United States Department of the Interior

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JUL 0 8 2011

Frank V. Guzman
Forest Supervisor
Salmon-Challis National Forest
1206 South Challis Street
Salmon, Idaho 83467

Subject: Biological Opinion on Livestock Grazing on the Herd Creek Grazing Allotment, on the Salmon-Challis National Forest in Custer County, Idaho
File# 114.0100 and 14420-2011-F-0222

Dear Mr. Guzman:

This letter transmits the Fish and Wildlife Service's (Service) Biological Opinion (Opinion) on effects of the Salmon-Challis National Forests' (Forest) proposal for livestock grazing on Herd Creek Grazing Allotment in Custer County, Idaho to threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat. Bull trout and its designated critical habitat are listed under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.; [Act]). In a letter dated June 15, 2011, and received by the Service on June 17, 2011, the Forest requested consultation under section 7 of the Act. Your letter included a biological assessment describing effects of the subject action on bull trout and its critical habitat.

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

Sincerely,

Russell L. Holder

FOR Brian T. Kelly
State Supervisor

Enclosure

cc: SCNF, Salmon (Melvin)
NOAA, Boise (Mabe)

BIOLOGICAL OPINION
FOR THE
HERD CREEK GRAZING ALLOTMENT
SALMON-CHALLIS NATIONAL FOREST

14420-2011-F-0222

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

Field Supervisor Russell R. Holden

Date 7/7/2011

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INTRODUCTION

This document represents the Fish and Wildlife Service's (Service) Biological Opinion (Opinion) on the Salmon-Challis National Forest's (Forest) proposed livestock grazing authorization for the Herd Creek Allotment (Allotment) in Idaho and its effects on the threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat. This Opinion was prepared in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 USC 1531 et seq.). Your request for consultation was received on June 17, 2011.

This Opinion is primarily based on the Forest's *Aquatic Species Biological Assessment for the Herd Creek Cattle Allotment* (USFS 2011; herein Assessment), dated June 15, 2011, and the other sources of information cited herein. The Assessment is incorporated by reference in this Opinion.

Consultation History

Beginning in spring of 2009, the Forest began collecting and compiling information on the condition of habitat for bull trout in a large number of the Forest's grazing allotments. Since that time, monthly meetings were held between Forest staff and the Level 1 consultation streamlining team (of which the Service is a member) to discuss biological assessment drafts, effects determinations, and grazing strategies, and to take field trips to many of the grazing allotments often with grazing permittees.

In the June 2011 Assessment, the Forest determined that the proposed action may affect and is likely to adversely affect bull trout and may affect, likely to adversely affect designated critical habitat for the bull trout. A complete decision record for this consultation is on file at the Service's Eastern Idaho Field Office in Chubbuck, Idaho.

PURPOSE and ORGANIZATION of this BIOLOGICAL OPINION

In accordance with the requirements of section 7(a)(2) of the Act and its implementing regulations, the formal consultation process culminates in the Service's issuance of an Opinion that sets forth the basis for a determination as to whether the proposed Federal action is likely to jeopardize the continued existence of listed species or destroy or adversely modify critical habitat, as appropriate. The regulatory definition of jeopardy and adverse modification and a description of the formal consultation process are provided at 50 CFR[1] 402.02 and 402.14, respectively. If the Service finds that a proposed Federal action is not likely to jeopardize a listed species but anticipates that it is likely to cause incidental take of the species, then the Service must identify that take and exempt it from the prohibitions against such take under section 9 of the Act through an Incidental Take Statement.

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

Analytical Framework for the Jeopardy and Adverse Modification Analyses

Jeopardy Determination

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

- *Status of the Species*, which evaluates the bull trout range-wide condition, the factors responsible for that condition, and its survival and recovery needs
- *Environmental Baseline*, which evaluates the condition of the bull trout in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the bull trout
- *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the bull trout
- *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the bull trout.

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

The jeopardy analysis in this Biological Opinion places an emphasis on consideration of the range-wide survival and recovery needs of the bull trout and the role of the action area in the survival and recovery of the bull trout 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.

Adverse Modification Determination

This Opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this Biological Opinion relies on four components:

- *Status of Critical Habitat*, which evaluates the range-wide condition of designated critical habitat for the bull trout in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall, as well as the intended recovery function in general of critical habitat units

- *Environmental Baseline*, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area

- *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected critical habitat units

- *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units

For purposes of the adverse modification determination, the effects of the proposed Federal action on bull trout critical habitat are evaluated in the context of the range-wide condition of the critical habitat, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional (or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the bull trout. The analysis in this Opinion places an emphasis on using the intended range-wide recovery function of bull trout critical habitat and the role of the action area relative to that intended function 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 adverse modification determination.

I. DESCRIPTION OF THE PROPOSED ACTION

A. Action Area

The term "action area" is defined in the regulations as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." In this case, the action area is described as those lands within the Herd Creek Allotment which is located in Custer County, Idaho (Assessment, p. 2).

B. Proposed Action

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

The Forest proposed action is to authorize grazing of the Allotment in a manner consistent with information contained in the Assessment (Assessment, pp. 6-11). The Allotment consists of four units (pastures) and is grazed in a 3-year rest rotation system (Assessment p. 6). The unit names are the Taylor/McDonald, Lake Basin, Herd Lake, and West Fork Unit. No grazing occurs on the West Fork Unit. The Allotment permit currently allows for 636 cow/calf pairs to use the allotment from June 16 to October 31. However, annual authorization of livestock from 2002 to 2010 has been for 50 -215 cow/calf pairs. Therefore, this consultation will be based on 215 cow/calf pairs. If in the future there is a want to graze more cattle on the allotment, reinitiation

will need to occur. In general, units are entered when the range is ready (correct forage conditions), and movement from one unit to the next is triggered by stubble height, browse use, bank alteration, etc. (Assessment, p. 6).

C. Term of Action

The Forest intends to continue to authorize grazing on the Allotment through the life of the existing permit(s) and potentially reissue those permit(s). If there are no changes to the proposed action that trigger re-initiation of this consultation, the Service considers this consultation to extend until December of 2019. That time period is long enough to observe subtle trends in habitat condition and fish trend data that cannot be observed in a shorter time span. However, the annual use information is sensitive enough to detect larger, more significant changes within that time period and which would then trigger reinitiation before 2019.

D. Measures to Reduce Impacts

The Forest has identified specific management actions and riparian area protection measures to reduce the degree of impact from livestock grazing on bull trout and its habitat. These measures are identified on page 12 of the Assessment. For example, salt blocks are kept at least ¼ mile away from live water and riders are used to prevent livestock congregating near streams, fences and water developments must be kept in good condition to maintain good distribution of livestock, hardened fords are used during trailing when possible, and annual use indicators are used to move livestock to reduce the chance of damage to the plants and stream banks.

II. STATUS OF THE BULL TROUT

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

A. Regulatory Status

1. Listed under the Act

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

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

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

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

2. Threats

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

3. Other Threats

Climate change represents a newly identified threat to the bull trout. The current change in world climate is trending toward warmer temperatures (Intergovernmental Panel on Climate Change 2007). Because bull trout are dependent on cold water temperatures, changes toward higher average temperatures could effectively reduce its available habitat (Rieman et al. 2007, p. 4). Rieman et al. (2007, p. 14) found that a change of 0.6° to 5° C could reduce the percent of large habitat patches by 27 to 97 percent across the bull trout's range. In Central Idaho, habitat may be affected less than other areas of the bull trout's range because of the wide range in elevation that its current habitat is distributed. Given the broad range of the estimate it would be difficult to reasonably estimate what impact climate change is likely to have on the survival and recovery of bull trout throughout its range. Rieman et al. (2007, p. 17) caution that their results cannot be extrapolated directly for management of bull trout without consideration of many other factors. Until better models are developed on which to base an understanding of climate change-related effects on the bull trout, Rieman et al. (2007, p. 17) suggest continuation of bull trout conservation efforts to maximize its resiliency.

4. Designated Critical Habitat

The Service issued a final rule designating critical habitat for bull trout range-wide on September 30, 2010 (USFWS 2010, p. 63897). The designation includes 18,975 miles of stream, 754 miles of shoreline, and 488,252 acres of lake or reservoir. Methods on how we designate critical habitat can be found in the Federal Register (USFWS 2010).

B. Survival and Recovery Needs

1. Recovery Planning

There is no final recovery plan in place for bull trout, so the best available scientific information regarding the recovery needs of the species is the draft recovery plan. The draft recovery plan for the bull trout (USFWS 2002, p. 49) has identified the following survival and recovery needs for the bull trout: (1) maintain and restore multiple, interconnected populations in diverse habitats across the range of each interim recovery unit; (2) preserve the diversity of life-history strategies; (3) maintain genetic and phenotypic diversity across the range of each interim recovery unit; and (4) establish a positive population trend. More specifically, the survival and recovery needs of the bull trout are often generally expressed as the need to provide **cold** stream temperatures, **clean** water quality that is relatively free of sediment and contaminants, **complex** channel characteristics (including abundant large wood and undercut banks), and large patches of such habitat that are well **connected** by unobstructed migratory pathways. All are needed to promote survival and recovery of the bull trout at multiple scales ranging from the coterminous United States population (the listed taxon) to local populations.

