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Snake River Area Office
230 Collins Road
Boise, Idaho 83702-4520

AUG 1 3 2010

Subject: Repairs to Deadwood Dam Access Bridge—Valley County, Idaho—Biological Opinion
1009.0600 14420-2010-F-0388

Dear Ms. Stark:

Enclosed is the Fish and Wildlife Service's (Service) Biological Opinion (Opinion) on the Bureau of Reclamation's (Reclamation) determinations of effect for species listed under the Endangered Species Act (Act) of 1973, as amended, for the proposed Repairs to Deadwood Dam Access Bridge Project (Project) in Valley County, Idaho. In a letter dated July 12, 2010, and received by the Service on July 13, Reclamation requested formal consultation on the determination under section 7 of the Act that the proposed Project is likely to adversely affect bull trout (*Salvelinus confluentus*). We have concluded that your action will not jeopardize the continued existence of bull trout. Reclamation also determined that the proposed project will have no effect on the Canada lynx (*Lynx canadensis*) and northern Idaho ground squirrel (*Spermophilus brunneus brunneus*); the Service acknowledges these determinations.

The enclosed Opinion is based primarily on our review of the proposed action, as described in your July 12, 2010 Biological Assessment (Assessment), and the anticipated effects of the action on bull trout. Our Opinion was prepared in accordance with section 7 of the Act, and concludes that the proposed Project will not jeopardize the survival and recovery of bull trout. A complete record of this consultation is on file at this office.

As you are aware, the Service is currently in the process of designating bull trout critical habitat. The tentative final designation date is September 30, 2010. Pending a final rule, bull trout critical habitat may be designated within the action area of this Project. If your Project has not been completed, you should consider re-evaluating this Project at the time of final critical habitat designation to ensure your actions do not adversely modify critical habitat.

This Opinion is also intended to address section 7 consultation requirements for the issuance of any Project-related permits required under section 404 of the Clean Water Act. Use of this letter and associated Opinion to document that the Army Corps of Engineers (COE) has fulfilled its responsibilities under section 7 of the Act is contingent upon the following conditions:

1. The action considered by the COE in their 404 permitting process must be consistent with the proposed Project as described in the Assessment such that no detectable difference in the effects of the action on listed species will occur.
2. Any terms applied to the 404 permit must also be consistent with conservation measures and terms and conditions as described in the Assessment and addressed in this letter and Opinion.

Thank you for your continued interest in the conservation of threatened and endangered species. Please contact Pam Druliner at (208) 378-5348 if you have questions concerning this Opinion.

Sincerely,

Gary L Burton

for Brian T. Kelly, State Supervisor
Idaho Fish and Wildlife Office

Enclosure

cc: COE, Boise (Martinez)
BOR SRAO, Boise (Meuleman, Vidergar)

BIOLOGICAL OPINION
FOR THE
REPAIRS TO DEADWOOD DAM ACCESS BRIDGE PROJECT

14420-2010-F-0388

August 2010

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

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1. BACKGROUND AND INFORMAL CONSULTATION

1.1 Introduction

The Fish and Wildlife Service (Service) has prepared this Biological Opinion (Opinion) in response to the Bureau of Reclamation's (Reclamation) request for formal consultation on the effects to bull trout (*Salvelinus confluentus*) from the proposed Repairs to Deadwood Dam Access Bridge Project. In a letter dated July 12, 2010, Reclamation's Snake River Area Office requested formal consultation with the Service under section 7 of the Endangered Species Act (Act) for its proposal to carry out the action. Reclamation determined that the proposed action is likely to adversely affect bull trout. As described in this Opinion, and based on Reclamation's July 12, 2010 Biological Assessment (Assessment) and other information, the Service has concluded that the action, as proposed, is not likely to jeopardize the continued existence of bull trout.

Reclamation also determined the action will have no effect on Canada lynx (*Lynx canadensis*) and northern Idaho ground squirrel (*Spermophilus brunneus brunneus*). The Service acknowledges these determinations.

1.2 Consultation History

Reclamation and the Service have had the following meetings and correspondence concerning the Project:

February 11, 2010	Reclamation made initial contact with the Service where they outlined their need for the proposed Project and provided a preliminary Project description.
April 2, 2010	Reclamation and the Service discussed additional details of the proposed Project and noted the need to address this action as it relates to their Upper Snake Operations consultation.
May 25, 2010	A draft Assessment was transmitted to the Service for review and comments.
June 3, 2010	Comments on the draft Assessment from the Service were provided to Reclamation.
June 9, 2010	Representatives from Reclamation and the Service met to discuss the Project, the draft Asssement, and additional information regarding bull trout in the Deadwood River system.
June 24, 2010	Representatives from the Service, the Forest Service and Reclamation met at Deadwood Reservoir and visited the Project site, the Deadwood River, Trail Creek, and Wilson Creek, and toured the reservoir. Additional information regarding bull trout was discussed and additional comments for the draft biological assessment were provided.
July 13, 2010	Reclamation transmitted, and the Service received, the final Assessment and Reclamation's request for formal consultation.

July 23, 2010 The Service submitted its Draft Opinion to Reclamation for review.

August 3, 2010 Reclamation submitted comments on the Draft Opinion to the Service.

