctuations and catastrophic events (Mangel and Tier 1994). In 1993, Gavin et al. (1999) developed a computer population viability simulation program using recruitment and death values recorded over 8 years from an intensively studied NIDGS population site. Variables in the model included no natural immigration, and began the population viability analysis using 50 individuals, a figure that was 30 individuals lower than the actual population size of 80 individuals (Sherman and Yensen 1994). This model determined that all but 1 of 100 population sites could become extinct in less than 20 years. In 1999, the Service contracted with the U.S. Geological Survey-Patuxent Wildlife Research Center, to further develop a population model for the NIDGS. The model was designed to allow the user to develop population projections for a population site or population complex using data collected about the demographic structure over 3 or more years. Using the assumptions of a closed population and overwintering survival of the female and pups, this model predicted that existing populations could become extinct within 7 years using current demographic trends if no conservation measures are taken.

In a metapopulation system such as that of NIDGS, the extinction and re-colonization of local populations is perceived to be a natural occurrence (Smith 1996). Some local populations may be larger and more robust than others because of the availability of suitable resources such as well drained soils, above-ground structure for cover, and diverse and nutritious food sources. These productive sites are often referred to as "source populations." Areas that harbor less resource value may support small populations during periods of ideal climatic conditions but may not remain viable when climatic conditions further reduce the resource value. These sites are referred to as "sink populations" in that most of the animals that occur there arrive via dispersal from source sites (Meffe and Carroll 1994).

In general, larger local populations have a greater ability to persist through intermittent fluctuations in climate and food resources and can serve as source populations, through dispersal, for less viable populations or can re-colonize local populations that have gone extinct (Meffe and Carroll 1994). A necessity for this process to work is the connectivity among local populations, a characteristic that is now lacking across substantial portions of the NIDGS range. Sink populations, although potentially intermittently occupied, are valuable to the metapopulation as well. They can contribute genetic diversity and can serve as a bridge between other source populations that would otherwise lack connection.

For several years, population sites with the largest numbers of NIDGS have been closely monitored by researchers. These sites occur within the Forest (Slaughter Gulch campground) and the privately-owned OX Ranch. The two population sites on the OX Ranch (Squirrel Manor and Squirrel Valley) have been monitored for the longest period of time. Sherman and Gavin (1997; 1999) and Sherman and Runge (2002) documented the decline of the Squirrel Valley population from 120 individuals in 1987 to 10 in 1999. The Squirrel Manor had a population decline from 250 individuals in 1996 to fewer than 50 individuals in 1999. Each of four other population sites monitored between 1998 and 1999 declined markedly. The declines in 1999 may have been largely due to cold, spring conditions (Sherman and Gavin 1999), whereas the longer-term declines may be related to declining habitat conditions. In 2008, the population at Squirrel Manor was estimated to be 149 individuals (Evans Mack and Bond 2008). It is worth noting that the two largest populations exist in close proximity to human habitation and a popular campground, and population declines here have not been attributed primarily to human activity.

Over the last few years, State and Federal employees, as well as private landowners have cooperated in demographic research, rehabilitation of local populations and potential corridors between local populations, and translocation efforts. In addition, a captive breeding program has been implemented at Zoo Boise in Boise, Idaho using southern Idaho ground squirrels and with the intention of also having a breeding population of NIDGS once the techniques are refined. The objectives of these efforts are focused on increasing the population size of the NIDGS and re-establishing the connectivity among local populations so delisting of this species can occur.

2.3.3.4 Status and Distribution

2.3.3.4.1 Historical and Current Distribution

The NIDGS is found only in Adams and Valley counties of western Idaho. It has the smallest geographic range of any squirrel species and one of the smallest mammal ranges in North America (Gill and Yensen 1992). Its present range is north of Council, Idaho, with one location in Round Valley, and covers an area of about 230,000 acres. Within this extent, NIDGS are known to occur at 47 isolated sites within an elevation range of 400 to 2,300 meters (1,312 to 7,565 feet) (Evans Mack and Bond 2008). Historically, its range probably was much larger and extended southeast to Round Valley near Cascade, Idaho.

2.3.3.4.2 Factors Affecting Species Environment

The NIDGS is primarily threatened by habitat loss due to forest encroachment into former suitable meadow habitat. Forest encroachment results in habitat fragmentation, eliminates potential dispersal corridors, and confines the species populations into small isolated habitat islands. The species is also threatened by land use changes, recreational shooting, poisoning, genetic isolation and genetic drift, random naturally occurring events (stochastic events), and competition from the larger Columbian ground squirrel (USFWS 2003).

2.3.3.5 Consulted-on Effects Rangewide

The Service has conducted numerous informal and formal section 7 consultations with the Forest Service and other Federal agencies, in addition to the Forest Plan revision consultation. The majority of these consultations were on site-specific actions such as timber sales, vegetation management actions, road maintenance and construction, and livestock grazing. To date, several consultations authorizing incidental take have been issued (Council to Cuprum Road Construction, Managing the Payette National Forest in the Brownlee Reservoir, Little Salmon River Watershed, and Weiser River Watershed (three documents)). Due to the nature of the consultations completed to date (individually and in aggregate), these have not compromised the survival and recovery of the NIDGS. Land management on the Payette and Boise National Forests is considered critically important to the species and its habitat because these Forests constitute the primary Federal action agency with the potential to affect its survival and assist in recovery under section 7(a)(1) of the Act (USFWS 2003). In summary, the Service's 2003 Biological Opinion for the Land Resource Management Plan developed the following assumptions with regards to implementation of the plan and NIDGS to avoid a jeopardy determination. The Service assumes that (1) all actions proposed under this Forest Land Resource Management Plan will benefit the recovery of the NIDGS, and (2) any adverse effects to the NIDGS will be short-term and offset by long-term benefits.

2.3.3.6 Conservation Needs

A final recovery plan for NIDGS was developed and released by the Service on July 28, 2003 (USFWS 2003). The goal of this recovery plan is to increase the population size and establish a sufficient number of viable metapopulations of the NIDGS so the subspecies can be delisted. According to the recovery plan, due to the restricted geographic range and low numbers, the populations of NIDGS must be increased and stabilized. The only historical population level recorded was in 1985 when it was estimated to be approximately 5,000 individuals (Yensen 1985). This estimate was made for populations judged to be in decline; hence, the recovery target needs to be higher than this historical estimate. The plan states that the recovery target for the species is based on an effective population size (*Ne*) greater than 5,000 individuals among a minimum of 10 metapopulations. Delisting may be considered when the following four recovery criteria have been met.

1. Of the 17 potential metapopulations (Figure 4) that have been identified within the probable historical distribution, there must be at least 10 metapopulations, each maintaining an average effective population size of greater than 500 individuals for 5 consecutive years.

2. The area occupied by a minimum of 10 potential metapopulations must be protected. In order for an area to be deemed protected, it must be: (a) owned or managed by a government agency with appropriate management standards in place; (b) managed by a conservation organization that identifies maintenance of the species as the primary objective for the area; or, (c) on private lands with a long-term conservation easement or covenant that commits present and future landowners to the perpetuation of the species.

3. Site-specific management plans have been completed for the continued ecological management of habitats for a minimum of 10 potential metapopulation sites.

4. A post-delisting monitoring plan covering a minimum of 10 potential metapopulation sites has been completed and is ready for implementation.

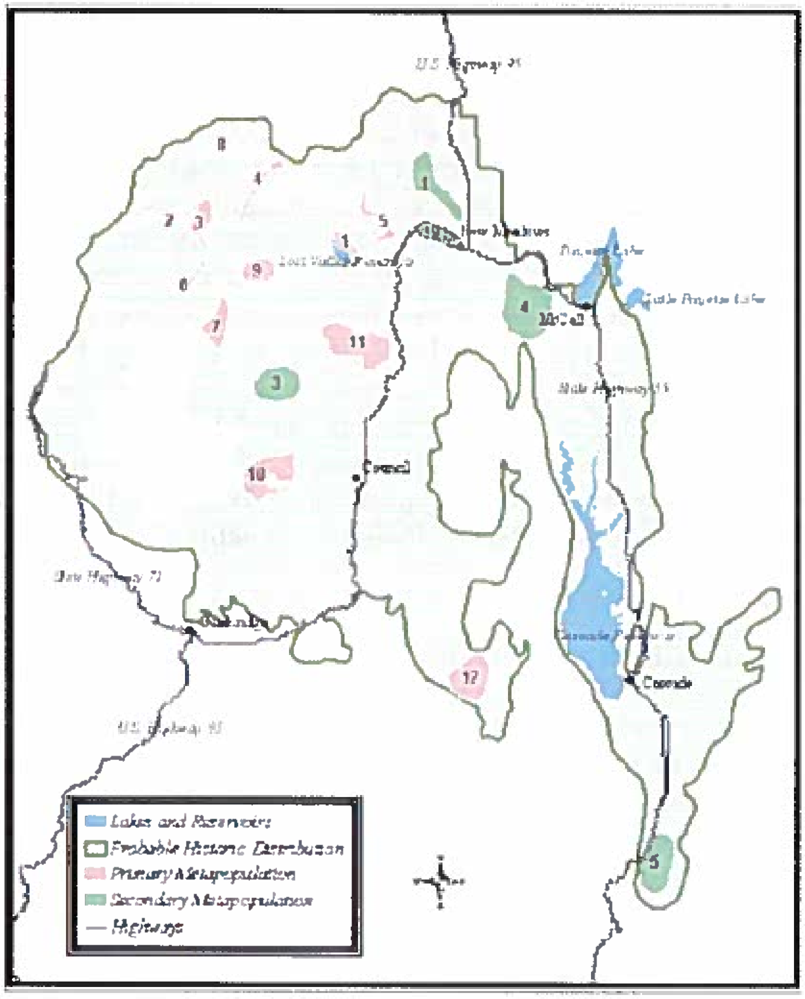

Figure 4. Northern Idaho ground squirrel probable historical distribution and identified metapopulation sites.

2.4 Environmental Baseline of the Action Area

This section assesses the effects of past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects 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 this consultation.

2.4.1 Bull Trout

2.4.1.1 Status of the Bull Trout in the Action Area

The project area occurs within the Upper Snake and Mid-Columbia Recovery Units. Bull trout are currently known to use spawning and rearing habitat in at least 29 subwatersheds in each of the 4th level hydrologic unit codes (HUC) within the action area (Figure 5 and Table 4).

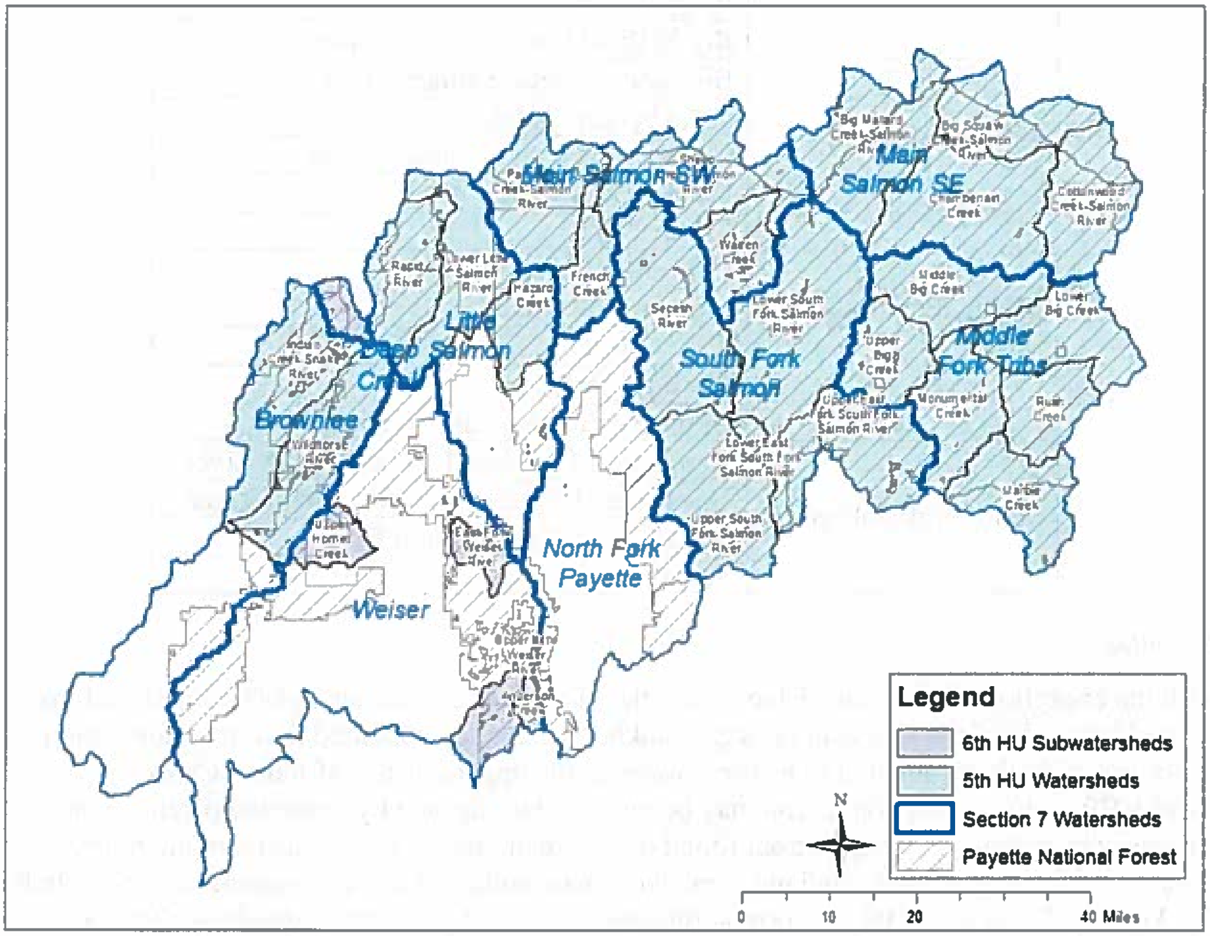

Figure 5. Watersheds on the Payette National Forest where bull trout are present.

Table 4. Watersheds and subwatersheds within the analysis area.

4th HUC/Watershed	5th or 6th HUC/subwatershed
Weiser	Upper Hornet Creek
	East Fork Weiser River
	Upper Little Weiser River
	Anderson Creek
Deep Creek	Deep Creek
Brownlee	Wildhorse River
	Indian Creek-Snake River
	Rapid River

4th HUC/Watershed	5th or 6th HUC/subwatershed
Little Salmon River	Lower Little Salmon River
	Hazard Creek
	Partridge Creek-Salmon River
Main Salmon SW	French Creek
	Sheep Creek-Salmon River
	Warren Creek
	Big Mallard Creek-Salmon River
Main Salmon SE	Big Squaw Creek-Salmon River
	Chamberlain Creek
	Cottonwood Creek-Salmon River
	Middle Big Creek
Middle Fork Salmon River	Lower Big Creek
	Upper Big Creek
	Monumental Creek
	Rush Creek
	Marble Creek
	Upper South Fork Salmon River
South Fork Salmon	Lower East Fork South Fork Salmon River
	Upper East Fork South Fork Salmon River
	Lower South Fork Salmon River
	Secesh River

Brownlee

With the exception of the Snake River itself, the historical and current distribution of bull trout on the Idaho side of the subbasin is largely unknown. One documented bull trout population exists, probably the resident "life history" form, in the upper reaches of Indian Creek (Reid 1979, *in litt*). This population may be restricted to the area by water temperatures and perhaps competition from brook trout found downstream; however, downstream migrants, possibly originating in upper Indian Creek, have been collected in weirs near the mouth of Indian Creek (Chandler et al. 2001). A correlation between area of connected aquatic habitat above 5,249 feet (1,600 meters) has been suggested (Rieman and McIntyre 1995); the Forest used this probable relationship to determine where bull trout were likely or not likely to be found in the Brownlee Reservoir watershed where limited evidence existed. The Indian Creek population roughly corresponds to this presumed relationship, and was used to help determine where additional surveys should be conducted. More extensive surveys were then conducted in Bear Creek and Crooked River, where bull trout were considered likely and were found, and in Lick Creek, where they were considered unlikely but possible and were not found (Williams and Veach 1999). Bull trout are considered by IDFG to have been extirpated from the Snake River in the Brownlee Reservoir subbasin above Brownlee Dam (IDFG 1997), though they have been found in Hells Canyon Reservoir on the Snake River (Buchanan et al. 1997). Fluvial fish in the reservoir may use Indian Creek and the lowest reaches of Kinney Creek, where large reservoir-dwelling salmonids have been seen. Because of the large waterfall on Bear Creek, it is unlikely that Bear Creek acts as a migratory corridor for fish in Oxbow Reservoir or its tailwaters, though bull trout in Bear Creek may go downstream. On the other hand, Crooked River is accessible and at least one bull trout of 9.5 inches (242 millimeters (mm)) was collected from Crooked River in 1999 (Williams and Veach 1999); however, bull trout have yet to be firmly identified in the Oxbow reach of the Snake River and downstream migrants have not been collected in the Idaho Power Company weir at the mouth of the Wildhorse River.