Central to the survival and recovery of the bull trout at a population level is the maintenance of viable core areas (USFWS 2002, pp. 47 and 48) defined below. Each of the interim recovery units listed below consists of one or more core areas. Approximately 121 core areas are recognized across the United States range of the bull trout (USFWS 2005, p. 4).
The Service (USFWS 2002, p. 52) organized the draft recovery plan for the bull trout along the same lines as the DPSs and added the smaller scales of core areas and local populations; see definitions below.

Interim Recovery Unit: one of five DPSs identified in the final listing rule (e.g., the Columbia River Interim Recovery Unit).

> Core Area: a geographic area within an interim recovery unit occupied by one or more local bull trout populations that overlap in their use of rearing, foraging, migratory, and overwintering habitat, and in some cases in their use of spawning habitat.
>
> > Local Population: a group of bull trout within a Core Area that spawn within a particular stream or portion of a stream system. A local population is considered to be the smallest group of fish that is known to represent an interacting reproductive unit.

C. Rangewide Status and Distribution

In recognition of available scientific information relating to their uniqueness and significance, five segments of the coterminous United States population of the bull trout are considered essential to the survival and recovery of this species and are identified as interim recovery units: (1) Jarbidge River; (2) Klamath River; (3) Coastal-Puget Sound; (4) St. Mary-Belly River, and (5) Columbia River. Each of these segments 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. A summary of the current status

and survival and recovery needs of the bull trout within these units is provided below. A comprehensive discussion of these topics is found in the Service's draft recovery plan for the bull trout (USFWS 2002, pp. 49-61.).

1. Jarbidge River

This interim recovery unit currently contains a single core area with six local populations. Less than 500 resident and migratory adult bull trout, representing about 50 to 125 spawners, are estimated to occur within the core area (Fish and Wildlife Service 2004b, p.16). The current condition of the bull trout in this interim recovery unit is attributed to the effects of livestock grazing, roads, angler harvest, timber harvest, and the introduction of non-native fishes.

2. Klamath River

This interim recovery unit currently contains 3 core areas and 12 local populations. The current abundance, distribution, and range of the bull trout in the Klamath River Basin are greatly reduced from historical levels due to habitat loss and water quality degradation caused by reduced water quality, timber harvest, livestock grazing, water diversions, roads, and the introduction of non-native fishes (USFWS 2002, pp. 17-28). Because of these impacts, bull trout populations in this unit face a high risk of extirpation (USFWS 2002a).

3. Coastal-Puget Sound

Bull trout in the Coastal-Puget Sound interim recovery unit exhibit anadromous, adfluvial, fluvial, and resident life history patterns. The anadromous life history form is unique to this unit. This interim recovery unit currently contains 14 core areas and 67 local populations (USFWS 2004, p iv, and 2004a, p. 20). Bull trout are distributed throughout most of the large rivers and associated tributary systems within this unit. With limited exceptions, bull trout continue to be present in nearly all major watersheds where they likely occurred historically within this unit. Generally, bull trout distribution has contracted and abundance has declined especially in the southeastern part of the unit (Fish and Wildlife Service 2004, p.47). The current condition of the bull trout in this interim recovery unit is attributed to the adverse effects of dams, forest management practices (e.g., timber harvest and associated road building activities), agricultural practices (e.g., diking, water control structures, draining of wetlands, channelization, and the removal of riparian vegetation), livestock grazing, roads, mining, urbanization, angler harvest, and the introduction of non-native species.

4. St. Mary-Belly River

This interim recovery unit currently contains 6 core areas and 9 local populations (USFWS 2002c, p. 88). Currently, the bull trout is widely distributed in the St. Mary River drainage and occurs in nearly all of the waters that it inhabited historically. Bull trout are found only in a 1.2-mile reach of the North Fork Belly River within the United States. Redd count surveys of the North Fork Belly River documented an increase from 27 redds in 1995 to 119 redds in 1999. This increase was attributed primarily to protection from angler harvest (USFWS 2002c, p.37). The current condition of the bull trout in this interim recovery unit is primarily attributed to the

effects of dams, water diversions, roads, mining, and the introduction of non-native fishes (USFWS 2002c, p. vi and vii).

5. Columbia River (includes the action area)

This interim recovery unit currently contains about 90 core areas and 500 local populations. About 62 % of these core areas and local populations occur in central Idaho and northwestern Montana. The condition of the bull trout within these core areas varies from poor to good but generally all have been subject to the combined effects of habitat degradation, fragmentation, and alteration associated with one or more of the following activities: stream and river dewatering; road construction and maintenance; mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment into diversion channels; and introduced non-native species. The draft bull trout recovery plan (USFWS 2002, pp. 49-61) identifies the following survival and recovery needs for this unit: maintain or expand the current distribution of the bull trout within core areas; maintain stable or increasing trends in bull trout abundance; maintain/restore suitable habitat conditions for all bull trout life history stages and strategies; and conserve genetic diversity and provide opportunities for genetic exchange.

D. Life History

Bull trout exhibit both resident and migratory life history strategies. Both resident and migratory forms may be found together, and either form may produce offspring exhibiting either resident or migratory behavior. Resident bull trout complete their entire life cycle in the tributary (or nearby) streams in which they spawn and rear. The resident form tends to be smaller than the migratory form at maturity and also produces fewer eggs. Migratory bull trout spawn in tributary streams where juvenile fish rear 1 to 4 years before migrating to either a lake (adfluvial form), river (fluvial form), or ocean (anadromous) to rear as sub adults or to live as adults. Bull trout normally reach sexual maturity in 4 to 7 years and may live longer than 12 years. Growth varies depending upon life-history strategy. Resident adults range from 6 to 12 inches total length, and migratory adults commonly reach 24 inches or more. They 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.

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

E. Habitat Characteristics

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

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

Cold water temperatures play an important role in determining bull trout habitat, as these fish are primarily found in colder streams (below 59° F), and spawning habitats are generally characterized by temperatures that drop below 48 degrees Fahrenheit in the fall. Thermal requirements for bull trout appear to differ at different life stages. Spawning areas are often associated with cold-water springs, groundwater infiltration, and the coldest streams in a given watershed. Optimum incubation temperatures for bull trout eggs range from 35 to 39° F whereas optimum water temperatures for rearing range from about 46 to 50° F (Buchanan and Gregory 1997, p. 122). In Granite Creek, Idaho, Bonneau and Scarnecchia (1996, p. 629-630) observed that juvenile bull trout selected the coldest water available in a plunge pool, 46 to 48° F, within a temperature gradient of 46 to 60° F. In a landscape study relating bull trout distribution to maximum water temperatures, Dunham et al. (2003, pp.899-900) found that the probability of juvenile bull trout occurrence does not become high (i.e., greater than 75 %) until maximum temperatures decline to 52 to 54° F.

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

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools. Maintaining bull trout habitat requires stability of stream channels and maintenance of natural flow patterns. Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover. These areas are sensitive to activities that directly or indirectly affect stream channel stability and alter natural flow patterns. For example, altered stream flow in the fall may disrupt bull trout during

the spawning period, and channel instability resulting in egg stranding may decrease survival of eggs and young juveniles in the gravel from winter through spring. Increases in fine sediment can reduce egg survival and emergence.

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

Migratory forms of the bull trout appear to develop when habitat conditions allow movement between spawning and rearing streams and larger rivers or lakes where foraging opportunities may be enhanced (Frissell 1993, pp. 347-351). Benefits to migratory bull trout include greater growth in the more productive waters of larger streams and lakes, greater fecundity resulting in increased reproductive potential, and dispersing the population across space and time so that spawning streams may be recolonized should local populations suffer a catastrophic loss. In the absence of the migratory bull trout life form, isolated populations cannot be replenished when disturbance makes local habitats temporarily unsuitable, the range of the species is diminished, and the potential for enhanced reproductive capabilities are lost (Rieman and McIntyre 1993, p. 11). Additional information about the bull trout's habitat requirements can be found in the final listing rule (USFWS 1999).

F. Diet

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

Migration allows bull trout to move to or with a food source, access optimal foraging areas and exploit a wider variety of prey resources. Migratory bull trout begin growing rapidly once they move to waters with abundant forage that includes fish (Shepard et al. 1984, p. 49). As these fish mature they become larger bodied predators and are able to travel greater distances in search of prey species of larger size and in greater abundance. In Lake Billy Chinook, as bull trout became increasingly piscivorous with increasing size, the prey species changed from mainly smaller bull trout and rainbow trout for bull trout less than 17.7 inches in length to mainly kokanee for bull trout greater in size (Beauchamp and Van Tassell 2001, p. 213). Additional information on the bull trout's diet can be found in the final listing rule (USFWS 1999).

G. Previously Consulted-on Effects

1. Rangewide

Consulted-on effects are those that have been analyzed in section 7 consultations and reported in a biological opinion. As of August 2003, the Service had issued a total of 137 biological opinions addressing the effects of proposed actions on the bull trout throughout its range; all of these opinions were the subject of non-jeopardy/non-adverse modification of critical habitat determinations. Of these, 124 biological opinions applied to activities affecting bull trout in the Columbia Basin population segment, 12 biological opinions applied to activities affecting bull trout in the Coastal-Puget Sound population segment, 7 biological opinions applied to activities affecting bull trout in the Klamath Basin population segment, and 1 biological opinion applied to activities affecting the Jarbidge and St. Mary-Belly population segments.

The Service has completed section 7 consultations on many programs and actions that benefit bull trout. Some of the beneficial programs were small scale actions such as removing passage barriers, installing 'fish friendly' crossing structures, and some were large such as restoring habitat conditions in degraded streams and riparian areas. Three consultations that had broad and long-term benefits to bull trout were consultations on documents that amended Forest Plans and provided 'fish friendly' standards and guidelines related to federally listed anadromous and native inland fish on National Forest Service lands in Idaho.

The majority of consultations on projects that resulted in adverse effects were for effects that were short-term and very local. Overall, our review in 2003 showed that we consulted on a wide array of actions that had varying levels of effect and that none were found to appreciably reduce the likelihood of survival and recovery of the bull trout. Furthermore, no actions that have undergone consultation were anticipated to result in the loss of local populations of bull trout, the smallest, most sensitive scale in the bull trout recovery plan's concept of metapopulation.

2. Eastern Idaho

For this Opinion, the Eastern Idaho Office examined the record for Opinions issued since 2003 for those actions areas that overlap any or all of the following 8 bull trout recovery core areas: Upper Salmon, Pahsimeroi River, Lemhi River, Middle Salmon River-Panther, Little Lost River, Middle Fork Salmon River, Lake Creek, and Opal Creek (USFWS, 2011).

Approximately 50 Opinions have been issued across six bull trout recovery areas. Four of them are broad-scale, program-level Opinions. In three of those four, no take was anticipated or none has occurred. In the remaining Opinions, varying amounts of lethal and non lethal take of adult bull trout, juvenile bull trout and bull trout redds was anticipated. In each of those actions, less take than was anticipated has been detected (Appendix B and USFWS 2010a). All 50 Opinions concluded that the proposed actions would not be likely to jeopardize the coterminous U. S. population of bull trout. Further, only one was found to cause a significant impact to a core area or any local population within a core area.

III. ENVIRONMENTAL BASELINE OF THE ACTION AREA

This section assesses the effects of past and ongoing human and natural factors that have led to the current status of the species, its habitat and ecosystem in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have already undergone section 7 consultations, and the impacts of state and private actions which are contemporaneous with the consultations in progress.

A. Status of the Bull Trout in the Upper Salmon River Core Area

This core area encompasses the 4th field Hydrologic Unit that extends from the mouth of the Pahsimeroi River to the headwaters in the Sawtooth Mountains, including the mainstem Salmon River and tributaries (USFWS 2002b, p. 7). The area contains 3,251 miles of streams. Eighty-nine percent of this core area is public land and most is managed by the Federal government. Eighteen local populations and one potential local population have been identified in this core area (USFWS 2002b, p. 7). Road density in this core area is relatively low at 0.5 miles per square mile (mi/mi^2) (USFWS 2005a, p. 49) and overall this core area is considered (from all causes) as being at potential risk of extinction[2] (USFWS 2008 p. 34).

In the draft bull trout recovery plan (USFWS 2002 p. 65), adult bull trout abundance in the Upper Salmon River Core Area was estimated to be greater than 5,000 adult fish. This estimate was based on many disparate pieces of information and the professional judgment of fish biologists familiar with bull trout and stream conditions in the core areas (USFWS 2002, p. 2).

In 2005, Idaho Department of Fish and Game (IDFG) reported population numbers for the Upper Salmon River Core Area 2005, p. 32) based on an extensive modeling effort (IDFG 2005 and High et al. 2008). A corrected table (K. Meyer, IDFG, pers. comm., March 11, 2009) showed an approximate population of 31,461 (± 10,804) bull trout (adults and young) for the core area. Using an assumption that 10% of the total number are adult fish (K. Meyer, IDFG, pers. comm., March 11, 2009), that suggests an adult population in this core area of approximately 3,100 individuals. This is less than the recovery plan estimate of 5,000 adult bull trout cited above, but within the same order of magnitude.

Based on that number of adult fish, this core area was classified as not at risk of extirpation due to the deleterious effects of genetic drift (USFWS 2002) and because there are migratory bull trout in nearly all local populations, this core area was considered to be at a diminished risk of extirpation from loss of connectivity (USFWS 2002b, p. 7). Some creeks in the core area have been significantly impacted by sediment from mining operations and impacts from irrigation diversions (USFWS, 2002b, p. 7). Brook trout, a threat to bull trout through competition, hybridization, and predation, have also been found in several local population creeks.

[2] The final core area ranking (High Risk, At Risk, Potential Risk, and Low Risk) were produced using ranking categories adapted from adapted from Montana's application of the Natural Heritage Program's Nature Serve Conservation Status Assessment Criteria (USFWS, 2005a, p. 11)

The Service has issued seven Opinions in this core area. One was for reconstruction of a diversion headworks (beneficial to bull trout) and that anticipated non lethal take of 11 bull trout; one covered the impact from an irrigation diversions and that anticipated ten bull trout (juvenile and adult) taken through entrainment; one was for non lethal salvage from a ditch supporting a mining operation; and one was from impacts from a mine with no specific take enumerated; and three for impacts from grazing that anticipated 13-62 redds trampled. In all cases, the Service concluded that this take was not likely to cause substantial impacts to the local population or core area, and not likely to jeopardize the coterminous U.S. population of the bull trout (USFWS, 2011). Surveys to date have not found any take of redds and found substantially lower density of redds in the action areas' streams than were used to estimate take. (Appendix B).

B. Status of Bull Trout and its Designated Critical Habitat in the Action Area

1. Population Information

The Forest indicates that bull trout are present in Herd Creek, Pass Creek, East Fork Herd Creek, West Fork Herd Creek, and Taylor Creek within the Allotment, with spawning and rearing occurring in all but the main stem Herd Creek (Assessment, p. 14). There are approximately 7 miles of occupied streams with 4.6 miles of this being spawning habitat. High water temperature and instream fine sediments are considered limiting factors for fisheries production in this allotment (Assessment p.20).

The action area is within the East Fork Salmon River local population which is one of 18 local populations in the Upper Salmon River Core Area (USFWS, 2002b). The draft bull trout recovery plan is silent on the specific roles of these bull trout local populations in the survival and recovery of the listed species, but it is our professional judgment, taking into account the fundamental principles of conservation biology, that maintaining this local population is important to maintaining the overall production and distribution of bull trout in the Upper Salmon River Core Area.

2. Critical Habitat

Critical habitat was revised and designated for the bull trout on September 30, 2010. The action area contains 19.2 miles of designated critical habitat. Streams that have been designated as critical habitat for bull trout include Herd, West Fork Herd, East Fork Herd, Taylor, East Pass, and Meridian Creek. The last two creeks are totally within the Fish Conservation Unit and will not be grazed (Assessment p.15).

C. Role of the Action Area in the Survival and Recovery of the Bull Trout

The Forest used focus indicators (discussed below) to establish a baseline condition for the bull trout and their habitat in the action area, and typically that information would be summarized in this section of the Opinion. However, this information will be presented in the "Effects of the Proposed Action" section below so that the reader can more directly compare the potential effects of the action against the baseline condition.

Establishment of Baseline Conditions for Bull Trout

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

One tool that was developed to assist in describing the condition of watersheds and streams on which bull trout depends is entitled *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* [3] (Appendix 9 in Lee et al. 1997). It is commonly referred to as the "Matrix of Pathways and Indicators" and, at its most basic level, is a table which identifies the important elements or indicators of a bull trout's habitat. Using this table assists in consistent organization and assessment of current conditions and in judging how those indicators may be impacted by a proposed action (Lee et al. 1997, p. 9-6). The Forest included a matrix for this Allotment on pages B2 – B13 of the Assessment. Because the Matrix of Pathways and Indicators was developed to operate at several spatial scales (Lee et al. 1997, p. 9-9), the Forest selected six indicators as their "focus indicators" to address the scale of the Allotment.

The six selected focus indicators are spawning and incubation, water temperature, sediment, stream channel width to depth ratio, streambank condition, and condition of the Riparian Habitat Conservation Area. These indicators represent quantifiable attributes of bull trout habitat (related to its survival and recovery needs) that are most likely to reflect the complex relationships between actions, pathways for effects to the bull trout caused by these actions and the likely effects to the fish (discussed below). Because these indicators are quantifiable, monitoring data can be collected on their status and tracked over time to determine trends. For these reasons, the Service concludes that use of these indicators is a valid method of assessing baseline conditions and the impacts of an action on the bull trout.

Using data on the above indicators, the Forest characterized condition of habitat for bull trout in the occupied streams within this Allotment. If stream-specific information was not available, then observational information or information from similar streams was used. If one (or several) of the focus indicators showed a habitat condition not within the range of condition considered to be appropriate to fully supporting bull trout's conservation needs, the Forest presented its professional judgment regarding the most likely cause for that condition. By identifying any known specific habitat limitations, the Forest and the Service can more closely focus their analysis of the proposed action's effects on that component of the bull trout's habitat. In that way a more precise evaluation of potential effects can be made. To assist the reader, the "Effects of the Proposed Action" section below is organized in the same way.

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

Limiting Factors

On this allotment, the Forest found water temperature and instream fine sediments are most likely limiting factors for bull trout (Assessment, p. 20).