Deep Creek

The Deep Creek watershed drains into the Snake River just downstream of Hells Canyon Dam, and constitutes the entire watershed for Forest consultations. The watershed comprises approximately 19,000 acres and ranges from 1,500 feet in elevation at its confluence with the Snake River to nearly 7,800 feet in elevation at the headwaters. Surveys for bull trout in the Deep Creek watershed have been limited. Bull trout are known to occur in the Snake River between the mouth of the Imnaha River and Hells Canyon Dam. IDFG personnel have observed bull trout in Idaho streams entering this reach of the Snake River at the mouth of Sheep, Granite, Deep and Wolf creeks (USFS 2005). Idaho Power Company biologists radio tracked one bull trout that entered Deep Creek and stayed approximately 1 month (USFS 2005). Surveys for bull trout within the Deep Creek watershed are limited, and so their distribution is unknown.

Weiser

Bull trout are currently known to use spawning habitat in at least five streams or stream complexes (local populations) in the Weiser River Core Area. Most adult bull trout are relatively small in the Weiser River drainage. Surveys of State lands in the Hornet Creek watershed occurred in 2000, and no bull trout were found greater than 216 mm (8.5 inches) in total length. Local populations include: Sheep Creek, Anderson Creek and the Upper Little Weiser River; Upper Hornet Creek, in the Hornet Creek drainage; and the Upper East Fork Weiser River in the Upper Weiser River drainage (USFWS 2002c).

In the Upper East Fork Weiser River, bull trout have been found in Dewey Creek and the Upper East Fork Weiser River from Bench Creek to the headwaters upstream of the confluence of Dewey Creek. In 2001, IDFG performed electrofishing surveys in Dewey Creek and East Fork Weiser River and they estimated bull trout densities in Dewey Creek to be 0.06 fish per square meter (m^2) and 0.008 fish per m^2 in the upper East Fork Weiser River (USFS 2012). A bull trout (225 mm) that was collected 100 meters downstream of the East Fork Ditch diversion (USFS 2012) was the furthest downstream bull trout observation in the East Fork Weiser River. The Forest collected two bull trout in the upper East Fork Weiser River and 31 in Dewey Creek in 2010; populations may be increasing in Dewey Creek (USFS 2012). Two suspected hybrids were also collected at the same location.

Little Salmon River

Fluvial bull trout occur in the Little Salmon River watershed and are known to occur in Boulder Creek and Lake Creek. A single bull trout was observed in Partridge Creek during Forest surveys, but it was too small to be considered fluvial. Lower Hazard Creek and Hard Creek also contain spawning and rearing bull trout (USFWS 2015f). The mainstem Salmon River provides for migration and adult and sub adult foraging, rearing, and wintering habitat. The Little Salmon River is believed to provide habitat only for bull trout migration.

Occupied resident bull trout habitat in Lower John Day Creek is located upstream from a barrier at stream kilometer 3.8. Good data on bull trout distributions in Rapid River also exist and range from 112 to 359 adults (USFWS 2002c).

Main Salmon River

In general, anadromous species in the Main Salmon watershed are limited to the lower sections and mouths of streams by steep gradients and passage impairments, while bull trout are also found above such barriers in several streams. Resident bull trout populations are known to occur in several Main Salmon River tributaries, but their complete distribution, population dynamics, and metapopulation structure are unclear. However, fluvial bull trout are known to occur downstream in the mouth of the Little Salmon River and upstream in the South Fork Salmon River watershed, so they are assumed to still be present in this portion of the mainstem Salmon River. In fact, they have been tracked downstream as far as Lucille, Idaho. Westslope cutthroat trout (*Oncorhynchus clarkii lewisi*) were noted in surveys of Partridge Creek (low reaches), and very high in California Creek, Warren Creek, Schissler Creek, and Mayflower Creek; however, they do not occur in large numbers in the Main Salmon watershed and may have resulted from stocking of lakes in the headwaters of streams in the analysis area. Bull trout occur in the mouth of the Main Salmon River watershed and in the Lake Creek, Partridge Creek, Fall Creek, and Warren Creek analysis areas.

South Fork Salmon River

The South Fork Salmon River occurs in Valley and Idaho counties and enters the mainstem Salmon River east of French Creek and extends south to its headwaters upstream of Warm Lake. The ridges that form the eastern boundary of this relatively narrow, north-south oriented area lie in the headwaters of the Middle Fork Salmon River and Big Creek. The western boundary is the divide between the upper North Fork Payette River and the South Fork Salmon River. The core area is 338,100 acres (835,000 hectares) in size. The U.S. Forest Service manages 99 percent of the land in this core area (USFWS 2015f).

Bull trout are currently known to use spawning and rearing habitat in streams comprising 27 local populations in the South Fork Salmon River core area, including Upper Lake Creek, Grouse-Flat Creek, Ruby Creek, Summit Creek, Victor Creek, Loon Creek, Lick Creek, Zena Creek, Fitsum Creek, Buckhorn Creek, Cougar Creek, Fourmile Creek, Blackmare Creek, Dollar-Six Bit Creeks, Warm Lake, Curtis Creek, Upper South Fork Salmon River, Burntlog Creek, Trapper Creek, Riordan Lake, Upper East Fork South Fork Salmon River, Sugar Creek, Tamarack Creek, Profile Creek, Quartz Creek, Elk Creek, and Pony Creek (USFWS 2015f).

Bull trout are considered widespread throughout these subwatersheds, and it is assumed that bull trout occur in the areas between documented sightings. Both fluvial and resident life forms are known to occur (Watry and Scarnecchia 2008).

Middle Fork Salmon River

Bull trout are widely distributed in the Big Creek watershed, and the Forest has documented them in several streams in both Upper Big Creek and Lower Big Creek drainages. The bull trout populations in the Big Creek watershed are part of the Columbia River Bull Trout DPS (63 FR 31647) and the Upper Snake River Recovery Unit, which has been subdivided for recovery planning into "core areas." This watershed is in the Middle Fork Salmon River Core Area, which contains some of the strongest bull trout populations in the northwest (USFWS 2015f).

There are limited abundance data for bull trout and no actual trend data available for this area, but the Service (USFWS 2008) rated the Middle Fork Salmon Core Area as being at low risk relative to most others, reflecting its largely wilderness character. The Forest's fisheries program observed bull trout during snorkel surveys in 2002 through 2004 in Big Creek; they documented densities of about 8.3 fish per 100 meters[6], and the existence of fluvial fish (USFS 2012). In 2008, additional fish surveys were conducted in several streams in the proposed ongoing project area that showed fairly low densities, and Figure 5 depicts the most up-to-date presence/absence survey results and areas of focal or spawning habitat for the species. Bull trout are present throughout the entire project area.

There are two fords remaining on Forest roads open to the public that cross streams that may be occupied by bull trout. These are NFS road 346/Warren Creek and NFS road 373/North Fork Smith Creek. In addition, there are 140 stream crossings on trails authorized and maintained by the Forest that occur within modelled bull trout spawning and rearing habitat (Table 5).

Table 5. Estimated number of motorized and non-motorized trail fords in bull trout spawning/rearing habitat.

Watershed	Watershed / Subwatershed*	Estimated fords in bull trout spawning/rearing habitat
Weiser	Upper Hornet Creek*	
	East Fork Weiser River*	1
	Upper Little Weiser River*	5
	Anderson Creek*	
Deep Creek	Deep Creek*	
Brownlee	Indian Creek-Snake River	
	Wildhorse River	1
Little Salmon River	Rapid River	14
	Lower Little Salmon River	
	Hazard Creek	2
Main Salmon SW	Partridge Creek-Salmon River	14
	French Creek	
	Sheep Creek-Salmon River	
	Warren Creek	1
Main Salmon SE	Big Mallard Creek-Salmon River	
	Big Squaw Creek-Salmon River	
	Chamberlain Creek	3
	Cottonwood Creek-Salmon River	
Middle Fork Tributaries	Middle Big Creek	26
	Lower Big Creek	3
	Upper Big Creek	5
	Monumental Creek	15
	Rush Creek	5

[6] Weighted average of snorkel counts over 36 stream reaches.

Watershed	Watershed / Subwatershed*	Estimated fords in bull trout spawning/rearing habitat
	Marble Creek	13
South Fork Salmon	Upper South Fork Salmon River	14
	Lower East Fork South Fork Salmon River	
	Upper East Fork South Fork Salmon River	
	Lower South Fork Salmon River	2
	Secesh River	11
Total		140

2.4.1.2 Factors Affecting the Bull Trout in the Action Area

Road and Trail Maintenance

An important factor affecting bull trout in the action area is the road and trail maintenance work conducted. As a direct result of the 2007 Travel Plan, the Forest closed motorized access to non-system routes through the following methods: signage, public outreach and the official Motor Vehicle Use Map (MVUM), gates across some access points, and decommissioning of many non-system routes using barrier rocks and roadbed ripping. The Forest also prohibited cross-country travel by motor vehicles on 510,930 acres.

Since 2007, several projects have been implemented, which have changed the motor vehicle use designations from the 2007 Travel Plan. The Mill Creek Council Mountain Landscape Restoration Project (USFWS Reference #01EIFW00-2012-F-0153), Lost Creek Boulder Creek Landscape Restoration Project (USFWS Reference #01EIFW00-2014-F-0246), Big Creek Restoration and Access Management Project (USFWS Reference #01EIFW00-2017-F-0070), and Middle Fork Weiser Landscape Restoration Project (USFWS Reference #01EIFW00-2018-I-0146) have made significant localized changes to the designated system. Additionally, there have been numerous smaller projects that have made minor changes, mostly reducing designations. Site-specific consultations occur when decisions are made to modify or revise the designations for motor vehicle use on the MVUM.

The closure of these routes, as described above, has facilitated both active and passive ecological restoration with many watershed benefits, as well as direct and indirect benefits to aquatic habitats including designated bull trout critical habitat. Direct benefits to aquatic and riparian habitats have been in the form of removal of stream fords, elimination of riparian and streambank impacts, native planting, and seeding of riparian and upland areas. Indirect benefits include reduction of upland erosion and sedimentation, restoration of hillslopes and more natural slope hydrology, and passive revegetation along old routes, which increases hillslope resiliency and reduces risk of mass wasting during major storm events.

The post-decommissioning monitoring by the Forest has found that many of the closed non-system routes have grown in with native grasses, forbs, and shrubs. In many cases, the decommissioned and obliterated routes are no longer visible from system roads and trails.

The existing road networks have facilitated mining, developed and dispersed recreation, administrative access for grazing and timber harvest, and firewood cutting. Some of these activities have increased sediment, altered flow regimes as travel routes intercept surface and ground water, and accelerated impacts to riparian habitat. There are currently no culverts within occupied streams or designated critical habitat that are known passage barriers to the species.

The Forest maintains roads and trails under the Forest maintenance programs (see Section 2.5.4, below). The maintenance of designated roads and trails to minimize runoff and sediment delivery into stream and river habitats were consulted on in the consultation documents titled: Managing the Payette Forest in the Brownlee Reservoir; Deep Creek; Weiser River; Little Salmon River; Main Salmon River; South Fork Salmon River; and the Middle Fork Salmon River (USFWS 2009b-h, seven documents). Under the Forest maintenance program, a system route designation means motorized roads and trails receive tread, drainage (culverts, water bars, ditch lines), and trail way (brushing, removing fallen obstacles, etc.) maintenance to maintain tread and hillslope integrity. These maintenance programs help to minimize runoff and sediment delivery into stream and river habitats. Under the maintenance program, system routes can also be relocated or realigned from unsuitable locations that cannot be adequately maintained under specified conditions that include mitigation measures. Road and trail maintenance can offset some of the negative effects of roads and trails on the landscape, but the maintenance activities themselves can also have negative effects on aquatic systems. These negative effects include sediment introduction, removal of streamside vegetation (i.e., roadside brushing), and removal of in-stream habitat when it threatens road function. Negative effects are most prominent where the travel ways are located within 300 feet of riparian areas.

Recreation

Recreation is the most popular public use on the Forest, with designated campgrounds and transfer camps, trailheads, hot springs, and dispersed recreational activities occurring across much of the Forest with the possibility of indirectly impacting bull trout and its designated critical habitat. Dispersed camping and picnicking occurs across the entire action area, with no restrictions other than topography and the prohibitions against causing resource damage. Some areas of the Forest (e.g., Boulder Creek in the Little Salmon River and the South Fork Salmon River) only allow dispersed camping in designated areas, but because it is legal to drive and park a vehicle within 300 feet of a road, many Forest-users continue to disperse camp where it is technically discouraged. There are many user-established, undesignated camping sites within the RCA along the road corridors, many in sensitive areas where bull trout are known to occur. Some of these sites have been moderately improved with boulders and logs placed to delineate edges of use, in order to limit the size of these sites and prevent vehicle encroachment in the riparian zone and to minimize pressures on the riverbank. The recreation sites that still remain in sensitive areas can have negative effects on aquatic systems and require constant monitoring by the Forest during the summer travel season. Ongoing monitoring includes assessments of dispersed camping and other recreational impacts on riparian conservation areas conditions, riparian functions, and streambanks. If there are negative impacts on resources occurring, such as the loss of riparian shading, streambank sloughing, or illegal vehicle entries into the stream, or if there is the potential for significant effects on bull trout and designated critical habitat, those effects will be mitigated through site rehabilitation, area closures, signage, or other measures as appropriate.

The South Fork Salmon River is renowned as a fishing destination, like the Big Creek subwatershed, and sport-fishing occurs within the action area, with fly-rod and traditional rod/lure fishing equipment being used. Fishing regulations are in place, which prohibit the intentional or accidental harvest of bull trout, with regulatory signage prominent along the roadways at all major access points to the Forest corridor.

Brook trout, introduced for angling purposes, occur throughout the Forest and are especially prevalent on the west side of the Forest. Brook trout are thought to have originated from fish introduced in alpine lakes and stocked streams by State and Federal resource agencies and private individuals during the 1940s and 1950s. Bull trout x brook trout hybrids have been observed on the Forest.

Restoration Activities at Stream Crossings (Stream Crossing Programmatic)

The 2012 Restoration Activities at Stream Crossings (Stream Crossing Programmatic) consultation (Reference #01EIFW00-2012-F-0015) covers the effects of five road/stream crossing activity categories:

- Culvert removal and associated channel rehabilitation;
- Culvert, bridge, or ford replacement with a bridge;
- Culvert or ford replacement with a culvert or open-bottomed arch;
- Culvert replacement with low-water trail ford; and
- Programmatic project maintenance - maintenance actions include removal of debris (not sediment) that has accumulated at stream crossing structures or inlets during flood events, and that has been determined to obstruct fish passage or pose threats to the integrity of the road crossing.

Through this consultation and the associated Biological Opinion, the Service determined that these activities would not jeopardize the survival and recovery of bull trout nor result in destruction or adverse modification of designated critical habitat.

Water Quality

Water quality varies throughout the analysis area from streams with excellent water quality to streams with impaired water quality (i.e., functioning appropriately (FA), functioning at risk (FR), functioning at unacceptable risk (FUR)). Streams with excellent water quality are generally located within headwater sections of streams, and more streams with impaired water quality are generally within the lower sections of streams. Streams within the action area are impacted by grazing, mining, timber removal, and road building. High levels of natural sediment exacerbate these impacts in many areas. There are some streams (e.g., in the Brownlee and Weiser watersheds) that have a high amount of sediment. Temperatures in many streams of the analysis area are, for the most part, functioning poorly for cold water species (USFS 2018), while temperatures in the Main Salmon are in good condition and functioning appropriately for bull trout (USFS 2018). Increases in water temperature may cause a shift in the thermal suitability of aquatic habitats (Poff et al. 2002). For species that require colder water temperatures to survive and reproduce, warmer temperatures could lead to significant decreases in available suitable habitat. Increased frequency and severity of flood flows during winter can affect incubating eggs and alevins in the streambed and overwintering juvenile fish. These effects are expected to exist throughout the action area because of the FR to FUR ratings for road density and disturbance regime watershed indicators reported in Table 6 below. Eggs of fall spawning fish, such as bull trout, may suffer high levels of mortality when exposed to increased flood flows (Independent Scientific Advisory Board 2007).