IV. EFFECTS OF THE PROPOSED ACTION

A. Direct and Indirect Effects of the Proposed Action

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

1. Analytical Approach and Assumptions

In the following evaluation, the Service relied upon the Forest's effects analysis in their Assessment, which is based on a series of assumptions about bull trout presence and distribution in the action area, likely spawning timing, and potential impacts to redds from livestock grazing in units that include bull trout-occupied streams. Because of the construct of these assumptions, they are more likely to overestimate, rather than underestimate, the impacts. When examining the potential impacts to a species that is listed as threatened under the Act, and there is substantial imprecision in some of the information, this approach is a reasonably cautious and prudent approach for assessing impacts to populations of that species. Absent the consideration of the full potential of effects, detrimental impacts to the species can go unrecognized (National Research Council 1995, p.167).

2. General Overview of Grazing Impacts on Bull Trout

The relationship between grazing activities and their effect to fish and fish habitat is complex and, at times, includes synergistic and interrelated relationships. To assist the reader in understanding how grazing activities act through cause and effect pathways to result in effects to fish, the Service developed a source document (Appendix A - *Assessing the Effects of Grazing on Bull Trout and Their Habitat*) that identifies and evaluates those pathways based on published information and commonly accepted rationales. By creating a source document, relevant portions can be incorporated by reference, without substantially increasing the narrative of this Opinion. Figure 1 and Table 1 summarize the results of the evaluation presented in Appendix A.

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Figure 1. Summary of effect pathways that may be triggered by grazing activities and the possible environmental results and consequences to bull trout/aquatic habitat.

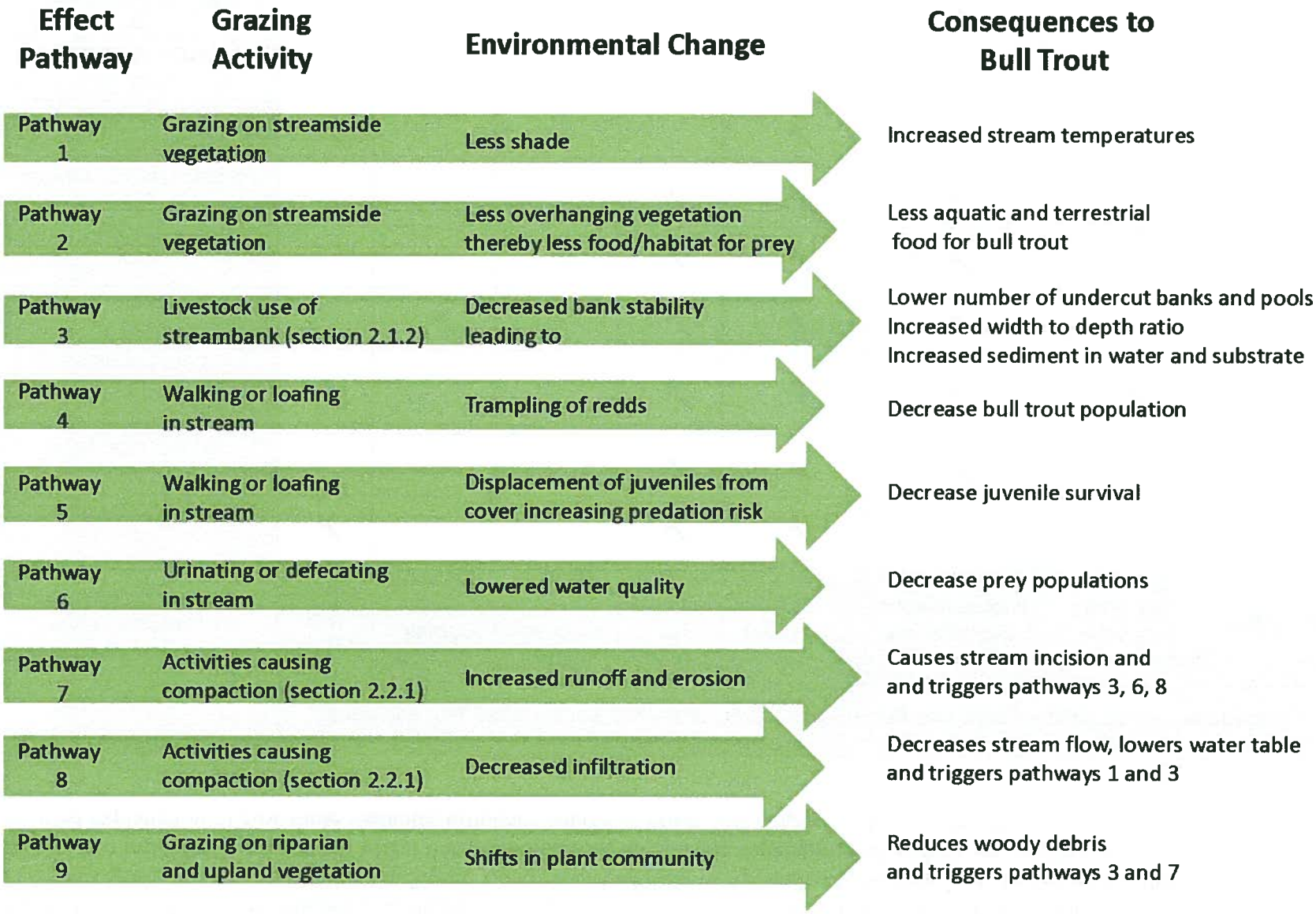

Table 1. Variables which influence the degree of impact that grazing can have on bull trout or their habitat separated by Effect Pathways (pathways are summarized in Figure 1 and described fully in Appendix A, Section 2.0). For example, the 'amount of stream access' can influence the degree of effect that grazing has on streamside vegetation and, in turn, on 'stream temperature'. For a detailed explanation of how these variables influence degree of effect, see Appendix A, Section 3.0.

Effect pathway # and element that may be affected by grazing	Variables that influence the degree of impact that grazing can have on bull trout or their habitat							
	Slope and aspect	Habitat suitability for spawning	Habitat suitability for juveniles	Amount of stream access	Vegetation type	Management considerations	Soil condition, type, and moisture content	Elevation
1 Stream temperature	✓			✓	✓	✓		
2 Prey abundance				✓	✓	✓	✓	
3 Bank condition and sediment load	✓			✓	✓	✓	✓	✓
4 Redd trampling		✓		✓	✓	✓		
5 Juvenile displacement			✓	✓	✓	✓		
6 Stream nutrient levels				✓	✓	✓		
7 Runoff and erosion	✓				✓	✓	✓	
8 Infiltration rate	✓				✓	✓	✓	
9 Plant community					✓	✓	✓	

Level of Grazing Pressure.

The level of grazing pressure on a particular area can determine the impacts on environment and the effectiveness of variables that mitigate or enhance that impact (Appendix A, Section 3.1.4 and 3.3.6). On this Allotment, the proposed annual use indicator for stubble height is 4 to 6 inches (Assessment, p. 12). One reference represents a 4-6 inch stubble height as 50 – 25 percent use of the plant's biomass (USFS, 1992), and that range has been characterized as "light to medium" grazing by Clary (1999, p. 218). Holecheck et al. (2006, p. 8), reviewed 20 grazing studies and based on the categorization of the definitions within those studies, summarized 50-25 percent as being "light to moderate grazing". Clary (1999, p. 224) found that when those levels of grazing were applied to historically heavily grazed lands streams narrowed and deepened, substrate embeddedness decreased, streambank stability increased, and streamside willow communities increased in both height and cover. These attributes specifically align with several of the focus indicators used below for analysis, but the Service will not repeat them in the sections below.

The Service concludes that the level of grazing proposed by the Forest is consistent with generally maintaining habitat in a suitable condition for fish to thrive, and may even improve areas that have been negatively impacted by past heavy grazing (see Appendix A section 3.1.4c for full discussion).

3. Effects of the Proposed Action on Focus Indicators

a. Spawning, Redds and Incubation

Bull trout typically spawn when the water temperature drops to approximately 48-50° F. In the Upper Salmon River Basin depending on elevation and local conditions, this temperature drop generally occurs sometime after mid August. Eggs are placed in appropriate stream substrate and remain there for 100 to 145 days. Humans, wildlife, and livestock can disturb spawning fish and trample redds or portions of redds in the stream gravel (See Appendix A, Section 2.1.3 for full discussion of redd trampling).

The Forest found that bull trout are present in six creeks in the Allotment. Based on the unit rotations, fences, topographical features, and grazing period, livestock use will overlap with bull trout spawning periods in Taylor/McDonald and Lake Basin Units (Assessment, p. 28). In Taylor/McDonald Unit, livestock will be present one out of three years of the rotation for up to seven weeks after August 15th. During this time, cattle will have access to approximately 1 mile of spawning habitat on Taylor Creek. Livestock will be in the Lake Basin Unit during the bull trout spawning period for approximately seven weeks, one out of three years. During this time, cattle will have access to 3.5 miles of East Fork Herd Creek, and less than 0.1 mile of West Fork Herd Creek, all which is spawning habitat. Cattle will not have access to Fish Conservation Unit or any fish-bearing streams on Herd Lake Unit (Assessment p. 21, C-7).

To approximate the scale of redd trampling in those streams where livestock and spawning overlap, the number of redds likely to be in individual streams must be estimated. The Assessment presents no redd surveys to help inform this estimate and estimates in general are

subject to a large number of variables. Of particular importance is that redd survey information provided by the Forest or state agencies is typically based on preferred spawning areas and therefore densities cannot be reliably extrapolated to an entire stream length. Appendix B presents the Service's reviews of the range of difficulties in redd density estimation. Also in that appendix, we use a report with different survey methods (Sausen, 2010) to arrive at two redd density values that we believe are reasonable to inform our effects analysis (Appendix B). Those values are 11.5 redds per mile for large streams or small rivers (width greater than approximately 15 feet), and 2.4 redds per mile for smaller streams (width less than approximately 15 feet). In the absence of stream-specific survey data or data from similar streams in the action area, the Service will use the above estimates.

Bull trout spawning takes place over a several month period beginning slowly – peaking – and then tapering off. Therefore, depending on which part of the period is exposed to livestock trampling, differing number of redds are exposed. Based on professional judgment, the Service estimates that during the early portion of the spawning period; approximately 25 percent of the total number of redds are produced, by the middle (peak) portion of the spawning period 75 percent of the total are present, and the total (100 percent) occurs several weeks after the peak. Not all areas of a stream are appropriate gradient for spawning habitat and not all creeks are accessible (or even desirable) for livestock grazing. These variables can affect the likelihood and degree of exposure of redds to livestock (Table 1 and Appendix A Section 3.4). The Forest has presented an estimate of the length of creek segments exposed to livestock and we have used it in the following summary. The following numerical estimates in Table 2 have been rounded to whole numbers.

Summary of the Scale of Impacts to Redds and Spawning Fish

The use of redd per mile values and stream miles in estimating the potential number of redds exposed to livestock, allows for the generation of specific numerical values. However, the Service cautions the Forest to view the values cited below as a way to indicate a sense of scale or magnitude of impacts rather than precise values.

Taylor Creek (in Taylor/McDonald Unit) has an estimated 1 mile of creek that support bull trout spawning (Assessment p. 21). Cattle will be in this unit during spawning for up to 7 weeks one out of three years. Using the above methodology, the Service estimates that the 1 mile of creek in this unit are likely to contain a maximum of 3 bull trout redds (1 x 2.4) at peak spawning (generally between mid September and October).

East Fork Herd Creek (in Lake Basin Unit) has an estimated 3.5 miles of creek that support bull trout spawning (Assessment p. 21). Cattle will be in this unit during spawning for up to 7 weeks one out of three years. Using the above methodology, the Service estimates that the 3.5 miles of creek in this unit are likely to contain a maximum of 9 bull trout redds (3.5 x 2.4) at peak spawning (generally between mid September and October).

West Fork Herd Creek (in Lake Basin Unit) has an estimated 0.1 miles of creek that support bull trout spawning (Assessment p. 21). Cattle will be in this unit during spawning for up to 7 weeks one out of three years. Using the above methodology, the Service estimates that the 0.1 miles of

creek in this unit are likely to contain a maximum of 1 bull trout redd (0.1 x 2.4) at peak spawning (generally between mid September and October).

Table 2. Summary of the estimated number of spawning bull trout and redds in the Allotment, by creek. Also included is an estimate of the range of redds likely to be trampled by livestock at 12 and 78 percent trampling rate.

Creek and Unit Name	Estimated number of bull trout redds in creek lengths exposed to livestock		Estimated **total** number of adult bull trout associated with redds in creek lengths exposed to livestock
	Total estimate	Estimated range at 12 and 78 percent	
Taylor/McDonald Unit-One of three years			
Taylor Creek	3	1-3	6
Lake Basin Unit- One of three years			
East Fork Herd Creek	9	1-7	14
Lake Basin Unit- One of three years			
West Frk Herd Creek	1	1	2
Total	13	3-11	22

There are multiple factors that affect the number of projected redds and adult bull trout in Table 2 that are likely to be trampled or adversely affected. Assuming that two spawning adults may be initiating or tending each redd, the Service expects adult bull trout associated with the redds in Table 2, to be disturbed to the extent that it temporarily disrupts their spawning behavior. The Service believes that disturbance will not be substantial enough to preclude spawning, because the disturbance is likely to cause only short avoidance movements and will last only a few minutes once cattle leave the area.

Another factor affecting exposure to grazing livestock is timing of grazing. Bull trout spawning takes place over a several month period beginning slowly – peaking – and then tapering off (see "Effects of the Proposed Action on Focus Indicators; Spawning, Redds and Incubation). On this allotment, the time of spawning and grazing overlap is approximately five weeks (Assessment, p. 4). An overlap of five weeks would overlap with the spawning peak.

As for what percentage of redds exposed to livestock actually get trampled, research on simulated redd trampling using clay pigeons as a surrogate for redds (Gregory and Gamett 2009), found a wide variation (12 to 78 percent) (Appendix A, Section 2.1.3) in the percent of simulated redds exposed to cattle that are actually impacted (at least one broken clay pigeon). Using the range found by Gregory and Gamett (2009, p. 364), our estimates yield a range of 4-5 redds likely impacted and a range of 8-10 spawning bull trout associated with those redds (Table 2). However, as discussed earlier this range is likely an overestimate. In fact, to date, surveys from stream segments in various Allotments on the Forest have consistently found lower redd density than estimated and none trampled (Appendix B). Gregory and Gamett (2009, p. 364) also found that even given that a surrogate redd was trampled, there was variation in how much damage was done, but it did not exceed 50 percent of clay pigeons broken in a simulated redd. The Service recognizes that a redd contains thousands of eggs and not all are destroyed when a redd is

impacted, however we believe that it is reasonable to use a redd as the biological unit for the discussion above.

Population effects of redd trampling

The relationship of redd trampling to population recruitment and population persistence is complicated by many factors. Percentage of eggs killed in an impacted redd, amount of additional mortality post-impact, and compensatory young survival rates all affect population trends.

Because redds typically are larger than livestock hooves, a redd that is trampled can have both disturbed and undisturbed portions. As a result, some percentage of eggs may survive impact to a redd. Gregory and Gamett (2009, p. 364) demonstrated this using several clay pigeons to simulate redds. They found that not only was there variation in how much disturbance was done, but that it did not exceed 50 percent of the clay pigeons broken in a simulated redd. Therefore, not all eggs in a trampled redd are likely to be killed.

The amount of additional mortality and how that might drive population trajectories was explored by Peterson et al. (2010) using a matrix model for cutthroat trout. They found that high trampling rates (increased egg mortality) did not necessarily lead to dramatic changes in trajectory, but could reduce the ability of a population to rebound. Negative population trends caused by redd trampling were dependent on several variables including existing natural mortality, time of trampling related to egg development, and overlap of the trampling with the population (Peterson et al. 2010, pp. 960-963). In a few cases Peterson et al. (2010, p. 960) found that it took a trampling rate of greater than 100 percent to produce a negative population trend.

Another example of the relationship between egg mortality and young survival is from Lower Kananaskis Lake in Alberta Canada where bull trout demonstrated compensatory density dependence (Johnston et al. 2007, p. 122). This study found that having a higher number of eggs that hatch (lower egg mortality) did not result in a change to the actual number of fish that reach 1 year of age. Cannibalism was mentioned as a possible mechanism, but evidence for this is not clear and there could be other habitat variables affecting this mechanism. Information from both this and the Peterson et al. study suggests that very high egg mortality would be necessary to reduce the number of young fish that reach one year of age.

Trout populations may be resistant to the effects of redd trampling (barring any other external, unusual, and chronic stressors) because trout exhibit a reproductive strategy best described as 'r-selected'. This strategy includes large numbers of eggs, a high mortality rate of eggs and young, little to no parental care of young, and a relatively short time to reproductive maturity. It is a strategy evolved to allow for persistence of populations in the face of unpredictable and episodic environmental stressors by allowing populations to rebound quickly and re-colonize areas once temporary stressors are absent.

Based on the above discussion, the Service concludes that the mortality to eggs from the redd trampling alone on this allotment is unlikely to result in a negative population trend. This is

based on the fact that many eggs will survive in a trampled redd and only a portion of the redds in the creek are likely to be trampled (the population model used by Peterson et al. appears to have assumed all redds in the population received varying levels of additional mortality).

b. Water Temperature

Bull trout are adapted to and prefer very cold water. Grazing can impact water temperature primarily through changes to streamside vegetation, but also through development of water sources and compaction of soil. Specific grazing practices and local circumstances can affect the degree of that impact to temperature (See Appendix A, Section 2.1.1, 2.2.1, 2.2.2, and 2.2.4 for full discussion).

Based on information presented in the Assessment (p. 22), the Service concludes that the streams in the Allotment have annual temperatures that reflect near optimum conditions for bull trout life history needs were considered Functioning Appropriately (Assessment p. 29). Annual variations in seasonal maxima may exceed optimal temperature but those exceedences are attributed to variations in seasonal air temperature and not due to grazing (Assessment p. 29). The near optimal water temperature was likely the result of limits to vegetation use by livestock (through stubble heights and browse percentages) and the active management of livestock to distribute their grazing outside the riparian area.

After reviewing the information presented by the Forest in the Assessment, and background information on the variables affecting the degree of change to stream temperature (Appendix A, Section 3.1, 3.7 and 3.8), the Service concludes the following:

(1) The temperature range of the affected creeks currently meets temperature resource objectives for bull trout, and streamside vegetation (important for shading) is at or near late seral condition. That is the environmental baseline for this focus indicator.

(2) The proposed action represents light to moderate grazing, which is consistent with the gradual improvement of many riparian area characteristics (Appendix A, Section 3.1.4c and 3.3.6c). However, it is likely to alter some physical and biological elements of the riparian area from what they would be without grazing.