Watershed and Habitat Conditions

Watershed and habitat conditions on the Forest are largely influenced by actions on these Federal lands. Legacy (or past) mining, livestock grazing, recreation, road management, and timber harvest have influenced conditions across the Forest. These actions have resulted in sediment delivery to streams, altered riparian vegetation, less potential wood sources, altered stream channels, reduced pools and off-channel habitats, and reduced stream connectivity. Water diversions for irrigation and other uses also occurs throughout the action area. These water diversions contribute to decreased mainstem river flows and contribute to elevated summer water temperatures which may affect down river segments occupied by bull trout.

Historical mining activity was widespread and remains so throughout the Salmon River drainages on the Forest. Most current mining activity is localized and very small scale, but some large-scale mining interest still remains. All of the effects of mining on Forest lands have been analyzed under previous section 7 consultations.

Human-related development along the tributaries and unstable geology has also exacerbated habitat damage during past and recent flooding events. Rock structures such as riprap and other stream stabilization projects further constricted stream channels and may reduce in-stream habitat quality for rearing and migrating bull trout. Recreation and fire suppression have also influenced the watersheds on the Forest. In general, these activities result in ground disturbance and vegetation removal and increase the potential for erosion and sediment delivery to stream channels. In addition, recreational motorized vehicle use is very popular across the Forest, which is usually within the scope of the Forest Travel Plan; however, evidence of illegal motorized recreational vehicle use has been found in areas closed to this activity. Ground disturbance, fording of streams, and creation of new, unauthorized trails have caused resource damage in areas of both authorized and unauthorized use.

Grazing is widespread and ongoing although levels of use have decreased greatly from historical highs. Even in areas where grazing has been reduced, there are lingering effects of historical grazing practices on hillslope stability and erosion, as well as current, ongoing effects on streambank stability, channel conditions, riparian vegetation conditions, plant diversity, and weed distribution.

Table 6. Baseline conditions for relevant watershed indicators. Note that the watersheds are defined by jurisdictional boundaries and only indicate the portions on Payette National Forest Lands. Ratings range from functioning acceptably (FA) to function at risk (FR) to functioning at unacceptable risk (FUR).

Watershed Condition Indicator	Brownlee	Weiser	Little Salmon SW	Main Salmon SW	Main Salmon SE	Middle Fork Salmon	South Fork Salmon
Subpopulation Size	FA-FUR	FA-FR	FA-FUR	FR-FUR	FR	FR	FA-FR
Growth and Survival	FR-FUR	FA-FR	FA-FUR	FR	FR	FR	FR
Life History Diversity and Isolation	FUR	FUR	FR	FR-FUR	FA	FA-FR	FA-FR
Persistence and Genetic Integrity	FUR	FR-FUR	FR	FR-FUR	FA	FA-FR	FR

Watershed Condition Indicator	Brownlee	Weiser	Little Salmon SW	Main Salmon SW	Main Salmon SE	Middle Fork Salmon	South Fork Salmon
Temperature (Bull trout)	FR	FR-FUR	FA-FR	FA-FUR	FA	FA-FR	FR-FUR
Sediment/ Turbidity (Bull trout)	FR-FUR	FR-FUR	FR	FR	FA	FA-FR	FA
Chemical Contaminants/ Nutrients	FA-FR	FA-FR	FA	FA-FUR	FA	FA	FA-FUR
Physical Barriers	FUR	FR-FUR	FA-FR	FA-FR	FA	FA-FR	FA-FR
Substrate Embeddedness	FR	FA-FR	FR	FA-FR	FA	FA-FR	FA
Large Woody Debris	FA-FR	FA	FA	FA-FR	FA	FA	FA
Pool Frequency and Quality	FA	FA-FR	FA	FA-FR	FA	FA	FA-FR
Large Pools/Pool Quality	FR-FUR	FR	FA	FA-FR	FA	FA	FA
Off-Channel Habitat	FA-FR	FR	FA	FA-FR	FA	FA	FA-FR
Refugia (Bull trout)	FUR	FUR	FA-FR	FR-FUR	FA	FA	FR
Wetted Width/ Maximum Depth Ratio	FA	FA-FR	FA	FA-FR	FA	FA	FA
Streambank Condition	FA-FR	FA-FR	FA-FR	FA-FR	FA	FA	FA-FR
Floodplain Connectivity	FR	FA-FUR	FA-FR	FA-FUR	FA	FA	FR
Change in Peak/Base Flows	FR-FUR	FR-FUR	FA-FR	FA-FUR	FA	FA-FR	FA-FR
Change in Drainage Network	FR-FUR	FR-FUR	FA-FR	FA-FR	FA	FA-FR	FA-FR
Road Density and Location	FUR	FUR	FA-FUR	FR-FUR	FA	FA-FR	FR-FUR
Disturbance History	FR-FUR	FA-FUR	FA-FR	FR-FUR	FA	FA-FR	FR
Riparian Conservation Areas	FR	FR-FUR	FA-FR	FA-FUR	FA	FA-FR	FA-FUR
Disturbance Regime	FR	FR-FUR	FA-FR	FA-FUR	FA	FA	FA-FUR
Integration of Species and Habitat Conditions	FUR	FUR	FA-FR	FA-FUR	FR	FR	FR

Based on an analysis of the baseline conditions for selected physical watershed indicators, there is a range in the condition of the streams on the Forest. The best conditions are estimated to be within the Main Salmon SE watershed, with the other Salmon River tributaries in intermediate conditions; and the lowest conditions, with the most indicators in an "at risk" category, are within the Weiser River watershed. Even with these varying conditions, the fish population within the Forest area is estimated to be increasing. With the relatively recent improvements in road and trail, and grazing management, watershed conditions are likely to improve, which should support these increasing population trends. Even with many of the habitat indicators categorized as either functioning at risk or functioning at unacceptable risk, many bull trout populations appear to be on an improving trend. This apparent contradiction is likely the result of the lag time between improvement in forest and riparian management and recorded improvements in in-stream habitat conditions (Beechie et al. 2010). One exception is the Weiser River, where bull trout numbers are recognized as in steady decline and the prospects for species recovery are grim.

2.4.2 Bull Trout Critical Habitat

2.4.2.1 Status of Bull Trout Critical Habitat in the Action Area

The Service published a final rule designating critical habitat for bull trout range wide on October 18, 2010 (effective November 17, 2010). Designated critical habitat has been classified primarily as spawning and/or rearing habitat or overwintering habitat. All nine PBFs are present in the entire action area.

Brownlee Reservoir

The Brownlee Reservoir watershed includes the Wildhorse Critical Habitat Subunit (CHSU) and the Indian Creek CHSU of the Hells Canyon Complex CHU [CHU 19], one of 32 CHUs. Within the CHU there are three subunits, including the Pine Creek CHSU in Oregon (not part of the action area). Bear Creek from its confluence with Crooked River upstream 20.4 km (12.7 mi) to its confluence with Little Bear Creek contains overwintering habitat. Crooked River from its confluence with Bear Creek upstream 9.6 km (6.0 mi) to its confluence with Dick Ross Creek contains overwintering habitat (USFWS 2010c pp. 506). Indian Creek from its confluence with the east bank of the Snake River within the Oxbow Bypass upstream 26.3 km (16.3 mi) to its confluence with Camp Creek contains overwintering habitat; Indian Creek from its confluence with Camp Creek upstream 3.3 km (2.1 mi) to its headwaters provides spawning and rearing habitat; and Camp Creek from its confluence with Indian Creek upstream 3.7 km (2.3 mi) to its headwaters provides SR habitat (USFWS 2010c).

Deep Creek

Deep Creek is included in the Mainstem Snake CHU (CHU 23), but is not designated as critical habitat for bull trout. Deep Creek flows into the Snake River below Hells Canyon Dam and the Snake River mainstem from the confluence with the Columbia River upstream 451.7 km (280.6 mi) to Brownlee Dam provides essential overwintering habitat and connectivity for at least 10 bull trout core areas and the Middle Columbia River and Upper Snake River RUs. Critical habitat includes the free-flowing reaches of the Snake River and the reservoirs to the ordinary high water elevations and normal operating pool elevations, respectively (USFWS 2010c).

Weiser River

Weiser River is part of the Southwest Idaho Basins CHSU and is part of the Upper Snake River RU. The East Fork Weiser River from its confluence with the Weiser River upstream 24.5 km (15.2 mi), and including Dewey Creek, to its headwaters provides SR habitat. The Upper Little

Weiser River, Anderson Creek, and Sheep Creek are also designated as critical habitat with some SR habitat available.

Little Salmon River

The Little Salmon River watershed is part of the Upper Snake River RU and the Little Lower Salmon River CHSU. Located within Idaho, Adams, and Valley counties in west-central Idaho immediately southeast of the town of Riggins, Idaho, designated critical habitat includes 472.7 km (293.7 mi) of streams. The action area currently provides SR habitat and overwintering habitat. (USFWS 2010c)

Main Salmon River

The Main Salmon River watershed on the Forest is located within the Upper Snake River RU and the Salmon River Basin Unit (CHU 27), one of 32 designated CHUs. Within the CHU there are 10 CHSUs, including the Middle Salmon River-Chamberlain River CHSU. Located within Idaho and Valley counties in east-central Idaho 80 km (50 mi) east of the town of Riggins, Idaho, designated critical habitat includes 793.7 km (493.2 mi) of streams. The action area currently provides SR habitat and overwintering habitat. (USFWS 2010c)

South Fork Salmon

The South Fork Salmon River CHSU is located in Idaho and Valley counties in central Idaho and includes 758 miles of streams and 640 acres of lake surface area. This CHSU includes overwintering habitat in the South Fork Salmon River, from its confluence with the Salmon River upstream 128.7 km (80 mi), and SR habitat from its confluence with Tyndall Creek upstream to its headwaters.

The East Fork South Fork Salmon River from its confluence with South Fork Salmon River upstream 52.2 km (32.5 mi) to its headwaters provides SR habitat (USFWS 2010c). Although the Yellowpine Pit Lake is included in this reach of SR habitat, the lake itself is used for foraging, migrating, and overwintering, not for spawning.

Middle Fork Salmon River

The Middle Fork Salmon River CHSU is essential to bull trout conservation because it contains the largest number of local populations, a high number of individuals, a large amount of habitat, and few threats. This CHSU also has fluvial life history forms that are important to the long-term recovery of the species. Big Creek, from its confluence with the Middle Fork Salmon River upstream 20 km (12.4 mi) to its headwaters, provides spawning, rearing, and overwintering habitat for bull trout. Logan Creek provides 13.4 km (8.3 mi) of spawning and rearing bull trout habitat and flows into Big Creek. The Middle Fork of Smith Creek, Smith Creek, and the South Fork of Smith Creek provide 3.7, 10.0, and 4.8 km (2.3, 6.2, and 3.0 mi), respectively, of SR bull trout habitat.

Designated bull trout critical habitat in the action area has been classified primarily as SR habitat, with a stretch of overwintering habitat in Lower Big Creek upstream to Cave Creek; there is also some apparently unclassified habitat (as overwintering or SR) in the watershed (USFWS 2010c).

2.4.2.2 Factors Affecting Bull Trout Critical Habitat in the Action Area

The same factors that have direct or indirect effects on bull trout in the action area also have direct or indirect effects on the PBFs of critical habitat. The Matrix of Pathways and Indicators (MPI) provides a means to assess the baseline condition of the PBFs in the action area and the effects of the proposed ongoing action on the PBFs as described in the Assessment. Table 7 provides more context on how the MPIs and PBFs relate to on another. The purpose of this matrix is to aid in making effects determinations for proposed projects on the nine PBFs for bull trout. These PBFs correspond to many of the matrix habitat parameters. A more detailed description is provided in a Service document entitled Crosswalk between the Bull Trout Matrix and Bull Trout Critical Habitat Primary Constituent Elements (USFWS 2011).

Changes in hydrology and temperature caused by changing climate have the potential to negatively impact aquatic ecosystems in Idaho, with salmonid fishes being especially sensitive. Average annual temperature increases due to increased carbon dioxide are affecting snowpack, peak runoff, and base flows of streams and rivers (Mote et al. 2003). Increases in water temperature may cause a shift in the thermal suitability of aquatic habitats (Poff et al. 2002). For species that require colder water temperatures to survive and reproduce, warmer temperatures could lead to significant decreases in available suitable habitat. Increased frequency and severity of flood flows during winter can affect incubating eggs and alevins in the streambed and over-wintering juvenile fish. Eggs of fall spawning fish, such as bull trout, may suffer high levels of mortality when exposed to increased flood flows (Independent Scientific Advisory Board 2007).

Table 7. Crosswalk between PBFs and Matrix of Pathways and Indicators

Diagnostic Pathway/ Watershed Condition Indicator	PBF 1 Springs, seeps ground-water	PBF 2 Migratory Habitats	PBF 3 Abundant Food Base	PBF 4 Complex Habitat	PBF 5 Water Temps	PBF 6 Substrate Features	PBF 7 Natural Hydrograph	PBF 8 Water Quality and Quantity	PBF 9 Predator Competition
Water Quality									
Temperature		X	X						
Sediment		X	X			X			
Chemical Contaminants & Nutrients	X	X	X						
Habitat Access									
Physical Barriers	X	X	X						X
Habitat Elements									
Substrate Embeddedness	X		X			X			
Large Woody Debris				X		X			
Pool Frequency and Quality			X	X		X			
Large Pools				X	X				

Off-Channel Habitat				X					
Refugia		X			X				
Channel Conditions and Dynamics									
Wetted Width/Depth Ratio		X		X	X				
Streambank Condition	X			X	X	X			
Floodplain Connectivity	X		X	X	X		X	X	
Flow/ Hydrology									
Changes in Peak/Base Flows	X	X			X		X	X	
Drainage Network Increase	X						X	X	
Watershed Conditions									
Road Density/Location	X				X		X		
Disturbance History/Regime				X			X	X	
Riparian Conservation Areas	X		X	X	X		X		

2.4.3 Northern Idaho Ground Squirrel

2.4.3.1 Status of the Species within the Action Area

Currently, the NIDGS is known to occur on the Council and New Meadows Ranger Districts (i.e., Brownlee, Little Salmon, and Weiser watersheds; Figures 6 and 7), in addition to private, State, and county lands adjacent to Forest land. The NIDGS is on approximately 3,497 acres in the action area (Table 8). Most of this habitat is not used for reproduction/burrow development by NIDGS, rather it is used by the NIDGS for foraging and movement between colonies. The NIDGS is known to occur in 60 locations at this time, and the current population estimate of 2,120 (IDFG 2017) adults and yearlings is slightly lower than the estimates in 2016. For purposes of this Opinion, our effects analysis focuses on the species range and acreages identified in Table 8. Figure 6 depicts known colonies and potential NIDGS habitat.