(3) These alterations (a small reduction in the biomass of vegetation that border and shade the stream) can influence stream temperature. However, these perturbations are unlikely to produce a long-term negative trend in stream temperature within the action area, because they are minor in distribution or intensity and they are seasonally temporary. Past monitoring of temperature and riparian vegetation under grazing similar to that proposed in this action, supports this conclusion.

(4) Because the temperature baseline condition of the affected creeks meets objectives, when the minor impacts of the proposed action are added the resulting effect to bull trout is insignificant.

c. Sediment

Sediment in the water column can cause negative effects to bull trout by abrading gills and even cause death if sediment concentration is great enough or over a long enough period of time. Sediment settling into the substrate also has the potential to smother eggs in the gravel or change the substrate to being unsuitable for spawning. Livestock can introduce sediment into the stream by bank shearing and by damaging the vegetation holding the bank together and also by compacting soil leading to faster water runoff and erosion (See Appendix A, Section 2.1.2 for a full discussion).

Based on information presented in the Assessment (p. 22), the Service concludes that the streams in the Allotment have sediment levels that exceed the range of levels supportive of all phases of bull trout natural history. Sediment readings outside that range are likely due to the volcanic geology of the area (Assessment p. 22). Livestock grazing will likely result in some continued, localized bank erosion and sediment delivery, adding to an already compromised system.

Some bank stability levels show grazing to be impacting those attributes which makes sediment introduction to the water column more likely (Assessment, pp. 30-32). While sediment input (compared to recent past grazing activities) is expected to decrease, grazing will continue to directly or indirectly introduce some amount of sediment into the steams (Assessment, p. 31). Occasionally as a result of livestock concentration and steam crossings, livestock may create unexpected bank damage which can introduce observable sediment into the stream. The Forest has acknowledged this situation can occur and has developed a process for reviewing and mitigating those impacts as needed (Assessment, pp. F1 and F2).

After reviewing the information presented by the Forest in the Assessment (pp. 22, 30-32), and background information on the variables affecting the degree of change to sediment levels (Appendix A, Section 3.3), the Service concludes the following:

(1) Sediment levels of the affected creeks currently do not meet resource objectives for bull trout. That is the environmental baseline for this focus indicator.

(2) The proposed action represents light to moderate grazing, consistent with the gradual improvement of many riparian area characteristics (Appendix A, Section 3.1.4c and 3.3.6c). However, it is likely to alter some of the physical and biological elements of the riparian area from what they would be without grazing.

(3) These alterations (a small reduction in soil holding capabilities of the bank vegetation) can create sediment inputs to the stream. Perturbations are likely to maintain current sediment levels or slow recovery to objectives, but are unlikely to contribute to any long-term negative trend in stream sediment levels in the action area. This is because they are minor in distribution and intensity. Past monitoring of bank stability and bank alteration support this conclusion.

(4) Because of the sediment baseline condition of the affected creeks and the impacts to the creeks from grazing will be localized in distribution and minimal in intensity, the effects to

bull trout from the proposed action is likely to be minor and will not raise to the level of take.

d. Width to Depth Ratio of Stream Channel

A stream's channel can be categorized using a number of variables describing the topography, gradient, and hydrology of the watershed. For different types of stream channels a range of width to depth ratios is expected if the stream is functioning appropriately for its channel type. Therefore, measuring width to depth ratios of streams is useful for assessing the condition of the stream. Streams that have a high width to depth ratios expose greater surface area for heating and the shade provided by low bank vegetation does not extend very far across the water surface. Since bull trout need cool water and are sensitive to warm water temperatures, width to depth ratios of bull trout-occupied streams are an important component of habitat quality. Livestock have the potential for increasing channel width to depth ratios by shearing off segments of the bank and reducing the vegetative community on the bank, thus making bank slough off (and widening) more likely (See Appendix A, Section 2.1.2 for a discussion of the impacts of grazing on stream channel width to depth ratios).

Based on information presented in the Assessment, the Service concludes that the streams in the allotment have reported width to depth ratios that are functioning appropriately (Assessment, p. 23) and supportive of all phases bull trout life history. Recent grazing management on this Allotment was very similar to the proposed action and did not result in a change attributable to grazing. This was likely the result of limits to bank alteration and vegetation use by livestock (through bank alteration indicators, stubble heights and browse percentages), and the active management of livestock to distribute grazing outside the riparian area. Livestock can, at times, cause small (but observable) bank loss through shearing. These effects are very localized and temporary (Assessment, p. 32). The Forest has acknowledged this situation can occur and has developed a process for reviewing and mitigating those impacts as needed (Assessment, p. F1 and F2). These impacts may have a temporary and localized effect on channel width to depth ratios within small sections of affected streams.

After reviewing the information presented by the Forest in the Assessment and background information on the variables affecting width to depth ratios (Appendix A, Section 3.3), the Service concludes the following:

(1) The width to depth ratios are thought to meet resource objectives for bull trout, and bank stability (important for maintaining channel integrity) is generally high. That is the environmental baseline for this focus indicator.

(2) The proposed action represents light to moderate grazing, consistent with the gradual improvement of many riparian area characteristics (Appendix A, Section 3.1.4c and 3.3.6c). However, it is likely to alter some of the physical and biological elements of the riparian area from what they would be without grazing.

(3) These alterations (small bank modifications due to cattle use and small changes to vegetation biomass) can influence width to depth ratios. However, these perturbations are

unlikely to produce a long-term negative trend in stream channel width to depth ratios within the action area, because they are minor in distribution or intensity and they are seasonally temporary. Past monitoring of width to depth ratios, and riparian vegetation, under grazing similar to that proposed in this action, supports this conclusion.

(4) Because the width to depth ratio baseline condition of the affected creeks meets objectives, and the impacts to the creeks from grazing will be localized in distribution and minimal in intensity, the effects to bull trout from the proposed action is likely to be minor and will not raise to the level of take.

e. Streambank Condition

Streambank stability determines how easily portions of a bank can slough off into a stream when livestock walk on banks or natural high flow events move through the stream. Sloughing banks eliminate fish hiding cover under overhanging banks. Sloughing banks also contribute sediment into the channel and make the stream more likely to move out of its channel creating higher width to depth ratios and exposing more surface area to warming. Livestock grazing has the potential to reduce streambank stability by reducing bank vegetation, which "holds" the soil via plant roots and by directly shearing off overhanging banks (See Appendix A, Section 2.1.2 for a complete discussion).

Based on information presented in the Assessment (p. 22-23), the Service concludes that most creeks in the allotment are functioning appropriately. Recent grazing management on this Allotment was very similar to the proposed action and did not result in a change attributable to grazing. This was likely the result of limits to bank alteration and vegetation use by livestock (through bank alteration indicators, stubble heights and browse percentages), and the active management of livestock to distribute their grazing outside the riparian area. However, as a result of congregation or stream crossings, livestock may create small areas of bank damage, but those are expected to be localized and minor. The Forest has acknowledged this situation can occur and has developed a process for assessing those impacts as needed (Assessment, pp. F1 and F2).

After reviewing the information presented by the Forest in the Assessment, and background information on the variables affecting bank stability (Appendix A, Section 3.3), the Service concludes the following:

(1) The stream bank stability generally meets resource objectives for bull trout, and width to depth ratios (indicators of bank stability) are at acceptable levels. That is the environmental baseline for this focus indicator.

(2) The proposed action represents light to moderate grazing consistent with the gradual improvement of many riparian area characteristics (Appendix A, Ssection 3.1.4c and 3.3.6c). However, it is likely to alter some of the physical and biological elements of the riparian area from what they would be without grazing.

(3) These alterations (small bank modifications due to cattle use and small changes to vegetation biomass) can influence bank stability. These perturbations are unlikely to produce a long-term negative trend in bank stability within the action area, because they are minor in distribution or intensity and they are seasonally temporary. Past monitoring of bank modification and riparian vegetation under grazing similar to that proposed in this action, supports this conclusion.

(4) Because the bank stability baseline conditions of the affected creeks generally meets objectives, and the impacts to the creeks from grazing will be localized in distribution and minimal in intensity, the effects to bull trout from the proposed action is likely to be minor and will not raise to the level of take.

f. Riparian Habitat Conservation Areas

Riparian Habitat Conservation Area (RHCA) is a term used to identify areas around streams or water bodies for special management and conservation. The term originated in the Inland Native Fish Strategy (INFISH) developed in 1995 that amended many National Forests' management plans (in Eastern Oregon, Washington, Idaho and portions of California and Nevada) including the plan for the Salmon-Challis National Forest. For fish bearing streams it establishes default buffer widths (on each side) of a stream or waterbody as a RHCA.

The Forest uses a variety of information to assess whether the RHCA is functioning appropriately and its trend over time. Some of this information is strongly related and even slightly redundant to several of the focus indicators discussed above. Livestock grazing can negatively impact vegetation characteristics, stream bank, and Greenline Ecological Status[4] such that the riparian community trends lower and the quality of habitat for bull trout is reduced. The RHCA condition for the East Fork Herd Creek MIM site and Taylor Creek MIM site were mid seral and later seral respectively (Assessment p. 23).