In 2017, IDFG completed the fourth full year of the new long-term population monitoring strategy for the species. The monitory strategy uses a rotating panel design for sampling 1,757 grid cells (100-meter by 100-meter) across all known occupied habitat. Twenty percent fewer NIDGS groups were detected in 2017 versus 2016, though this change in NIDGS abundance was not statistically significant. The sampling design assumes that a representative sample is taken each year, even though the grids selected, and thus the transect lines surveyed, vary. Therefore it is possible that one year's panel of cells encompasses fewer NIDGS than other years, which provides fewer detections on which to base estimates of population. The lower numbers of individuals observed in 2017 could therefore have been due to the change in cells surveyed, rather than a change in the actual number of individuals. The 2017 monitoring results reported

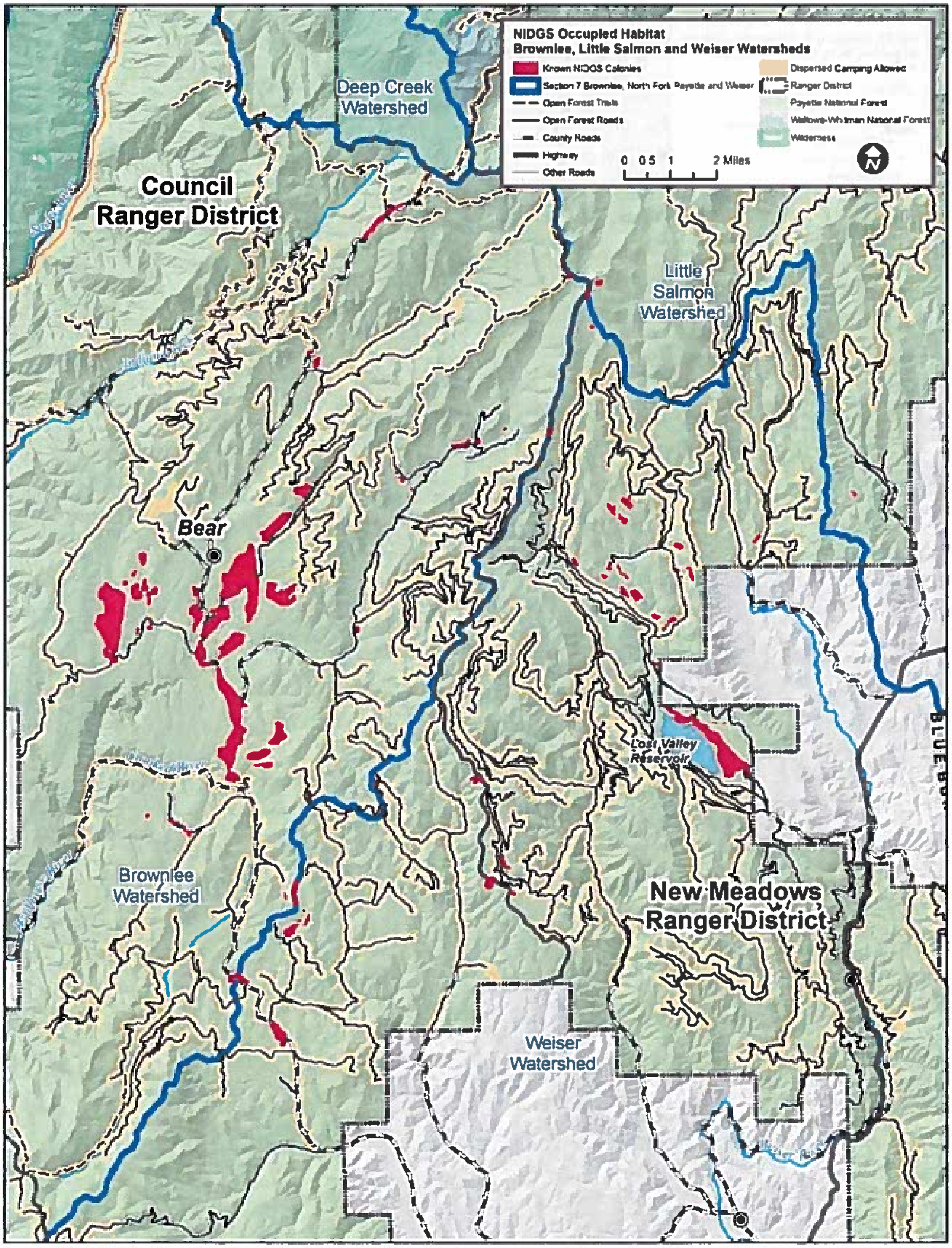

Figure 6. Occupied NIDGS habitat in the Brownlee, Weiser, and Little Salmon watersheds.

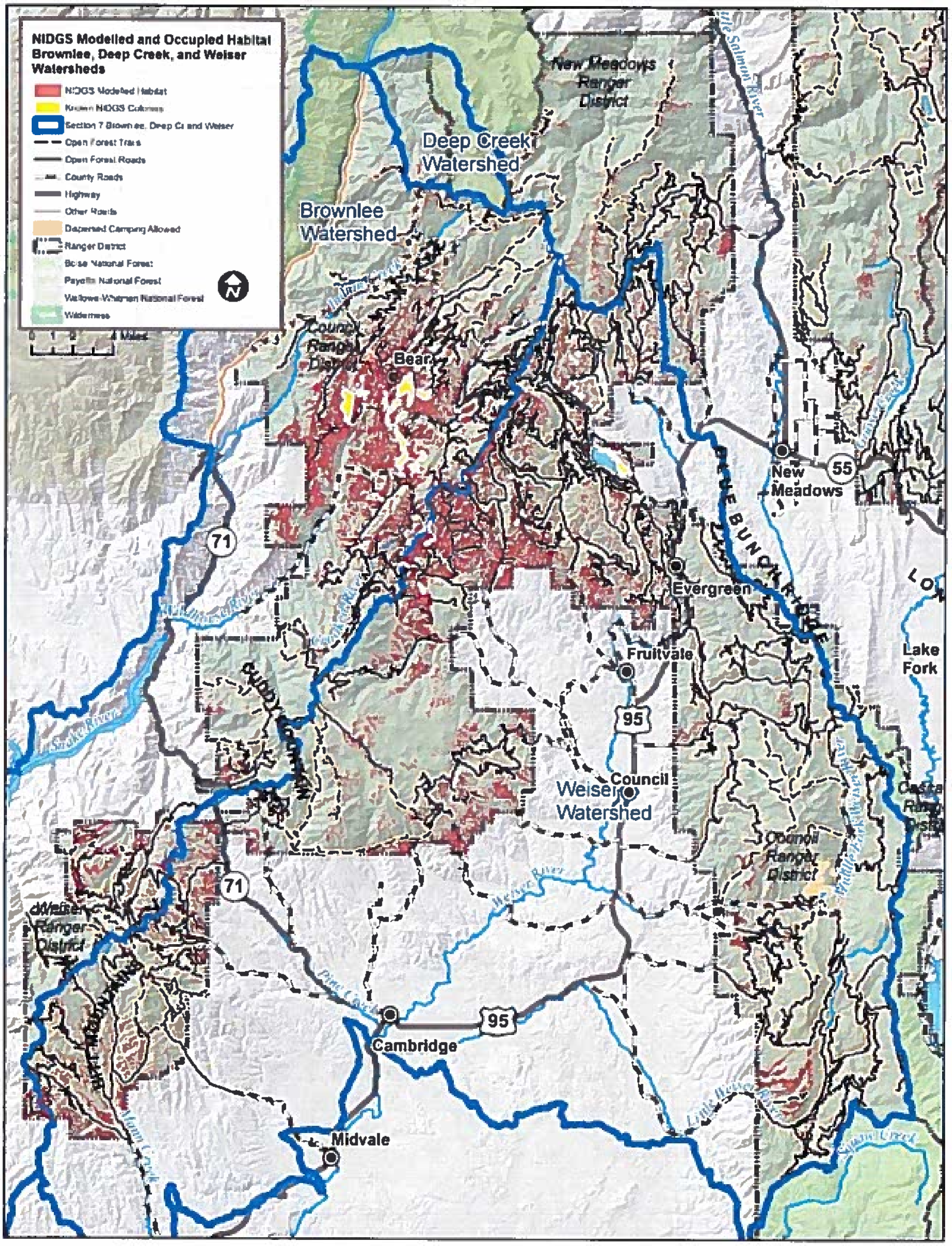

Figure 7. Occupied and modeled NIDGS habitat in the Brownlee, Deep Creek, and Weiser watersheds.

an estimated density of 1.21 squirrels per hectare and a total population size of 2,120 squirrels (95 percent confidence interval: 1,879–2,444 squirrels) (IDFG 2017). The IDFG applied an adjustment factor of 1.35 to their density estimate to yield an adjusted index of NIDGS abundance of 2,862 squirrels in 2017 (IDFG 2017). The adjustment factor was needed to tease out error in observations. The adjustment factor was calculated by comparing abundance estimates from line-transect surveys and mark-recapture at 10 sites in 2016 (IDFG 2016).

The decline of NIDGS throughout the 1980s and 90s was attributed primarily to changes to and loss of habitat that resulted in isolated populations. It was also hypothesized that land conversion and fire suppression resulted in poorer quality forage (Yensen 2004). Given the extremely low population levels and disjunct and isolated habitat that presently occurs, population viability is still a concern for this species (USFWS 2017).

The data in Tables 8 and 9 represent the existing condition in occupied and modeled NIDGS habitat. These conditions are being analyzed as a result of the ongoing use of roads and trails as described in the proposed ongoing action. Tables 9 and 10 display miles of motorized access for open roads, motorized trails, and access for dispersed camping (300 feet off of designated roads and 100 feet off of designated trails), based on the 2017 MVUM summary provided in the Assessment, for occupied and modeled habitat, respectively.

The largest amount of occupied habitat for NIDGS on the Forest, 1,257.5 acres, is located in the Brownlee watershed in close proximity to Bear, Idaho (Figure 6).

Table 8. Occupied and modeled NIDGS habitat, by land ownership (e.g., Payette National Forest (PNF)) and watershed (2017).

Watershed	Land Ownership	Occupied Habitat (Acres)	Modeled Habitat (Acres)
Brownlee	PNF	1,257.5	22,290.1
Brownlee	Private	1,271.5	7,898.2
Brownlee	State	0	169.8
Deep Creek	PNF	0	164.1
Deep Creek	Private	0	12.7
Little Salmon	PNF	19.8	4,293.5
Little Salmon	Private	131	978.5
Main Salmon SW	PNF	0	272.6
Middle Fork Tributaries	PNF	0	13.9
North Fork Payette	PNF	0	958.1
South Fork Salmon	PNF	0	978.3
South Fork Salmon	State	0	18.5
Weiser	PNF	764.8	31,479
Weiser	Private	52.1	3,456.6
Weiser	State	0.57	3,519

Total Acres		3,497.2	76,502.7

On the Forest, there are 14.4 acres of open roads, 0.6. acres of motorized trails, and 19.9 acres of dispersed camping access that bisect or intersect occupied habitat (Table 9). The highest overlap, approximately 11 acres, exists in dispersed camping areas in occupied habitat located in the Brownlee Watershed.

Table 9. Acres of motorized access on PNF lands, in occupied NIDGS habitat, by watershed.

Watershed (Name)	Occupied NIDGS Habitat (Acres)	Open Roads (All)[1] (Acres)	Motorized Trails[2] (Miles)	Dispersed Camping Access (Roads/Trails combined) (Acres)
Brownlee	1,257.5	4.4	0.6*	11*
Deep Creek	0	0	0	0
Little Salmon	19.8	0	0	0
Main Salmon SW	0	0	0	0
Middle Fork Salmon River	0	0	0	0
North Fork Payette	0	0	0	0
South Fork Salmon	0	0	0	0
Weiser	764.8	10	0	8.9*
Total Acres	2,042.1	14.4	0.6	19.9

[1]Roads open to all vehicles, seasonal road designations, including 40-foot buffer.
[2]Trails open to all vehicles, including motorcycles, including 20-foot buffer.
*Resulting acreage from road and trail buffers.

There are 626.5 acres of open roads, with 42.5 acres of motorized trails and 6,788 acres of dispersed camping access in modeled NIDGS habitat on the Forest (Table 10). The highest amount of open roads exist in the Weiser watershed, an area with a fairly high amount of public use.

Table 10. Acres of motorized access, on Payette National Forest lands, in modeled NIDGS habitat, by watershed (2017).

Watershed (Name)	Modeled NIDGS Habitat (Acres)	Open Roads (All)[1] (Acres)	Motorized Trails[2] (Acres)	Dispersed Camping Access (Roads/Trails combined) (Acres)
Brownlee	22,290.1	197.7	18.3	2,414
Deep Creek	164.1	0	0.1	0.9
Little Salmon	4,293.5	36.7	7.4	319.5
Main Salmon SW	272.6	0	0.6	6.4
Middle Fork Salmon River	13.9	0	0	0

North Fork Payette	958.1	0	0.9	8.7
South Fork Salmon	978.3	0	0.4	3.5
Weiser	31,479	392.1	14.8	4,034.9
Total Acres	60,449.60	626.5	42.5	6,788

[1]Roads open to all vehicles, roads open to highway legal vehicles, seasonal road designations, including 40-foot buffer.
[2]Trails open to all vehicles, including motorcycles, including 20-foot buffer.
*Resulting acreage includes road and trail buffers.

2.5 Effects of the Ongoing Proposed Action

Effects of the action consider the direct and indirect effects of the proposed ongoing action on bull trout, NIDGS, and designated bull trout critical habitat, together with the effects of other activities that are interrelated or interdependent with the proposed ongoing action. These effects are considered along with the environmental baseline and the predicted cumulative effects to determine the overall effects to the species. Direct effects are defined as those that result from the proposed ongoing action and directly or immediately impact the species or its habitat. Indirect effects are those that are caused by, or will result from, the proposed ongoing action and are later in time, but still reasonably certain to occur. An interrelated activity is an activity that is part of the proposed ongoing action and depends on the proposed ongoing action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation.

2.5.1 Bull Trout

2.5.1.1 Direct and Indirect Effects of the Ongoing Proposed Action on the Bull Trout

After examining the effects analysis/discussion in the Assessment and its supporting materials, and considering the Forest's conservation measures and project design features, the Service has determined that the primary anticipated or potential effects of implementing the proposed ongoing action on bull trout are: (1) exposure of bull trout life stages to contaminants introduced into streams from motorized vehicles crossing stream segments; (2) exposure of bull trout life stages to direct disturbance or mortality caused by stream crossing use; (3) exposure of bull trout life stages to potential suspended and deposited sediment effects due to both stream crossing use and the presence of roads and trails within a watershed; and (4) interrelated and interdependent actions which will expose bull trout life stages to adverse effects caused by dispersed recreation and road maintenance. While the potential for these effects to impact individual bull trout exist, no population-level effects to the species are expected for the reasons discussed below. It is not possible to count the number of individual fish or eggs that could be adversely affected as a result of the proposed ongoing action. Therefore, as a practical matter, we are unable to estimate the number of individuals of each bull trout life stage likely or potentially exposed to the stressors identified above. For that reason, the Service is using a surrogate to establish the extent of adverse effects; for the purposes of this analysis, we are using the amount of habitat subject to exposure to the stressors identified above.

Chemical Contamination Effects

Vehicles crossing streams can potentially contaminate water from fuel leaks and lubricants or other automotive fluids that wash off the vehicle or drip into the water. Trace amounts of these chemicals are likely to be introduced with most crossings, but the expected low concentrations and infrequent occurrences of additions of these contaminants to water are an insignificant risk to fish or other aquatic species. Petroleum-based contaminants can cause chronic sublethal effects to aquatic organisms (Neff 1985). Fuels and petroleum products are moderately-to-highly toxic to salmonids, depending on concentrations and exposure time. Free oil and emulsions can adhere to gills and interfere with respiration, and heavy concentrations of oil can suffocate fish. Petroleum-based contaminants such as fuel, oil, and some hydraulic fluids are much lighter than water and do not readily mix with water. Evaporation, sedimentation, microbial degradation, and hydrology act to determine the fate of fuels entering fresh water (Saha and Konar 1986). Ethylene glycol (the primary ingredient in antifreeze) has been shown to result in sublethal effects to rainbow trout at concentrations of 20,400 milligrams/liter (mg/L) (Staples 2001). Brake fluid is also a mixture of glycols and glycol ethers, and has about the same toxicity as antifreeze. Even though petroleum based products are toxic to fish, the low frequency of additions and likely trace concentrations in the water due to vehicle stream crossings is an insignificant risk to bull trout.

Disturbance Effects and Direct Mortality of Individuals at Ford Stream Crossings

The proposed ongoing action will not change the existing density of roads or the numbers of crossings within the action area. There are two fords remaining on roads open to the public which cross streams that may be occupied by bull trout. These are NFS road 346/Warren Creek and NFS road 373/North Fork Smith Creek. The NFS road 346/Warren Creek ford is believed to be a low risk for direct impacts to bull trout because of downstream potential natural barriers and high summer stream temperatures. The 373/North Fork Smith Creek ford is approved to be replaced in the future with an aquatic organism passage structure, which will eliminate direct impacts to individuals from fording. Although there are adverse effects possible, these are expected to be short-term in nature because this ford is currently proposed to be upgraded and will eliminate the potential for these adverse effects. Furthermore, at the 373/North Fork Smith Creek ford, fin clip data in 2015 showed that westslope cutthroat trout were the only native species present at or immediately downstream of the ford (USFS 2018), because bull trout have not been detected in recent surveys, effects to bull trout are considered less likely.