The RHCAs in this Allotment indicate that the habitat at the East Fork MIM site is functioning at risk. This is believed to be caused by past grazing practices. Through its management of resource objectives, grazing indicators and movement triggers, the Forest intends to manage grazing to keep the RHCA condition in a stable or upward trend and believe this will occur in East Fork (Assessment p. 35). However, livestock grazing will likely slow the recovery of the RHCA. Also at congregation or stream crossing sites, livestock may create small areas of damage, but those are expected to be localized and minor.

After reviewing the information presented by the Forest in the Assessment (pp. 23), and background information on the variables affecting bank stability (Appendix A, Section 3.3), the Service concludes the following:

4 This indicator broadly rates the present state of vegetation in a riparian area in relation to the biotic community that would become established if all successional sequences were completed without human interference, under the present environmental conditions.

(1) The RHCA condition currently meets the resource objective for one out of two MIM sites for bull trout and streamside vegetation is at mid or late seral condition (important for this objective). That is the environmental baseline for this focus indicator.

(2) The proposed action represents light to moderate grazing which is consistent with the gradual improvement of many riparian area characteristics (Appendix A, Section 3.1.4c and 3.3.6c). However, it is likely to alter some of the physical and biological elements of the riparian area from what they would be without grazing.

(3) These alterations (small reduction in vegetation biomass) due to livestock use can influence RHCA condition. These perturbations are unlikely to produce a long-term negative trend in riparian habitat within the action area, because they are minor in distribution or intensity and they are seasonally temporary. However, grazing may slow recovery of some less that optimal riparian habitat. Past monitoring of the RHCA under grazing similar to that proposed in this action, supports this conclusion.

(4) Because the RHCA baseline conditions of the affected creeks generally meets objectives, and the impacts to the creeks from grazing will be localized in distribution and minimal in intensity, the effects to bull trout from the proposed action is likely to be minor and will not raise to the level of take.

B. Effects of Interrelated or Interdependent Actions

The implementing regulations for section 7 define interrelated actions as those that are a part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. No interrelated or interdependent actions have been identified in this consultation.

V. CUMULATIVE EFFECTS

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

VI. CONCLUSION

A. Bull Trout

After reviewing the current status of the bull trout, the environmental baseline for the action area, the effects of the proposed action, and any cumulative effects, it is the Service's Biological Opinion that the Forest's proposed action to continue authorization of livestock grazing in the Herd Creek Allotment in Idaho is not likely to jeopardize the coterminous U.S. population of the bull trout. The Service's rationale is presented below.

Generally, the condition of habitat in this Allotment, as assessed through the focus indicators, supports the essential biological behaviors of bull trout. This condition has been influenced in the past by grazing standards that are similar to those proposed by the Forest in this consultation. This result is supported by literature that characterizes levels of grazing similar to the Forest's as "light to medium" or "light to moderate"(see Effects section). The Service concludes that the level of grazing proposed by the Forest is consistent with maintaining habitat in a suitable condition for bull trout to thrive. This level of grazing may even improve areas that have been negatively impacted by past heavy grazing (see Appendix A section 3.1.4c and 3.3.6c for full discussion).

Results of monitoring past grazing activities within this Allotment have confirmed grazing is compatible with the habitat needs of bull trout. Therefore, the Service anticipates that the effects to water temperature, sediment embeddedness, bank stability and width to depth ratios, are likely to be small scale and not likely to be widespread on the Allotment. In addition, the Forest has established a process for identifying and addressing those impacts in a manner that addresses the needs of bull trout (Assessment, pp. F1 and F2).

Grazing livestock with access to streams in this Allotment where bull trout are spawning and depositing eggs is expected to cause some disturbance of spawning fish and trampling of some redds. In the effects section, the Service has estimated the scale and extent of that disturbance and trampling and explained that even redds that are trampled are not generally completely destroyed. The Service also discussed how the number of redds impacted by cattle can appear high, but because of the bull trout's r-select reproductive strategy, that does not represent an equivalent scale of impact to the viability of population. The Service also mentioned an example of compensatory density dependence relationship of eggs and recently hatched young, which is the reason for impacts to redds and eggs being of lower concern for the population than other impacts.

Because bull trout habitat is in good condition, the Service concludes that the level of effects to bull trout habitat, spawning adults, and redds are unlikely to be incompatible with sustaining the East Fork Salmon River Local Population as a viable population of bull trout. If the adverse effects of the proposed action are not substantial at the local population scale, then the effects are unlikely to be discernable at the Upper Salmon River Core Area-scale which has 3,251 miles of stream and potentially greater than 5,000 adult fish (See discussion in Baseline section). The stream miles with potential for redd trampling with implementation of the proposed action represent less than 0.1 percent of the stream miles in this core area. On that basis, the effects of the proposed action are not likely to have measurable adverse impacts that reduce the survival and recovery of the bull trout at the rangewide scale.

B. Designated Critical Habitat

After reviewing the current status of the designated critical habitat for bull trout, the environmental baseline for the action area, the effects of the proposed action, and any cumulative effects, it is the Service's Biological Opinion that the Forest's proposed action to continue authorization of livestock grazing in the Herd Creek Allotment in Idaho is not likely to result in

destruction or adverse modification of designated critical habitat for bull trout. The Service's rationale is presented below.

Habitat in some of this Allotment as assessed through the focus indicators does not adequately support the essential biological behaviors of bull trout, because some conditions are below objectives for healthy and robust populations. Literature characterizes levels of grazing similar to the Forest's as "light to medium" or "light to moderate" (see Effects section). The Service concludes that the level of grazing proposed by the Forest is unlikely to result in a further decline of habitat condition for bull trout, but may retard improvement. There may be limits to the natural capability of environmental conditions (e.g. sediment) to fully support bull trout life history, even without grazing.

Results of monitoring of past grazing activities within this Allotment have confirmed grazing does have some impact to the baseline condition. The Service anticipates that local effects to sediment embeddedness and riparian habitat (primary constituents for designated critical habitat) may be adverse, but will not occur evenly across the Allotment. Grazing may slow recovery of habitat in some areas. To prevent negative trends, the Forest has established a process for identifying and addressing impacts from livestock in a manner that addresses the needs of bull trout (Assessment, pp. El and E2).

The Service concludes that the level of adverse effects to bull trout designated critical habitat is not likely to cause a further degradation of those primary constituent elements in creeks where they are below objectives. Some improvement may occur but be limited by capabilities of the natural environment in the Allotment. Therefore, designated critical habitat would be likely to maintain its functionality (with some natural limitations) to serve the intended conservation role for the species. If adverse effects of the proposed action are not substantial within the Upper Salmon Critical Habitat Unit, then they are unlikely to be discernable to designated critical habitat at the rangewide scale.

VII. INCIDENTAL TAKE STATEMENT

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

Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement. The measures described below are non-discretionary, and must be

undertaken by the Forest so that they become binding conditions of any grant or permit issued to an applicant, as appropriate, for the exemption in section 7(o)(2) to apply.

A. Amount or Extent of Take Anticipated

Based on the results presented in the "Effects of the Action" section above, implementation of the proposed action is likely to cause take of bull trout. No adult bull trout are likely to be harmed or killed, but the Service anticipates that 3-11 bull trout redds are likely to be trampled by livestock on the Herd Creek Allotment (Table 2). These redds are expected to be a maximum extent of take and because it is dependent upon many variables (including the units grazed during the rotation, number of eggs killed in each redd, timing, etc.), the impacts could be much lower. This take is expected to occur every year.

B. Effect of the Take

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

C. Reasonable and Prudent Measures

The Service believes that the following Reasonable and Prudent Measures are necessary and appropriate to minimize impacts of incidental take of bull trout.

Reasonable and Prudent Measure 1 - The Forest shall report on the number or extent of bull trout redds trampled by livestock on the Allotment.

D. Terms and Conditions

Term and Condition 1 for Reasonable and Prudent Measure 1.

The Forest shall conduct monitoring and reporting of incidental take as follows. By March 1 of each year for the term of the proposed action, the Forest shall submit a completed form (see Appendix C) summarizing grazing results for the previous grazing year and the results of redd surveys for that year to the Field Supervisor of the Service's Eastern Idaho Field Office in Chubbuck, Idaho. The Forest shall survey a representative stream reach in the allotment that is grazed for longer than a week after August 15 to document any impacted bull trout redds. The following survey protocol shall be followed:

- The Forest shall use a trained observer(s) to conduct a focused survey of a 1,000-meter segment in at least one bull trout stream in the Allotment. That survey stream should be the stream with the highest likelihood of having bull trout redds or one that is known to have had such redds in the past. The surveyed segment should include the best spawning habitat in the stream

- The surveys shall be conducted when the likelihood of observing bull trout redds present in the stream that have been impacted by livestock is the greatest.

- The Forest shall record the location of the survey area, and the number of bull trout redds encountered, an estimate of the linear distance of suitable spawning habitat in the survey segment, and the number of redds impacted by grazing activities.

Changes to the above protocol can be made, as appropriate, in coordination with and the approval of the Service.

VIII. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery programs, or to develop new information on listed species.

The Service recommends monitoring all six focus indicators on all allotment Units whenever possible to better track long-term trends. This is particularly relevant to those Units that share streams or have tributaries connected to fish bearing streams.

IX. REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the Forest's proposal to authorize livestock grazing in the Herd Creek Grazing Allotment in Custer County, Idaho. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

If, during implementation of the proposed action, changes in circumstances, situation, or information regarding this proposed action changes, the Forest will assess the changes and any potential impacts to listed species, review the re-initiation triggers above, coordinate with the Service's Eastern Idaho Field Office at (208) 237-6975 for advice (if needed) and make a determination as to whether re-initiation is necessary.