There are 140 crossings accessed by motorized and non-motorized travelers (e.g., horseback) in known spawning habitat for bull trout (Table 5), and because the Forest does not have a complete inventory to determine how many are fords and how many have trail bridges, we need to assume that there is the potential for adverse effects at all of these 140 crossings. Continued authorization of motorized use, in particular, of these crossings may harass or possibly harm all bull trout life stages through direct exposure to the presence of motorized vehicles. It is possible that the vehicles crossing streams could crush juvenile fish or redds if they are present. It is very unlikely that adult fish would be crushed because they are mobile and would most likely move out of a vehicle's path. The proposed ongoing action includes seasonal road closures, the majority of which occur from September 30 to May 1 (USFS 2018). Some roads and trails are closed from November 30 to May 1. Bull trout typically spawn from August to November during periods of decreasing water temperatures. Fry normally emerge from early April through May depending upon water temperatures and increasing stream flows (Pratt 1992). Therefore, the road closures would protect a majority of the spawning season and extend through fry emergence. In addition to the habitat being unsuitable for spawning and marginal for rearing, the spring high flows may make some ford stream crossings difficult for vehicles during the spring prior to fry emergence. While crushing juvenile fish or redds is an adverse effect to individuals, due to the poor habitat, seasonal closures, high spring flow, and low number and likely low frequency of vehicle crossing, it is likely that only a few individuals would be killed or harmed. It will be difficult to measure affected individuals because eggs, fry, and juvenile fish are small, difficult to detect, may be hidden in the interstitial spaces in the gravels, and if killed would likely be washed downstream immediately.

Indirect disturbance may also be occurring at these crossings because bull trout may both see and hear motorized vehicles crossing at fords. Because sound waves are amplified in aquatic environments (Slabbekoom et al. 2010), we expect that bull trout will be impacted at a greater distance from the sound of motor vehicles at the fords than from the sight of these vehicles. This distance is dependent upon ambient background noise (e.g., riffles, rapids, falls), the number of vehicles crossing, size of the vehicles, and engine noise levels. Hawkins and Johnstone (1978) surmise that Atlantic salmon (*Salmo salar*) can "detect footfalls on the bank, perhaps at considerable distances from the source." Unfortunately, these authors did not quantify this distance. At the other extreme of sound level and detection distance, Amoser et al. (2004) conclude that char in a lake environment can hear power boat noise at distances up to 400 m (1,312 ft). Given that there is probably considerable background noise (e.g., riffles) at the fords and vehicle noise will be less than that from power boats, we will conservatively use 300 feet as the distance at which bull trout may hear and be disturbed by vehicle traffic at the fords. Disturbance could cause bull trout to move from preferred locations in the stream, thereby reducing feeding, or increasing predation risk or energy demands. We anticipate that individuals within 300 feet of fords are likely to be adversely affected by use of these fords, but these adverse effects will be limited to short stream sections, occur infrequently, and be of short duration. It is also expected that some disturbance and direct trampling could occur on non-motorized trails from horse travel, if the horse if fording in occupied bull trout habitat.

Fish Passage at Stream Crossings

Little information was presented in the Assessment related to passage or culvert inventories on all authorized roads and trails. The Forest actively monitors culverts for barriers and has prioritized upgrading passage barriers in occupied bull trout habitat as directed by their Land Resource Management Plan. Because the Assessment reports that there will be no effect to passage of bull trout as a result of implementing this proposed ongoing action (USFS 2018), we have made the assumption that no new passage barriers will develop on authorized roads and trails because of culverts or bridges that need to be upgraded in bull trout habitat (i.e., all upgrades will assure passage criteria are met).

Sediment Related Effects

Deposited and suspended sediment are very important stressors to salmonids and can affect them in both direct and indirect ways. Increased deposited and suspended sediments have the potential to affect primary production and benthic invertebrate abundance due to reductions in photosynthesis within murky waters, or due to filling the interstitial spaces among streambed gravels, which is habitat for benthic invertebrates. Thus, food availability for fish may be reduced as sediment levels increase (Lloyd et al. 1987 and Henley et al. 2000). Pools, which are an essential habitat type, can be filled by deposited sediment and degraded or lost (Megahan 1982).

Sediment can also reduce health of in-stream plants, reducing cover for fish and making them more vulnerable to predation (Waters 1995). Increases in suspended sediment have been shown to affect salmonid behavior in several ways. Social and feeding behavior can be disrupted by increased levels of suspended sediment. Fish may avoid high concentrations of suspended sediments altogether (Hicks et al. 1991). Even small elevations in suspended sediment may reduce feeding efficiency and growth rates of some salmonids (Sigler et al. 1984).

Newcombe and Jensen (1996,) and Bash et al. (2001) provide syntheses of research that has been conducted on the effects of suspended sediment on the physical condition of salmonids. Newcombe and Jensen (1996) report that suspended sediment concentrations of 500 mg/l for 3 hours caused signs of sublethal stress in adult steelhead, which we would also expect for bull trout. If suspended sediment concentrations reach 3,000 mg/l for up to an hour, it may cause moderate physiological stress (Newcombe and Jensen 1996), and could result in gill trauma and/or temporary adverse changes in blood physiology such as elevated blood sugars, plasma glucose, or plasma cortisol (Servizi and Martens 1987; Servizi and Martens 1992; Bash et al. 2001). Lethal effects can occur if suspended sediment concentrations reach 22,026 mg/l at any one time, or remain at concentrations of 3,000 mg/l for 3 hours (Newcombe and Jensen 1996).

Sediment introduced into streams does not just adversely affect fish at an individual physical level but can adversely affect fish populations. Deposition of silt on spawning beds can fill interstitial spaces in spawning areas with sediment (Phillips et al. 1975; Myers and Swanson 1996; Wood and Armitage 1997), impeding water flow, reducing dissolved oxygen levels, and restricting waste removal, which reduces the survival of fish embryos (Chapman 1988; Bjornn and Reiser 1991).

Sediment Related Effects Due to the Use of Roads and Trails

Sediment yield from roads surfaces and cut banks is influenced by road use, and more frequently used roads produce more sediment than unused roads (Reid and Dunne 1984). Reid and Dunne (1984) state that road maintenance undoubtedly influenced the amount of sediment produced by heavily used roads but road maintenance was not isolated in their study, so they could not differentiate between road use and road maintenance. The Forest has completed programmatic consultation with the Service on road and trail maintenance as part of previous consultations. Adverse effects are expected from these maintenance activities due to altered water quality associated from elevated deposited and suspended sediment (turbidity). Road maintenance work as well as the use of the current system of roads and trails will likely deliver temporary pulses (lasting minutes to hours) of sediment to streams, although the majority of this sediment generated during road maintenance or road use would not be delivered to the stream until subsequent rain events. While maintenance activities add sediment to streams, regular road maintenance is critical to reducing the amount of sediment delivered to streams from road networks mainly because during maintenance, drainage problems are corrected before large sediment producing failures occur.

As stated earlier, the proposed ongoing action does not include any increases to the road network, road densities, or stream crossings, so the existing baseline conditions are expected to persist. There are 734.87 miles of authorized roads in the action area that are within RCAs. Where sediment data is available, the watersheds in the action area are either functioning acceptably or at risk (e.g., Little Salmon and Main Salmon watersheds), although the Weiser and Brownlee watersheds are functioning at unacceptable risk in the Anderson Creek and Wildhorse River subwatersheds, respectively (Table 6 and USFS 2018). While we do not know the amount of sediment entering the stream network due to roads and road-related activities, the amount of sediment entering streams is unlikely to be increasing over time, based on the above described conditions (no increases to road network, road densities, or stream crossings). Given that bull trout populations seem to be increasing in many project area streams, it seems likely that currently sediment is having only limited adverse effects to in-stream habitats. Because upstream sediment inputs to streams accumulate in downstream depositional areas, and downslope and downstream sediment movement and deposition is a complex process related to seasonal (e.g., snowmelt and in-stream high flows) and stochastic (e.g., flood and landslide) events, it is difficult to measure road-related sediment and its impacts to bull trout. We, therefore, conclude that deposited and suspended sediment generated by the use of the existing road network may have adverse effects on individual fish, but not to bull trout populations at the RU scale, especially in areas where the conditions are currently functioning at unacceptable risk and bull trout are present.

Sediment Related Effects at Ford Stream Crossings

Sediment related effects of the proposed ongoing action that occur as a result of vehicular use primarily occur where vehicles are driven through stream ford crossings. There are two full vehicle fords and up to 140 trail fords that are in habitat possibly occupied by bull trout. Potential sediment related effects at these crossings include generation of turbidity caused by suspended sediment.

As a result of increased turbidity, adult and juvenile bull trout downstream from road crossings may avoid or reduce their exposure to turbidity by swimming to adjacent, less turbid habitat. Although the effects are not expected to result in mortality, these effects are likely to result in injury because bull trout normal behavior may be disrupted. Non-lethal adverse effects to juveniles may also occur as a result of increased turbidity leading to physiological stress and increased exposure to predators. Because road-stream crossings are areas that are subject to direct impacts from road use, we reviewed applicable monitoring data and found that measured harmful concentrations of suspended sediments occurred within 300 feet downstream of road maintenance activities and 600 feet downstream of culvert replacement projects (USFWS 2006; USFWS 2008).

Sediment and turbidity effects from a vehicle ford would typically be less in volume but could potentially extend downstream similar to road maintenance activities depending upon recent sediment transport events, size and number of vehicles, associated trailers, depth of water washing accumulated sediment off of crossing vehicles, etc. Therefore, we assume that the adverse effects associated with each crossing over bull trout habitat will be limited to the footprint of the crossing and downstream a specific linear distance. For vehicle ford crossings we selected 300 feet downstream and for single-track crossings we selected 100 feet downstream. We selected a smaller amount for single-track trail crossings in recognition of the relatively small footprint that single-track trails have (USFWS 2006; USFWS 2008) and used the ratio of the width of a typical road (12 feet) to the width of a single-track trail (4 feet) to determine that that potential adverse effects will not travel more than 100 feet downstream of each single-track crossing. All totaled, we anticipate that 15,184 linear feet (21.82 miles) of in-stream habitat will be affected by the two fords and 140 single-track trail crossings; this includes

300 feet of turbidity and sediment at the fords plus 12 feet directly impacted at each ford, and 100 feet of turbidity at each single-track trail crossing plus 4 feet directly impacted at each crossing. The adverse effects as described above will be difficult to measure because egg, fry, and juvenile bull trout are small, difficult to detect, and could be hiding within interstitial spaces in the gravels.

Adverse effects to adult and juvenile bull trout due to vehicles crossing the fords and 140 trail crossings are expected to be limited to short stream sections, occur infrequently, and be short-term in nature. Bull trout are known to occur in subwatersheds or stream complexes and these fords and crossings have the potential to impact 17 of the 29 subwatersheds. The local populations that can be impacted are East Fork Weiser River, Upper Little Weiser River, Wildhorse River, Rapid River, Hazard Creek, Partridge-Creek-Salmon River, Warren Creek, Chamberlain Creek, Middle Big Creek, Upper Big Creek, Lower Big Creek, Monumental Creek, Rush Creek, Marble Creek, Upper South Fork Salmon River, Lower South Fork Salmon River, and the Secesh River. Because of the low frequency, duration, and magnitude of effects of turbidity caused by vehicles and horses crossing fords, we expect that individual fish may be adversely affected, but population level effects are not likely to occur.

2.5.2 Bull Trout Critical Habitat

2.5.2.1 Direct and Indirect Effects of the Ongoing Proposed Action on Bull Trout Critical Habitat

The Watershed Condition Indicator (WCI) matrix and the effects analysis included in the Assessment provides an evaluation of the potential effects of the action on the PBFs of bull trout critical habitat. How the WCIs relate to the PBFs and the expected effects of the proposed ongoing action on PBFs are summarized in Table 11 below. The proposed ongoing action is anticipated to only cause: (1) potential effects from contaminants due to motorized vehicles crossing stream segments, (2) suspended sediment effects due to stream crossing use, and (3) potential suspended and deposited sediment effects due to the presence of roads and trails within a watershed on PBFs. Based on these three anticipated impacts, the PBFs that may be affected by the action include PBF 3 (Abundant Food Base), PBF 4 (Habitat Complexity), PBF 6 (Spawning Areas), and PBF 8 (Water Quality and Quantity). The effect from dispersed recreation is discussed below as part of Interrelated and Interdependent Effects of the Action on Bull Trout and will not be discussed in further detail here.

Effects to PBF 1 – Coldwater Sources

The presence of roads in streamside and riparian areas can disrupt and redirect springs, seeps, groundwater sources, and subsurface waters. The effects due to the presence of roads in streamside and riparian areas are included in the environmental baseline (i.e., 734.87 miles) and reflected in Table 6. Roads in RCAs and road segment delivering water to stream channels can affect cold water sources by intercepting cold sub-surface flows at cut-slopes, turning them into warmer surface flows, that are delivered quicker (i.e., more quickly than ground water flow which can change the hydrograph) through road ditches to streams. Additional effects of roads in riparian areas are described in Furniss et al. (1991):

King and Tennyson (1984) found that the hydrologic behaviors of small forested watersheds were altered when as little as 3.9 percent of the watershed was occupied by roads. Hauge et al. (1997) discussed several ways that roads can affect hillslope drainage, including changes in infiltration rates, interception and diversion of subsurface flow, changes in the watershed area of small stream, changes in the time distribution of water yield to channels, and changes in the fine (micro) details of drainage. These changes combine to cause rerouting of hillside drainage that can lead to changes in erosion and the hydrologic behavior of small streams.

Since no new roads are being constructed through this ongoing proposed action, we do not anticipate any additional effects on this PBF.

Table 11. Summary effects to PBFs

PBF #	PBF Description	Watershed Indicators	Indicators Degraded by Project	Anticipated Effect to PBF
1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.	Chemical contaminants, physical barriers, substrate embeddedness, channel conditions and dynamics (streambank condition, floodplain connectivity), flow/hydrology, road density and location, and riparian conservation areas.	Sediment and substrate embeddedness may be slightly increased temporarily. Water quality may also be impacted by the introduction of chemical contaminants and suspended sediments.	The increase in turbidity or deposited sediment are not expected to result in increases in cobble embeddedness or to create channel conditions changes, due to the low level, infrequent, and short duration of anticipated impacts. Effects from chemical contaminants to this PBF are expected to be insignificant because of the anticipated low levels of contaminant additions, the infrequent occurrences of the additions, and the few (2) stream crossing where contamination could occur.

PBF #	PBF Description	Watershed Indicators	Indicators Degraded by Project	Anticipated Effect to PBF
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.	Water quality (temperature, sediment, chemical and nutrient contaminants), physical barriers, change in peak/base flow, width/depth ratio, and refugia.	Water quality may also be impacted by the introduction of chemical contaminants and suspended sediments.	Effects from chemical contaminants to this PBF are expected to be insignificant. We do not anticipate that the amount of suspended sediment would result in migration barriers to the species.
3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Water quality (temperature, sediment, chemical and nutrient contaminants), physical barriers, substrate embeddedness, pool frequency and quality, floodplain connectivity, riparian conservation areas.	Sediment and substrate embeddedness may be slightly increased temporarily. Water quality may also be impacted by the introduction of chemical contaminants and deposited and suspended sediments.	Effects from chemical contaminants to this PBF are expected to be insignificant. The aquatic food base is likely to be adversely affected by deposited sediment downstream of crossings during fording or during storm events, or by deposition of sediments from road surfaces.
4	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.	Large woody debris, pool frequency and quality, large pools, off-channel habitat, channel conditions and dynamics (width/depth ratio, streambank condition, floodplain connectivity), disturbance history, riparian conservation areas, and disturbance regime.	There may be localized downstream effects on pool frequency and quality, and streambank condition from stream crossings.	Habitat complexity may be adversely affected by deposited sediment downstream of crossings during fording or during storm events, or by sediment delivery from road and trail surfaces.
5	Water temperatures ranging from 2 to 15°C (36 to 59°F), with adequate thermal refugia available for temperatures at the upper end of this range.	Temperature, large pools, refugia, channel conditions and dynamics (width/depth ratio, streambank condition, floodplain connectivity), change in peak/base flows, road density and location, riparian conservation areas.	There may be localized downstream effects on pool frequency and quality, streambank condition from stream crossings. Because of high road densities suppressing development of	Habitat complexity may be adversely affected by deposited sediment downstream of crossings during fording or during storm events, or by sediment deposition from roads. Effects

PBF #	PBF Description	Watershed Indicators	Indicators Degraded by Project	Anticipated Effect to PBF
			shade trees, additional effects are expected.	will be limited to stream crossings.
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 substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.	Sediment, substrate embeddedness, large woody debris, pool frequency and quality, and streambank condition.	Sediment and substrate embeddedness may be slightly increased temporarily. There may be localized downstream effects on pool frequency and quality, streambank condition from stream crossings.	Spawning areas at and downstream of fords may be temporarily adversely affected by fine sediment released during fording, or may be adversely affected by deposition of sediment from roads.
7	A natural hydrograph, including peak, high, low, and base flows within historical and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.	Floodplain connectivity, flow/hydrology (changes in peak/base flows and drainage network increase), watershed conditions (road density and location, disturbance history, riparian conservation areas, and disturbance regime).	Changes in the drainage network, due to the interception of flow by roads and road ditches are expected. In addition, those areas with high road densities (e.g., the Weiser River Watershed) and areas with high mileages of roads in RCAs (e.g., the Wildhorse River) are expected to be affected by the proposed ongoing action.	This PBF will be maintained.
8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	Floodplain connectivity, flow/hydrology (changes in peak /base flows and drainage network increase), water quality (temperature, sediment/turbidity, chemical and nutrient contaminants), disturbance history, and disturbance regime.	Sediment and substrate embeddedness may be slightly increased temporarily and suspended sediments.	Habitat complexity may be adversely affected by deposited sediment downstream of crossings during fording or during storm events, or due to sedimentation from roads

PBF #	PBF Description	Watershed Indicators	Indicators Degraded by Project	Anticipated Effect to PBF
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.	Physical barriers, refugia, persistence and genetic integrity.	No change to any relevant indicator.	This PBF will be maintained.

Effects to PBF 2 – Migratory Corridors

There are currently no known barriers in occupied stream crossing segments or at crossings within designated critical habitat. Implementation of the proposed ongoing action will not result in any passage barriers within the project areas. We do not anticipate any effects from the proposed ongoing action on this PBF.

Effects to PBF 3 – Abundant Food Sources

Activities associated with the proposed ongoing action have the potential to cause short-term increases in turbidity and deposition of fine sediments in streams. Macroinvertebrates are a significant food source for salmonids. Turbidity and deposited fine sediments can affect macroinvertebrates in multiple ways through increased invertebrate drift, feeding impacts, respiratory problems, and loss of habitat. The amount of fine sediment that enters a stream will depend on the weather conditions, stochastic erosional events, and the specific location of a road.

If we assume that the two full-sized vehicle ford crossings and 140 single-track crossings are within designated critical habitat and use a 300-foot downstream distance as the length that potential adverse effects could travel due to the vehicle ford crossings and a 100-foot distance for single-track trail crossings, this constitutes 21.82 miles of bull trout habitat, which represents less than 2 percent of designated critical habitat in the Hells Canyon Complex, Mainstem Snake, Salmon River Basin, and the Southwest Idaho Basin CHUs.

Effects to PBF 4 – Complex Stream Channels

Some road sections are located adjacent to stream channels and construction of these roads may have resulted in decreased channel complexity and disrupted natural channel migration, erosion, and deposition processes. Riparian roads can result in ongoing adverse effects to PBF 4 through the loss of riparian vegetation and reduced log and wood debris inputs. The primary adverse effect to PBF 4 is from the existing stream-adjacent roads that have removed riparian vegetation and have disrupted fluvial habitat-forming processes. There are 734.87 miles of riparian roads in the action area where these effects are potentially occurring. These effects are reflected in Table 6, which describes the environmental baseline conditions. Roads and trails segments and crossing sites in the action area will continue to adversely affect channel complexity and streambank conditions in the affected areas.

Effects to PBF 5 – Water Temperatures

Many factors influence water temperature including shade, discharge, channel morphology, air temperature, topography, stream aspect, and interactions with ground water. Roads and trails built immediately adjacent to a stream may decrease riparian vegetative shading in some areas, thereby increasing the amount of solar radiation striking the water. The proposed ongoing action should not result in reduction of shade except for those areas at occupied stream crossings.

The amount of riparian vegetation that will likely be removed due to ongoing use of roads (i.e., maintenance) and trails is expected to affect water temperature where adjacent to streams because shading from trees and shrubs will be absent as long as the road is utilized and maintained. This primary adverse effect to PBF 5 is from the existing stream-adjacent roads that have removed riparian vegetation. Such effects are included in the environmental baseline and the resulting conditions are reflected in Table 6. Since no new roads are being built in riparian areas, we do not anticipate any additional effects from the proposed ongoing action on this PBF.

Effects to PBF 6 – Substrate Composition

Road and trail use could result in increased fine sediment deposition in small streams that are crossed by roads. Chronic sediment inputs from road surfaces and roadside ditches can accumulate in the substrate of small streams. Roads generally accelerate soil erosion rates due to surface erosion and stochastic events including mass soil movement such as slumps and earth flows, debris avalanches, debris flows, and debris torrents. High rates of stream sedimentation result from this increased erosion. The use of these roads and trails are likely to result in short-term pulses of turbidity and deposition of fine sediments in small tributary streams. However, some use will occur when roads are wet or just prior to a storm event. How much fine sediment enters a stream will depend on the weather conditions and the location of a road. Use of roads and trails has the potential to cause short-term increases in turbidity as fine sediments are released into the stream. Adverse effects to various PBFs, including PBF 6, at crossings may also occur, particularly in locations where trails ford across a river or stream without a bridge. Trail crossings can damage stream banks, trail erosion can route sediments directly into streams, and fords across streams can directly affect bull trout spawning habitat and redds.

If we assume that the two full-sized vehicle ford crossings and 140 single-track crossings are within designated critical habitat and use a 300-foot downstream distance as the length that potential adverse effects could travel due to the vehicle ford crossings and a 100-foot distance for single-track trail crossings, this constitutes 21.82 miles of bull trout habitat, which represents less than 2 percent of designated critical habitat in the action area.

Effects to PBF 7 – Natural Hydrograph

Roads can modify natural drainage networks and accelerate natural hydrologic processes. These changes can alter physical processes in streams, leading to changes in stream flow regimes, sediment transport and storage, channel bank and bed configurations, substrate composition, and stability of slopes adjacent to streams. The primary adverse effect to PBF 7 is from the existing stream-adjacent roads that have removed riparian vegetation and have disrupted fluvial habitat-forming processes. These effects are included in the environmental baseline, and are reflected in Table 6. We do not anticipate ongoing use of roads and trails will result in additional measurable changes to this PBF.

Effects to PBF 8 – Water Quality and Quantity

Small fuel spills may occur during routine trail and road use. We assume that stream crossing areas are subject to ongoing adverse effects associated with road related fine-sediment inputs and turbidity. If we assume that the two ford crossings and 140 single-track crossings are within designated critical habitat and use a 300-foot downstream distance as the length that potential adverse effects could travel due to the vehicle ford crossings and a 100-foot distance for single-track trail crossings, this constitutes 21.82 miles of bull trout habitat, which represents less than 2 percent of designated critical habitat in the action area.

Effects to PBF 9 – Non-Native (Competition and Prey)

Brook trout represent another threat to bull trout populations. Brook trout is a congeneric species that competes with, and can hybridize with, bull trout. Core areas with fluvial and/or resident bull trout populations are more likely to be influenced by the widespread distribution and abundance of brook trout. Brook trout are known to occur within the South Fork Boise River but the proposed ongoing action is not anticipated to promote the expansion of brook trout or increase the exposure of bull trout to brook trout populations. We do not anticipate ongoing use of roads and trails will result in measurable changes on this PBF. These effects are included in the environmental baseline, and are reflected in Table 6.

Summary of Effects to Bull Trout Critical Habitat

The most likely effects from the action will occur from periodic spikes in sediment delivery to designated critical habitat affecting PBFs 3, 4, 5, 6 and 8, but again these spikes will be minimized to the degree practicable through the continued implementation of annual road and trail maintenance. Regardless of maintenance, roads generally accelerate soil-erosion rates due to surface erosion and stochastic events. Although sediment inputs to streams from roads are predicted to be low based on the literature review described in the Assessment (USFS 2018), our analysis here indicates that over time these effects will continue to affect PBFs associated with bull trout critical habitat. Sediment effects to salmonids are well documented (see Section 2.5.1.1) and even in small amounts, if they occur long-term, critical habitat will be adversely affected. If we assume that the two ford crossings and 140 single-track crossings are within designated critical habitat and use a 300-foot downstream distance as the length that potential adverse effects could travel due to the vehicle ford crossings and a 100-foot distance for single-track trail crossings, this constitutes 21.82 miles of bull trout habitat, which represents less than 2 percent of designated critical habitat in the action area in both the Mid-Columbia and Upper Snake RUs.

2.5.3 Northern Idaho Ground Squirrel

2.5.3.1 Direct and Indirect Effects of the Ongoing Proposed Action on Northern Idaho Ground Squirrel

General Effects

The proposed ongoing action will not increase roads or motorized trails in occupied NIDGS habitat and will restrict off-road travel. Off-road travel will only be allowed to access dispersed campsites within 300 feet of either side of a road and 100 feet on either side of a trail, but no off-road travel will be allowed for any reason in occupied NIDGS habitat. Cross-country motor vehicle use can detrimentally impact NIDGS habitat through soil compaction and removal of vegetation and can physically harm NIDGS individuals via collisions and illegal shooting resulting from additional access. Sites known to be occupied by NIDGSs are currently closed to off-road travel, but by restricting all cross-country travel, the proposed ongoing action also protects suitable habitat that has not yet been found to be occupied. There are 669 acres of authorized roads and trails in NIDGS habitat on the Forest (Table 10). A map of these roads in relation to known colonies is included in the supporting documentation of the Assessment. There are also roads in the action area which may intersect NIDGS habitat but are not designated for public travel. Because these roads are not designated for public travel, they were not considered in the Forest's analysis. Even though travel on undesignated roads is not authorized, some undesignated roads remain accessible and use of these roads may have effects on NIDGSs.

Forest roads which occur near colonies, but do not bisect the colony could still have negative impacts on NIDGS, primarily due to vehicle collisions. Access near NIDGS colonies also allows more opportunities for illegal shooting. In 2009, to reduce vehicle collisions and illegal shooting, the Forest posted road signs along the Lost Valley Reservoir road prior to the road entering the NIDGS site. The signs provided information on the NIDGS and advised the public to travel slowly through the area to avoid impacts. Closure of the Lost Valley Reservoir road was not considered a viable option because it is a major access route onto the Forest. Realignment of the road was considered, but rejected because it would likely provide only temporary benefits, because the road could be moved only to an area that is potential NIDGS habitat. Open roads in the ongoing proposed action area will likely have minor effects to NIDGS because these roads do not bisect occupied colonies and total less than 1 mile in length. Based on the analysis and mitigation measures identified above, effects to NIDGS will be minimized but would not be reduced to insignificant levels.

Non-motorized dispersed recreation is expected to have negligible impacts on NIDGS. Dispersed recreation tends to occur near water and forested areas and not in the scabland habitats (i.e., a region characterized by elevated tracts of rocky land with little or no soil cover) preferred by NIDGS. On the rare occasion that a person, horse, or mountain bike might travel through occupied habitat, it is reasonable to expect that the squirrels will be protected from any impacts simply by moving below ground. Such use is infrequent enough that no trailing or compaction is expected.

Increased Traffic Speed and Volume

Traffic volume and speed are correlated with increased use and road maintenance or improvements, respectively. Data collected by the Forest in 1988 and 1992 indicate that traffic levels have been increasing 2.8 percent per year during holiday travel (between Memorial Day and Labor Day). Updated information was not provided in the Assessment, but it is expected that as population growth continues, travel on the Forest will steadily increase over time. All roads and trails that access NIDGS habitat (those designated for public travel and those that are not designated as such) may be having effects on the NIDGS such as those discussed below, even though it is illegal for motorized vehicles to travel off of designated roads and trails.

Roadkill of NIDGSs could result from increased traffic volume and speed in the action area (Yensen and Sherman 1997). Increases in roadkill of wildlife due to road improvements and associated increases in traffic volume and speed are well documented. Gunther et al. (1998)

concluded that vehicle speed was the primary factor leading to collisions of large mammals with vehicles in Yellowstone National Park. The highway on which the highest traffic speed occurred accounted for 41 percent of all large mammal roadkill in the Park, although it consisted of only 7 percent of the total road length. In Australia, Jones (2000) observed local extinction of eastern quolls (*Dasyurus viverrinus*) and an approximate halving of a population of Tasmanian devils (*Sarcophilius laniarius*) concurrent with a "dramatic" increase in roadkill after a road was widened and paved in a national park. All elements of the NIDGS's life cycle could be affected by an increase in traffic volume and speed which is expected during the implementation of the ongoing proposed action. There could be an increased incidence of automobiles killing ground squirrels on roads throughout the action area. NIDGS in populations directly adjacent to roads in the action area could be killed by vehicles while foraging, searching for mates, engaging in agonistic behavior (e.g., aggressive encounters between males), and during dispersal. Once juveniles leave their natal burrows and begin foraging with adults, they also become susceptible to these effects (i.e., for approximately 3 months per year).

Even though traffic volumes are variable and unpredictable, a NIDGS crossing a road is probably unlikely to be killed by a vehicle, based on certain assumptions. To estimate the probability of a NIDGS being killed by an auto during a single crossing, we assumed:

- NIDGSs take fewer than 10 seconds to cross a road;
- Some drivers will attempt to avoid the squirrels;
- Most known occupied NIDGS sites are not transected by a road;
- Squirrels will successfully evade or avoid some cars.

Anecdotal information seems to indicate that the probability of a NIDGS being killed by a car while crossing a road is low, although anecdotal observations may be misleading and effects to NIDGSs repeatedly crossing roads must be factored. There are only three documented cases of NIDGSs being killed by motorized vehicles—near Mill Creek and Rocky Comfort Flat. The number of road-killed NIDGSs may be underestimated, because they are not likely to be observable for long after their death. For example, it has been noted that road-killed cottontails (*Sylvilagus* sp.) at Saguaro National Park were often scavenged within 1 hour of their first observation whereas unpalatable species (e.g., toads, *Bufo* sp.) remained visible for several days. Although dispersing NIDGSs may cross the road only once, as assumed above, NIDGSs whose home range includes roads may cross them several times per year, significantly increasing the likelihood of being killed by a vehicle. Therefore, mortality in populations along roads may be significant, especially when vehicular traffic is moving fast or in high concentrations (i.e., related to a construction site or timber sale). Dependent on the magnitude of this increased mortality and the demography of the affected animals, this mortality could affect the growth rate of these populations and, therefore, their probability of long-term survival.

Table 9 above indicates that there are 14.4 miles of authorized roads in habitat currently known to be occupied by NIDGSs. It is assumed that lethal take of NIDGSs is occurring on these 14.4 miles of authorized Forest routes through implementation of the proposed ongoing action. For the reasons stated above, the rates of kill are thought to be low, but NIDGSs are subject to a high rate of mortality on the 14.4 miles of occupied habitat adjacent to roads, compared to other occupied habitats on the Forest.

Habitat Fragmentation Effects

Increased traffic volume and speed could affect the NIDGS by decreasing connectivity among populations on different sides of roads. Because this ongoing Travel Plan action does not create new roads in occupied NIDGS sites, these effects are part of the baseline condition. Baseline effects are combined with effects of the proposed ongoing action here to complete the analysis of what the proposed ongoing action effects will mean to the survival and recovery of the NIDGS. In addition to ensuring the survival of each existing population, reestablishing and maintaining connectedness and connectivity among populations of NIDGS is crucial to the long-term survival and recovery of the species (Gavin et al. 1999). Dispersal helps to ensure the maintenance of genetic variation within populations (Mills and Allendorf 1996) and allows extinct populations to be "rescued" by emigrants from adjacent populations. Although dispersal distances in this species may approach 1 km, Gavin et al. (1999) found, based on capture re-capture data, that dispersal distances are predominately less than 200 meters. Now and in the future, especially if planned restoration activities become effective, dispersal will be of predominant importance within the groups targeted for recovery treatments, because dispersal among population groups may be limited by natural landscape features. Multiple population groups are affected or fragmented by roads in the action area. Over time, it is expected that the landscape will be further fragmented or affected by increased traffic volumes, and these fragmentation effects are expected to impact NIDGS, although the extent is difficult to predict. Two migrants per generation may be sufficient to avoid the loss of genetic diversity within populations (Mills and Allendorf 1996).