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XI PERSONAL COMMUNICATIONS

Meyer, Kevin. March, 11, 2009. Principal Fisheries Research Biologist. Idaho Department of Fish and Game. Email message as follow-up to phone conversation with Doug Laye, U.S. Fish and Wildlife Service, Eastern Idaho Fish and Wildlife Office. Subject: published article and bull trout population numbers in the Salmon River Core areas.

APPENDIX A

ASSESSING THE EFFECTS OF GRAZING ON BULL TROUT AND THEIR HABITAT

An alternative approach – the effects and variables influencing those effects

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APPENDIX B

ESTIMATING REDD DENSITIES FOR USE IN BIOLOGICAL OPINIONS

Estimating Redd Densities for Use in Biological Opinions
June 2010

Background

The Fish and Wildlife Service (Service) has written several biological opinions for actions of the Salmon-Challis National Forest (Forest) which anticipated bull trout redds being exposed to trampling from grazing livestock. When comprehensive redd surveys for action area streams where redds might be exposed to livestock trampling are lacking, the Service used a series of assumptions to approximate the redd numbers for those streams. In Appendix A to the Panther Creek Biological Opinion issued in October of 2007 (consultation number 1-4-07-F-0445), the Service laid out its approach for the approximation. Generally, the approximation was based on estimated bull trout densities, non-randomized redd surveys and stream lengths. In that appendix the Service also outlined the likely sources of error in the calculation. This same approach was used in several Opinions issued later including one on grazing in the Upper Hayden grazing allotment for 2009 (consultation number 14420-2007-F-0477, issued in July 2009). At the time, the Service was unaware of any better method or data to support a different, more accurate, approximation.

There is potential for large errors in the calculation because the number of redds deposited in a given section of occupied stream over a given period of time is driven by temperature of water over that period, gradient of stream, density of adult fish and amount of suitable spawning habitat and all of these conditions are variable. In turn, spawning habitat is limited to areas that have the substrate with correct gravel size, water depth and flow characteristics. The result of these variables is that the amount of suitable spawning habitat in a length of stream is generally much less (measured either in area or length) than the total area or length of the stream section. Using simplistic or sporadic fish density and redd surveys to extrapolate across the length of a stream fails to take into account those variables, and tends to substantially over-estimate the number redds or extent of the spawning habitat.

Field Observations

In those two Opinions that used the simplistic method as a part of the Incidental Take Statement, the Service required the Forest to survey segments of those streams to assess the results observed on the ground, compared to the impact anticipated by the Opinion. In addition to monitoring take from the Forest's action, this monitoring was intended to gain field information on the size of error of the Service's projected redds and redd impacts. Field surveys (in streams subject to Service redd estimates conducted in a few occupied streams on the Forest, in 2007, 2008, and 2009), have confirmed the substantial over-estimate of redd numbers using prior methodology. Below is a short description of the finding from those field surveys.

Little Deep Creek - In the Panther Opinion a density of 1.3 redds per 100 meters was predicted based on extrapolations from non-random redd surveys in that stream. On November 8, 2007, 1,700 meters of the stream were surveyed and 2-3 redds were observed. Extrapolated density estimate for that same length of stream segment predicted 22.1. This represents an over -

estimate at a scale of 10 fold. No trampled redds were found. Evidence of grazing was very, very light but livestock tracks were most common in areas that were most likely to be used as redd locations.

Moyer Creek - In the Panther Opinion a density of 0.04 redds per 100 meters was predicted based on extrapolations from non-random redd surveys in that stream. On September 18, 2007 (timed with livestock removal), 2,900 meters of the stream were surveyed and 0 redds were observed. Extrapolated density estimate (one redd) for that same length of stream segment predicted was an over-estimate but since no redds were found no particular error rate can be reached. However, surveyors saw very little area that was suitable for spawning – less than 100 meters of the stream surveyed. This does point to timing of grazing and redd initiation overlap as one area for error in an estimate.

Jefferson Creek - No habitat was expected in this stream (based on professional judgment about stream characteristics). On September 18, 2007, 450 meters of the stream were surveyed and 0 redds were observed. The stream lacked the width and substrate to likely support bull trout. The stream very narrow, often no more than 18 inches wide, making it likely that livestock would just step across the creek.

Moccasin Creek - In the Panther Opinion a density of 0 redds per 100 meters was predicted based on extrapolations from non-random redd surveys in streams similar to the characteristics of this stream. On September 18, 2007, 900 meters of the stream were surveyed and 0 redds were observed. No surveyed sections had substrate suitable for spawning. Part of the stream was very muddy and part was heavily armored and surrounded by spruce fir. These conditions confirm that streams do not contain spawning habitat for their entire length.

Arnett Creek -In the Panther Opinion a density of 0 redds per 100 meters was predicted based on previous non-random surveys of the stream. On October 30, 2008, 1,000 meters of the stream were surveyed and 0 redds were observed. Several bull trout were observed. Access to the stream was extremely difficult due to downed trees. It is doubtful livestock could access much of the stream. Only about 10 sites of less than 1 meter square were seen as suitable for spawning. Observations confirmed that conditions on the streams edge can reduce or eliminate access to stream (and redds).

East Fork of Hayden Creek - In the Upper Hayden Opinion a density of 7.2 redds per 100 meters was predicted based on extrapolations from non-random redd surveys in this stream. On August 26, 2009, 1,000 meters of the stream were surveyed and 0 redds were observed. Extrapolated density estimate for that same length of stream segment predicted 72 redds. Part of the reason for the difference may be that the survey was conducted at the time that livestock were expected to be off the allotment (though some were seen during the survey), but it also was at a time when few redds would be expected.

On September 16th another survey was performed along 700 meters of the best spawning habitat after all cattle had been removed. Twenty-one bull trout redds were observed (3 per 100 meters) and none appeared to have been trampled. Extrapolated density estimate would have predicted 54 redds.

Hayden Creek – In Upper Hayden Opinion a density of 6 redds per mile (0.67 redds per 100 meters) was predicted based on extrapolations from non-random redd surveys. On October 6, 2009, a survey of 1,000 meters was performed. Two bull trout redds were observed (2 redds per 1,000 meters) and neither were trampled.

The major observations from the field surveys were that - livestock tracks were not random and were often associated with spawning habitat, spawning habitat was not continuous and there were often large sections of stream unsuitable for spawning, Service estimates had as high as tenfold error potential, and many areas of streams were effectively blocked to livestock access by conditions on the stream's edge.

Recent Information

In 2010, a report was made available from the U. S. Fish and Wildlife Service Office in La Grande, Oregon on bull trout redd monitoring in the Wallowa Mountains in eastern Oregon (Sausen 2010). That report summarized the results from bull trout redd monitoring on the Lostine River, Imnaha River, Lick Creek, Bear Creek, Goat Creek and Big Sheep Creek. These surveys were done annually for 9-11 years and were performed along entire segments of the waterways that included both areas with and without spawning substrate. Average density of bull trout redds ranged between 2.4 redds per mile (Big Sheep and Lick Creeks) to 11.5 redds per mile (Imnaha River).

Based on photographs from this report (Sausen 2010, pp. 25-27) - Big Sheep Creek, Bear Creek (4.6 redds per mile) and Lick Creek are similar but trend larger in size than many of the creeks in grazing allotments on the Forest. Both resident and fluvial fish inhabited these streams and redds from both forms of bull trout were counted in the total redd counts (S. Schmidt, pers. comm., March 11, 2010).

Conclusion

Given findings from field surveys performed on the Forest, the averages presented in Sausen (2010) seems more likely to represent typical redd densities than previous methods. Lacking local redd data or surrogate data from nearby comparable streams, the Service intends to use estimates from Sausen. Those values are 11.5 redds per mile for small rivers and large streams (width greater than 15 feet), and 2.4 redds per mile for smaller streams (width less than 15 feet).

APPENDIX C

ANNUAL MONITORING REPORT FORM FOR ACTIONS COVERED UNDER THE SERVICE'S BIOLOGICAL OPINION FOR GRAZING ON ALLOTMENTS MANAGED BY THE SALMON CHALLIS NATIONAL FOREST.

APPENDIX C

Annual Monitoring Report Form for Actions covered under the Service's Biological Opinion for Grazing on Allotments Managed by the Salmon Challis National Forest.

Please submit annually by March 1 to the Supervisor of the Service's Eastern Idaho Field Office, 4425 Burley Dr., Suite A, Chubbuck, Idaho 83202; telephone (208) 237-6975. Please include name and contact information in case additional information is needed.

1. What was the name of that stream in this allotment surveyed for impacted redds?

2. What was the date of the survey, and what were the water conditions?

3. Which stream segment was surveyed and how many redds and impacted redds were found? (Please give GPS start and stop points for segments)?

4. What was the date that livestock removed from the pasture with surveyed stream segment?

5. Did this number exceed the scale anticipated in section VII of the Biological Opinion?

6. Were there any changes to the grazing management that differed from the proposed grazing management in the Forest's Biological Assessment? If yes, what were they?

7. Were there any unexpected circumstances or events that resulted in impacts beyond those anticipated in the Forest's in the Biological Assessment or the Service's Biological Opinion? If yes, please describe.

Salmon Challis NF Official: _____

Date: _____

Contact Information: _____