Effects on Survival of Populations Along Roads

Increased traffic may also affect the time budgets of NIDGS, but disruptions in normal behavior that may be related to increased traffic such as increase in "alert" or "locomotion" behaviors have been shown to be biologically insignificant. Plumpton and Lutz (1993), for example, found that traffic rate was positively correlated to the time burrowing owls (*Speotyto cunicularia*) spent in "alert" and "locomotion" behavior, but that at the maximum traffic rate observed (64 vehicles per hour) the magnitude of behavioral changes were likely not biologically significant. An increase in vigilant behavior could reduce the amount of time spent feeding, but this is unlikely to affect survival. When exposed to a conspecific alarm call, Belding's ground squirrels (*Spermophilus beldingii*) that were deprived of food spent more time in feeding than in vigilant behavior in contrast to those that received ad libitum diets (Bachman 1993). In other words, squirrels deprived of food appear to sacrifice vigilance in favor of obtaining needed food. Therefore, if feeding is especially important to individual NIDGSs, they may not reduce time spent feeding when disturbed by traffic. Assuming a current use of 150 vehicles per day, it would take a 10-fold increase in traffic volume to approximate the maximum traffic volume studied by Plumpton and Lutz (1993), which they found posed a negligible danger in disrupting normal behavior of burrowing owls. Therefore, some effects from road and trail use in occupied NIDGS habitat to the species' regular feeding behaviors are expected.

An additional effect on the species' survival is that roads, motorized trails, and cross-country motor vehicle use within close proximity to occupied sites can result in increased mortality to individuals from illegal shooting. This is a documented impact to NIDGS on the Forest (USFS 2018).

2.5.4 Effects of Interrelated or Interdependent Actions

Interrelated actions are those that are a part of a larger action and depend on the larger action for their justification. Interdependent actions are those actions that have no independent utility apart from the action under consideration. Because future activities such as new routes, reconstruction of existing routes, rerouting existing roads or trails, and the decommissioning of routes will undergo separate consultation, they will not be considered interrelated or interdependent actions. The effects from actions covered under previous and still valid consultations were discussed in the environmental baseline, so they will not be addressed here. Road and trail maintenance and dispersed recreation effects are discussed above and below in Section 2.5.4.1.

The formal consultation assessing effects from implementing the Forest's Road Maintenance Program were conducted in 2007 with Biological Opinions issued in 2009 and expiration dates of December 31, 2017. The Forest is actively engaged with the Service and NMFS to renew this programmatic consultation and the Service received draft versions of the Biological Assessments in June of 2018.

Road Maintenance Activities on the Payette National Forest

The Programmatic Road Maintenance Program covers roads management activities that take place on existing road systems (open or closed for the public) for the express purpose of maintaining the road or road system in a safe and properly functioning condition (e.g., adequate drainage, erosion minimized) for the user and level of use identified by the road use objective and maintenance level. Typical maintenance activities include the following:

- surface blading
- rock raking
- surface replacement
- cleaning ditches, culverts, and water bars
- vegetation clearing
- hazard tree removal
- clearing of slope failures or slide material
- material disposal
- repair of sloughed shoulder
- removal of large rocks or boulders
- maintenance of prism integrity
- elevating road surfaces above flood levels
- installation or repair of signs
- repair of bridges and abutments
- cattle guard repair
- placement of access controls
- dust abatement
- seasonal snowplowing
- other road maintenance activities of similar scope and scale

Work under the Programmatic Road Maintenance Program may include in-stream culvert installations (replacements, extensions, and new installations) on first and second order non-fish bearing streams, and bridge repair. It also includes riprap slope protection, prism reconstruction, retaining walls for slope stabilization, and seeding and mulching.

The 2009 Biological Opinion concurred with a likely to adversely affect determination for listed fish species and critical habitat and a may affect, not likely to adversely affected determination for listed terrestrial species.

Trails, Recreation and Administrative Site Operation and Maintenance Activities on the Payette National Forest

This programmatic consultation covers trail maintenance, trail reconstruction and realignment, and trail crossing (e.g., fords, culverts, and bridges) construction, maintenance, and removal. Trail maintenance on NFS trails (motorized and non-motorized) occurs to keep them in a condition suitable for use and to minimize resource impacts from the trail. Trail maintenance is typically performed by Forest employees, but it may also be performed by partners (e.g., Idaho Parks and Recreation, Central Idaho Mountain Bike Association, counties, outfitters and guides, etc.) or volunteers. Trail characteristics and use levels vary with the location and destination of the trail. Maintenance on these trails are performed after: (1) maintenance needs have been identified from condition and prescription surveys, and (2) an Annual Maintenance Plan is developed (within funding constraints). Maintenance is conducted on routine (usually annual or bi-annual schedule) and intensive (for one-time resolution of site-specific problems) levels using the methods outlined in Lund and Burns 1995 (USFS 2018)).

The 2007 Biological Assessment concluded a may affect, likely to adversely affect determination for listed fish species and critical habitat and a may affect, not likely to adversely affected determination for listed terrestrial species.

2.5.4.1 Bull Trout and Designated Critical Habitat

Road Maintenance Effects

Road maintenance work will likely deliver temporary pulses (lasting minutes to hours) of sediment, although the majority of this sediment would not be delivered until subsequent rain events. Deposited sediment can fill interstitial spaces, displacing fry and invertebrates, and become entrained in tailouts of pools where fish spawn. Quantifying turbidity levels and their effect on bull trout and their habitat is complicated by several factors. First, turbidity from an activity will typically decrease as distance from the activity increases. The time needed to attenuate these levels depends on the quantity of material in suspension (e.g., mass or volume), particle size, the amount and velocity of ambient water (dilution factor), and the physical/chemical properties of the sediments. Second, the impact of turbidity on fish is not only related to the turbidity levels but also to the particle size of the suspended sediments.

Fish present downstream from road maintenance activities are expected to be able to avoid or reduce their exposure to turbidity by swimming to adjacent, less turbid habitat (i.e., behavioral response only). These effects are still considered adverse, because turbid conditions will disrupt normal bull trout behavior. Adverse effects to juveniles are also likely to occur as a result of increased turbidity, as exposure of juveniles to predators will likely increase as they seek alternate rearing habitat. Adult bull trout are not at risk of increased predation due to increased turbidity, and it is unlikely that they will abandon a redd even if they temporarily move out of turbid conditions. Therefore, adverse effects to adult bull trout from road maintenance activities are expected to be short-term in nature.

Dispersed Recreation Effects

These activities include picnicking and dispersed camping in the RCA and riparian zone, fishing, hunting, recreational stream alterations such as building small check dams, manipulation of boulders and cobble to create channels and pools for entertainment, and illegal firewood cutting and vegetation removal in the riparian zone.

These recreational activities have the potential to alter riparian habitat and the local functions of the RCA, especially in areas of repeated heavy use by motor vehicles, trailers, ATVs, campfires, and other chronic disturbances. Riparian vegetation loss and soil compaction may lead to increased probability of site erosion and sediment deposition in streams. Streambank trampling for recreational access can cause instability and bank erosion. Recreational uses in the riparian zone and on streambanks can also increase the risk of contaminant releases such as human waste, garbage, fuels, oils, pesticides, and soap/detergents into riparian soils and adjacent waterways. The ongoing use of existing dispersed recreation sites within the riparian areas (i.e., undesignated campsites, pull-offs, and other dispersed recreation areas that are primarily within the South Fork river corridor) may prevent recovery of riparian vegetation in small, localized areas. However, habitat monitoring adjacent to recreation sites has not found evidence of a significant difference between substrate characteristics nor more than a localized effect (typically less than 50 feet of streambank disturbance) at dispersed camping sites.

Recreational fishing occurs in the rivers and streams across the Forest. The use of the roads and trails system facilitates access to most streams on the Forest, including those occupied by bull trout. Potential direct effects to bull trout include accidental or intentional entrapment and harvest of bull trout, redd trampling and destruction caused by wading in spawning waters, and the unintentional or intentional harassment of spawning and rearing bull trout. Incidental take of bull trout while fishing for other fish species is covered under a specific rulemaking pursuant to section 4(d) of the Act (50 CFR 17.44(w)-(x)) if fishing follows relevant State regulations.

Dispersed camping in streamside areas has the potential to affect bull trout and its habitat. The mechanism of these effects include sediment input into streams from driving vehicles in the RCA and, if redds are present at a dispersed camp site, potential harassment and redd trampling due to any foot or horse use in streams, including use from anglers, swimmers, hikers, and similar recreationalists. The dispersed camping that occurs across the Forest is predominantly "car camping," meaning that it involves vehicle access with use of trailers, motorhomes, and wall tents set up adjacent to full-sized vehicle parking. Therefore, most of the known dispersed campsites within the action area are located within the designated roads corridors. The most popular areas are not adjacent to known spawning areas but disturbance of migrating individuals is possible if people or horses are in the stream when an individual bull trout is in the area. This visual and/or noise disturbance is expected to be of short duration.

Ongoing monitoring includes analyses of dispersed camping and other recreational impacts on RCA conditions, riparian functions, and streambanks. If there are negative impacts on resources occurring, such as loss of riparian shading, streambank sloughing, or illegal vehicle entries into the streams, or if there is the potential for significant effects on bull trout and designated critical habitat, those effects will be reduced through site rehabilitation, area closures, signage, or other measures as appropriate. The activity of recreational fishing may result in accidental or unintentional adverse effects to the species. Based on these findings we conclude that dispersed recreation could result in adverse effects to the species.

2.5.4.2 Northern Idaho Ground Squirrel

Although there are 19.9 acres of occupied habitat in areas of dispersed camping (Table 9), these acres are closed to camping activities to protect NIDGS. Therefore, effects to NIDGS from interrelated and interdependent activities are not expected to be adverse. Road and trail maintenance may require ground disturbing activities which would have effects on NIDGS if the activity occurs in potential or occupied habitat. A wildlife biologist or NIDGS specialist will oversee any ground disturbing activities in the action area in order to reduce effects assumed on the species. Therefore, insignificant effects are expected on NIDGS as a result of road and trail maintenance activities.

2.6 Cumulative Effects

2.6.1 Bull Trout and Designated Critical Habitat

The implementing regulations for section 7 define cumulative effects to include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed ongoing action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

State and private land timber harvest and related road construction activities within Idaho are regulated by the Idaho Department of Lands (IDL). The IDL does not provide the same level of protection and conservation for threatened and endangered species as Forest-administered lands. Activities conducted by the IDL that may have effects on bull trout or its habitat include: road construction and maintenance, timber harvest, fire management, livestock grazing, road construction, recreation, and residential development. Land uses also include limited amounts of cultivation and irrigation of hay fields and pastures, water diversions and water-right allocations.

Illegal and inadvertent harvest of bull trout is considered a cumulative effect. Harvest can occur through both misidentification and deliberate catch. Schmetterling and Long (1999) found that only 44 percent of the anglers they interviewed in Montana could successfully identify bull trout. Being aggressive piscivores, bull trout readily take lures or bait (Ratliff and Howell 1992). Spawning bull trout are particularly vulnerable to harvest because the fish are easily observed during autumn low flow conditions. Hooking mortality rates range from 4 percent for non-anadromous salmonids with the use of artificial lures and flies (Schill and Scarpella 1997) to a 60 percent worst-case scenario for bull trout taken with bait (Cochnauer et al. 2001). Thus, even in cases where bull trout are released after being caught, some mortality can be expected. As access is not increasing, we do not expect that the amount of illegal or inadvertent harvest will increase over baseline conditions.

An additional cumulative effect to bull trout is global climate change. Changes have already been observed in many species' ranges consistent with changes in climate (Independent Scientific Advisory Board 2007; Hansen et al. 2001). Global climate change threatens bull trout throughout its range in the coterminous United States. Downscaled regional climate models for the Columbia River Basin predict a general air temperature warming of 1.0 to 2.5°C (1.8 to 4.5°F) or more by 2050 (Rieman et al. 2007). This predicted temperature trend may have important effects on the regional distribution and local extent of habitats available to salmonids (Rieman et al. 2007), although the relationship between changes in air temperature and water temperature are not well understood. Bull trout spawning and early rearing areas are currently largely constrained by low fall and winter water temperatures that define the spatial structuring of local populations or habitat patches across larger river basins; habitat patches represent networks of thermally suitable habitat that may lie in adjacent watersheds and are disconnected (or fragmented) by intervening stream segments of seasonally unsuitable habitat or by actual physical barriers (Rieman et al. 2007).

With a warming climate, thermally suitable bull trout spawning and rearing areas are predicted to shrink during warm seasons, in some cases very dramatically, becoming even more isolated from one another under moderate climate change scenarios (Rieman et al. 2007; Porter and Nelitz 2009). Climate change will likely interact with other stressors, such as habitat loss and fragmentation (Rieman et al. 2007; Porter and Nelitz 2009); invasions of nonnative fish (Rahel et al. 2008); diseases and parasites (McCullough et al. 2009); predators and competitors (McMahon et al. 2007; Rahel et al. 2008); and flow alteration (McCullough et al. 2009), rendering some current spawning, rearing, and migratory habitats marginal or wholly unsuitable.

Isaak et al. (2016) examined the role of mountain streams (such as those in the Upper South Fork subbasin) as refugia for cold-water species in the face of climate change. The research suggests that cold water streams are often the least sensitive to air temperature fluctuations and can serve as refugia for native species tolerant of cold temperatures. Using data collected in cold-water streams in the Pacific Northwest from 1968–2011, stream warming rates were estimated at 0.101°C when air temperature warmed at 0.21°C per decade. Isaak et al. (2016) states:

> Using large stream temperature and biological databases, we show that thermal habitat in mountain streams is highly resistant to temperature increases and that many populations of cold-water species exist where they are well-buffered from climate change. As a result, there is hope that many native species dependent on cold water can persist this century and mountain landscapes will play an important role in that preservation.

Climate-induced stream warming raises legitimate concerns for species like bull trout that are dependent on cold water. Despite this, Meyer et al. (2014) documented that bull trout populations in Idaho are generally stable to increasing and extinction risks were relatively low for most bull trout populations (the study included data for the Anderson Ranch Reservoir bull trout population).

Declining snowpack (Nolin and Daly 2006) could potentially pose a more significant risk to stream temperatures under a changing climate than would shifts in summer air temperatures, particularly in small snow fed streams in low to mid elevations. Earlier streamflow timing (Stewart et al. 2005) and changes in amount and timing of precipitation (Luce et al. 2013) have exacerbated decreases in summer runoff (Luce et al. 2014), which can lead to increases in stream temperatures. In addition, climate-induced changes to wildfire frequency (Holden et al. 2012) and vegetation conversions related to drought conditions may influence stream temperatures by decreasing stream-side shading (Isaak et al. 2010). Severe wildfires can also lead to erosion and debris flow events that displace fish from affected streams.

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.

As discussed above, bull trout are known to hybridize with introduced brook trout and hybridization is a potential factor in population declines. Brook trout and bull trout co-occur within the action area, but at this time there are no data that can be used to assess the local effects of the hybridization of bull trout with brook trout in the watershed. We have no information that would indicate that hybridization is increasing over baseline conditions.

Although cumulative effects are identified, and the impact of illegal or inadvertent harvest of bull trout, climate change, and introduced brook trout can be generally described, we cannot quantify the magnitude of their impacts on bull trout populations. We anticipate that the impacts of illegal or inadvertent harvest of bull trout, climate change, and introduced brook trout will generally be negative, but except for climate change, we do not expect any of these cumulative effects to appreciably alter the existing baseline conditions in the action area.

2.6.2 Northern Idaho Ground Squirrel

Predominant ongoing activities on non-Federal lands that are reasonably certain to affect NIDGS and their habitat include timber harvest, livestock grazing, road construction, recreation, fire suppression, and residential development. Land uses also include limited amounts of cultivation and irrigation of hay fields and pastures, water diversions and water-right allocations.

State and private land timber harvest and related road construction activities within Idaho are regulated by the IDL. The IDL does not provide the same level of protection and conservation for threatened and endangered species as Forest-administered lands. Activities that are requested by the IDL that may not provide adequate protection for NIDGS and their habitat include: road construction and maintenance, timber harvest, and fire management. Conversely, Forest management that reduces tree stocking and increases openings could have a beneficial effect on the species. There is one known NIDGS colony on State land and several private tracts where these actions are reasonably certain to directly or indirectly affect ground squirrels.

As noted above, there are pathways for both adverse and beneficial effects on ground squirrels from livestock grazing. State lands leased for grazing are currently operated under best management practices (BMPs) established under grazing management plans, overseen by the IDL. Grazing BMPs, as identified in the Idaho State Agricultural Pollution Abatement Plan (State Plan), are not mandatory but recommended for private lands. Because compliance with the State Plan is not required on private lands, no monitoring plan is in place to evaluate potential impacts to federally listed species or designated critical habitat. The IDL does perform monitoring of larger tracts of leased lands to ensure compliance with established grazing management plans. However, smaller, more isolated blocks of leased land are often not monitored for compliance and managed according to lands surrounding them (private or Federal). Grazing management plans as currently required by IDL are authorized for 10-year terms, leading to an inability to incorporate new and more ecologically friendly practices as these practices evolve. State management plan BMPs typically revolve around season of use and animal unit months (AUMs), not focusing on riparian area monitoring and protection. Given the limited controls on grazing under State oversight, it is unlikely that management would be carried out to assure adverse effects on NIDGS would be avoided and minimized.

As with timber management and grazing, recreation and fire management on non-Federal lands does not come with assurances of protection of listed species. The general nature of impacts of these activities on ground squirrels is described above. It is reasonably certain that adverse effects on the species could result from these activities. A number of ground squirrel colonies are located on private lands that are presently managed for agricultural uses. There is potential for the development of parts of these properties for residential use, and thus the potential for loss of NIDGS habitat.

The Act provides options for non-Federal entities to develop conservation agreements and habitat conservation plans (per section 10 of the Act) that address management and development effects on candidate, proposed, and listed species. Landowners in the general vicinity of the action area have been working with the Service to conserve other species, including southern Idaho ground squirrel. It is possible that in the future, NIDGS may benefit from actions carried out under similar private-Federal agreements.

2.7 Conclusion

2.7.1 Bull Trout

The Service has reviewed the current status of the bull trout, the environmental baseline in the action area, all of the effects of the proposed ongoing action, and cumulative effects, and it is our conclusion that the proposed ongoing action is not likely to jeopardize the continued existence of the bull trout. Our conclusion is based on the low level of anticipated adverse effects to individual bull trout within local populations, the apparently improving population trend in the Upper Snake River and Mid-Columbia RUs, which has led to these RUs being categorized as "apparently secure" (USFWS 2015a). The Forest also continues to implement restoration actions that likely have, and will over time, lead to improvements in riparian and stream habitat conditions. Some actions completed since the 2007 Travel Management Plan consultation include road obliteration, road decommissioning on system and non-system roads, and closing non-system roads in watersheds occupied by bull trout (see Section 2.4.2). Core area baseline conditions are anticipated to remain the same or to improve as the benefits of actions taken under the 2007 Travel Management Plan revision accrue to aquatic habitats. While some harm or harassment to individual bull trout will occur from the proposed ongoing action, the magnitude, duration, and frequency of these adverse effects are expected to be low. Given the low magnitude of the anticipated effects, the apparently improving status of the core area populations in the action area (USFWS 2015f), and apparently secure status of the Upper Snake River and Mid-Columbia RUs (USFWS 2015f), we conclude that the impacts of the proposed ongoing action will not jeopardize the continued existence or impede recovery of the coterminous population of bull trout.

2.7.2 Bull Trout Critical Habitat

The Service has reviewed the current status of bull trout critical habitat, the environmental baseline in the action area, all of the effects of the proposed ongoing action, and cumulative effects, and it is our conclusion that the proposed ongoing action is not likely to destroy or adversely modify designated critical habitat for bull trout. The critical habitat units in the action area provide spawning, rearing, overwintering, and connecting habitat. Adverse effects to critical habitat are anticipated, but these effects are anticipated to be low in magnitude, frequency, and duration; therefore, we anticipate that all the habitat functions will be maintained within the affected critical habitat sub-units and critical habitat units. Since the critical habitat unit function is maintained, we conclude that impacts from the proposed ongoing action will not destroy or adversely modify designated critical habitat for bull trout.

2.7.3 Northern Idaho Ground Squirrel

The Service has reviewed the current status of northern Idaho ground, the environmental baseline for the action area, all of the effects of the proposed ongoing action, and cumulative effects, and it is our conclusion that the proposed ongoing action is not likely to jeopardize the continued existence of the NIDGS. This determination is based upon the following considerations; (1) lethal take is expected but not at a level that would affect reproduction or the population status of the species throughout the term of the consultation; (2) proposed conservation measures will reduce effects to NIDGS habitat; and (3) reduced road use and off-road travel will protect individual NIDGSs.

2.7.4 Northern Idaho Ground Squirrel Critical Habitat

No critical habitat has been designated for the NIDGS.

2.8 Incidental Take Statement

Section 9 of the Act and Federal regulations issued pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species, respectively, without special exemption. Take is defined as to 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 intentional or negligent actions that create the likelihood of injury to listed species 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 this Incidental Take Statement (ITS).

The measures described below are non-discretionary, and must be undertaken by the Forest Service for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest (1) fails to assume and implement the terms and conditions or (2) fails to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement (ITS) [50 CFR

§402.14(i)(3)].

2.8.1 Form and Amount or Extent of Take Anticipated

2.8.1.1 Bull Trout

As described in the "Effects of the Action" section above, the use of ford and trail stream crossings creates the likelihood of injury (harass) of bull trout eggs, fry, and juveniles caused by their short-term (minutes to hours) exposures to sublethal concentrations of turbidity and suspended sediments associated with active vehicle ford and trail stream crossings that is likely to significantly disrupt their feeding and sheltering behavior, and will also create the likelihood of direct mortality (kill) caused by excavating or crushing eggs or pre-emergent fry, or crushing juveniles taking cover in the interstitial spaces among the gravels of the stream ford during a vehicle crossing. The extent of these impacts includes all known bull trout-occupied full-vehicle ford crossings (2) and all known occupied single-track trail crossings (140). However, it is not practical to monitor these take impacts because eggs, fry, and juveniles are small and difficult to detect, and the affected eggs, fry, or juveniles are likely to be hidden in the gravel or transported downstream immediately following a vehicle crossing.

In accordance with the implementing regulations for section 7, a surrogate can be used to express the amount or extent of take if: (1) the causal link between the surrogate and take is described; (2) it is explained why it is not practical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of individuals of the listed species; and (3) a clear standard is described for determining when the level of anticipated take has been exceeded.

In this case, the number of crossings (142 in bull trout spawning and rearing habitat) can be used as a surrogate to express and monitor the above take impacts. This surrogate represents the footprint, equal to a linear stream distance of 15,184 feet, where bull trout will be exposed to and subject to the above described take impacts (i.e., the causal link between the surrogate and take of the bull trout). For the reasons described above, it is not practical to monitor take impacts in terms of dead or injured bull trout life stages. Take will be exceeded when impacts occur outside of the 15,184 feet identified.

2.8.1.2 Northern Idaho Ground Squirrel

The Service anticipates that take in the form of death or injury to individual NIDGSs, harassment of individual squirrels, and adverse effects to their habitat that result in harm to individual squirrels are reasonably certain to occur as a result of the proposed action. The following level of take of this species can be anticipated by using existing information documenting effects to small mammals.

The effects of the proposed action considered in this Opinion are expected to result in the death of some NIDGSs located within the action area. Calculation of the amount of incidental take that may occur is complicated by the variation in the potential numbers of NIDGSs that may inhabit an area adjacent to a Forest road at the time of public use. Oxley et al. (1974) said that on roads that were less than 10 meters, squirrel deaths were 0.7 per mile over 116 days. If we use this same calculation, it is expected that on the 14.4 miles of Forest roads in occupied NIDGS habitat, 10 NIDGSs would be killed per 116 days. The NIDGS is out of hibernation for 90 to 120 days, so they are only susceptible to this form of take during this amount of time per year. If we consider the rationale in Section 2.5.3.2 for the unlikelihood that NIDGSs will be killed by vehicles (e.g., some drivers will avoid NIDGSs, it takes just a few seconds for a NIDGS to cross a road, etc), we expect the amount of take here to be about half of what Oxley predicted. Therefore, we are authorizing lethal take of five NIDGSs per year for the term of this consultation in the action area. Because some areas approved for travel are located adjacent to known NIDGS colonies, it is reasonable to assume that collisions between NIDGSs and vehicles will occur. Take of more than five individuals per year, given the small population size and limited extent of occupation, may impact population numbers and lead to reduced survival and recovery. Because off-road travel is not authorized in areas of NIDGS occupancy and it is assumed that the Forest will enforce unauthorized use, we are not authorizing take in the form of habitat destruction and public trespass.

2.8.2 Effect of the Take

2.8.2.1 Bull Trout

In the accompanying Opinion, the Service determined that the take of all bull trout for all life stages occupying 142 crossings is not likely to result in jeopardy to the bull trout across its range. Given the low magnitude of the anticipated effects, the apparently improving status of the core area populations in the action area (USFWS 2015f), and apparently secure status of the Upper Snake River and Mid-Columbia RUs (USFWS 2015f), we conclude that the impacts of the proposed ongoing action will not jeopardize the continued existence or impede recovery of the coterminous population of bull trout.

2.8.2.2 Northern Idaho Ground Squirrel

In the accompanying Opinion, the Service determined that the level of take anticipated as a result of the ongoing proposed action is not likely to jeopardize the NIDGS across its range. The proposed action is not expected to significantly reduce the reproduction, status, and distribution of NIDGS in the action area, and will not appreciably reduce the likelihood of survival and recovery of the species. Furthermore, each pair of NIDGSs produces one litter per year with two to seven pups each. Two to three litters would offset the loss of NIDGSs from ongoing proposed action, and therefore the effects will not appreciably reduce the likelihood of survival and recovery of the species.

We do not anticipate appreciable changes in the numbers, distribution, or reproduction of NIDGS that occur in the action area. Over the long-term, the projects implemented under this programmatic consultation are expected to contribute to the conservation and recovery of NIDGS throughout the action area, and the population segments on the Forest, specifically as off-road travel is eliminated and roads and dispersed camping are minimized in the action area.

2.8.3 Reasonable and Prudent Measures

The Service concludes that the following reasonable and prudent measures are necessary and appropriate to minimize the take of bull trout and NIDGS caused by the ongoing proposed action.

1. Minimize the potential adverse effects resulting from continued use of roads/trails and stream crossings on bull trout-occupied streams.
2. The Forest shall implement actions to minimize the effect of the take anticipated to bull trout and NIDGS populations.

2.8.4 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. These terms and conditions are non-discretionary. Required reporting and monitoring requirements are described in Section 2.8.5.

1a. Provide motor vehicle use maps to the public and enforce route designations as appropriate.

1b. In addition to the monitoring described in the proposed ongoing action (Section 2.1.2) the Forest shall report annually on monitoring to determine if any new fords or crossings have been created in bull trout-occupied habitat. Should a new ford or crossing be identified, the Forest, in consultation with the Service through the Level I Team, will identify measures to avoid or minimize adverse impacts likely to be caused by these new fords or crossings. Such measures may include, but will not be limited to: closure, rehabilitation, or signage. Depending on the specific circumstances, the detection of new fords or crossings may trigger reinitiation of formal consultation.

1c. The Forest shall install aquatic organism passage structures at the Smith Creek Fork and the upper North Fork Smith Creek ford by December 31, 2023. If mutually agreed by the Service, an extension of this date may be allowed if justified by funding availability and prioritization of ford replacements in spawning or rearing habitat.

1d. The Forest shall monitor unauthorized use, and barriers to prevent this use, on roads and trails closed to the public in the project area. Barriers that are not functioning appropriately will be repaired and/or modified as necessary to achieve intended results.

1e. The Forest shall monitor all 140 trail stream crossings and identify trail-stream crossings that are located in bull trout spawning/rearing habitat, develop a strategy to eliminate potential take associated with fording, and prioritize trail-stream crossings for remedial action. Remedial actions may include such things as hardening the ford or installing a structure capable of aquatic organism passage. Where spawning surveys are conducted by other entities, spawning survey data may be used to cross reference redd locations with known ford locations. Problem fords shall be addressed as funding resources become available.

2a. The Forest shall identify and close roads in occupied NIDGS habitat where illegal activities (i.e., illegal shooting) are occurring as a result of motorized travel or where unauthorized motorized travel in NIDGS habitat is likely to occur.

2b. Post a warning sign (i.e., "wildlife area") and prioritize areas for posting advisory speed plaques of 15 mph on road segments that intersect occupied NIDGS habitat where the

Forest has determined that vehicle speeds could easily exceed this speed (e.g., FR 58009), wherever possible.

2c. The Forest shall move FR 51454 and 50653 into long-term closure at the end of the Lost Creek Boulder Creek Vegetation Project implementation. These roads are not designated as open to travel on the MVUM, but illegal use could occur because the roadbed is well established and the roads appear to be open.

2.8.5 Reporting and Monitoring Requirement

In order to monitor the impacts of incidental take, the Federal agency or any applicant must report the progress of the action and its impact on the species to the Service as specified in the ITS [(50 CFR 402.14 (i)(3)].

1. The Forest shall include the following details in the programmatic road and trail maintenance report at the Level 1 team meeting to be scheduled in the early spring of each year during the term of the ongoing proposed action: (1) the results of the Forest's monitoring of stream fords and crossings on designated routes to determine if travel (motorized and non-motorized) is causing direct or indirect aquatic impacts to bull trout and designated critical habitat; (2) any site-specific minimization or mitigation measures to reduce or avoid adverse effects to sensitive resources that were developed and implemented as a result of the monitoring program. The results of any bull trout surveys conducted in the project area will also be provided to the Service.
2. A report summarizing the comprehensive inventory of trail-stream crossings in potential spawning/rearing habitat, strategies for address potential problems, and prioritization of trail-stream crossing actions shall be completed and provided to the Service by December 31, 2023. The Forest shall also provide the Service with a geographic information system layer of trail-stream crossings that are located in potential spawning/rearing habitat.
3. Any NIDGSs that are reported as vehicular mortality shall be reported to the Service as take tracking for this ongoing proposed action.
4. **Disposition of Individuals Taken:** In the course of implementing the ongoing proposed action addressed in this Opinion and the monitoring and reporting requirements addressed in this ITS, if dead, injured, or sick endangered or threatened species are detected and/or salvaged, the Service's Office of Law Enforcement in **Marsing, Idaho (208-442-9551)** and the Service's Ecological Service's office in **Boise, Idaho (208-378-5243)** shall be notified during normal business hours within 3 working days. Notification shall include the date, time, and precise location of the detection, and the species involved, and shall distinguish between injured and killed animals. If the listed species detected is not covered under this ITS, do not disturb the site and immediately contact the Service's Office of Law Enforcement referenced above.
5. Promptly notify the Service of any emergency or unanticipated situations arising that may be detrimental for bull trout or NIDGSs relative to the ongoing proposed action.

2.9 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.

- Consider future climate conditions when planning for any future project.
- Consider designing stream crossings to minimize sediment into streams.
- Consider developing a dispersed recreation strategy for dispersed uses within watersheds that contain bull trout.
- Continue monitoring for bull trout within the action area for sufficient population trend analysis.
- Expand public educational programs directed at minimizing harm and harassment of federally listed species at recreational facilities. Develop and/or acquire educational signs or brochures educating the public on the importance of avoiding redds, not disturbing listed fish, and limiting impacts on riparian habitats (e.g., not cutting firewood or other riparian vegetation, leaving woody debris in place, using developed trails rather than forging new trails, etc.). Consider updating protected species information on the Forest visitor's map to further emphasize responsible recreation.
- Continue to support collaborative processes that address access management and recreational opportunities across the Forest while emphasizing the need for compliance with LRMP standards pertinent to the protection and conservation of listed resources.
- Consider, on future travel plan decisions, measures to benefit federally listed species and/or designated critical habitat.
- Consider working with the IDFG in developing and placing additional angler signs to discourage the harvest of bull trout in areas where repeated harvests have occurred.
- Annually review survey data to determine presence of bull trout adjacent to and/or downstream of any crossing.
- At the streamlining Level 1 team meetings periodically (every other year), discuss the status of this specific consultation.
- Consider eDNA sampling to further refine bull trout presence/absence on the Forest.
- Limit all 18-wheeler traffic or regular vehicle trips (in excess of four round trips per day) within the Forest's control (i.e., related to an individual Forest action or permitted activity) in or adjacent to occupied NIDGS habitat to time periods when NIDGSs are in hibernation.
- The Forest should survey all bridges proposed for replacement or repair on the Forest for bat activity prior to implementation.

2.10 Reinitiation Notice

This concludes formal consultation on the Snow-free Season Travel Management Plan on the Payette National Forest. 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.
4. A new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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