2. BIOLOGICAL OPINION

2.1 Description of the Proposed Action

This section describes the proposed Federal action, including any measures that may avoid, minimize, or mitigate adverse effects to listed species or critical habitat, and the extent of the geographic area affected by the action (i.e., the action area). 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 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."

2.1.1 Action Area

The proposed Project, located 200 feet downstream of Deadwood Dam on the Deadwood River in Valley County, Idaho, will make repairs to the bridge accessing the lower portion of the dam. The bridge is used only for maintenance access and is not open to public traffic. Public traffic uses U.S. Forest Service (USFS) Road No. 555 which crosses the river approximately 1476 feet downstream of the dam. The Deadwood River below Deadwood Dam is a cold, freshwater river that runs between 50-1700 cubic feet per second (cfs) depending on the time of year. The site elevation is approximately 5200 feet with a 3.7 percent stream gradient in the first 3281 feet downstream from the dam. The river channel and side surfaces immediately below Deadwood Dam are composed primarily of granitic boulders and bedrock. Deadwood Dam is approximately 24 miles upstream from the confluence of the Deadwood River and the SF Payette River.

The action area includes the Deadwood River below Deadwood Dam downstream to the confluence of the SF Payette River, Deadwood Reservoir, and Trail and Deer creeks (tributaries to Deadwood Reservoir). In defining the entire action area, effects to bull trout can be segregated into four distinct areas/river reaches. The four areas include: the Deadwood River from Deadwood Dam downstream 0.3 miles to Wilson Creek; from Wilson Creek downstream to Whitehawk Creek (1.9 miles downstream of Deadwood Dam); from Whitehawk Creek downstream to the confluence of the SF Payette River; and because bull trout captured in the stilling basin may be transplanted above the dam, the action area also extends into Deadwood Reservoir, Trail Creek, and Deer Creek.

The legal description of the action area is centered on Township 11 N, Range 07 E, Sections 16 and 17.

2.1.2 Proposed Action

2.1.2.1 Overview

The proposed action consists of making repairs to the east bridge abutment which requires dewatering the river channel around the construction site. Biological data collections will also occur downstream of the dam during the shut off period (flows out of Deadwood Reservoir will

cease for a period of time). As a result of construction activities, flow reductions, and biological data collections, fish salvage operations will occur. Fish sampling and transport are covered under an Idaho Department of Fish and Game (IDFG) sampling permit (F-02-07-10) and transport permit (HQ-10-037).

2.1.2.2 Key Components of the Action

Dewatering of the River Channel

During the week of August 22, 2010, Deadwood Dam flows will be reduced from irrigation flows (anticipated to be between 50 and 200 cfs) to 5 cfs over one evening and held there for approximately 15 to 17 days for the purposes of biological data collections. During the week of September 5, 2010, flows will be reduced to zero for approximately 35 days for the construction repair work on the bridge and additional biological data collections. Construction activities will begin after the flows are reduced to zero and the construction site is fully dewatered.

Seepage from the dam is expected to collect in the stilling basin between the bridge and the dam. Seepage flows will be allowed to flow within the natural channel through the construction area. The river bed is comprised of bedrock, naturally constricting seepage flows into a narrow bedrock channel (approximately 3 feet deep and 3 feet wide) away from the stilling basin and through the construction site (but outside of the immediate construction area). Construction traffic will cross over the narrow channel without coming in contact with the water or interrupting the natural flow. Ground water seepage into the tailrace is expected to maintain a residual pool after releases from the dam are shut off. If seepage flows do not naturally drain through the construction area in the anticipated manner the water will be pumped as needed to keep the construction area dewatered. Seepage flows (as they flow through the natural channel constriction) will be measured to more adequately gauge total flows into the channel.

Construction will occur away from the stilling basin and best management practices (BMPs) will be employed to avoid any construction-related sediment inputs into the stilling basin or the river. At the completion of construction, releases from the dam will be increased to 50 cfs overnight to reestablish the winter minimum stream flows (50 cfs). The total time flows from Deadwood Dam will be reduced to 5 cfs is 15 days and the total time the flows will be completely shut off is 35 days; total duration of the flow reduction component of the action is approximately 52 days.

Fish Salvage

Two fish salvage efforts will occur starting immediately following the reduction of flows to 5 cfs. One salvage effort will concentrate in the stilling basin immediately below the dam; the other downstream from the dam in the main river channel. The first fish salvage effort will occur in the stilling basin to capture fishes that did not migrate out of the stilling basin as flows were reduced; this will occur during the first week that flows are reduced to 5 cfs. The second effort will salvage fishes in stranding pools downstream of the dam; this effort will begin during the first week that flows are reduced, but will continue for an additional two weeks. This activity will take place from the base of the dam downstream for a continuous 1.9 miles. Whitehawk Creek is located 1.9 miles downstream of the dam and is the third tributary from the dam that provides measurable flow to the Deadwood River. Additional salvage efforts will also occur at randomly selected sampling locations throughout the 24 miles of the Deadwood River to the SF Payette River during other scheduled fish and habitat sampling efforts throughout the drawdown period.

The first 1.9 miles of Deadwood River downstream of Deadwood Dam was chosen for fish salvage because of the potential for in-channel stranding pools (disconnected habitat) to occur when the flows through Deadwood Dam are reduced to zero. Three tributaries provide measurable flow year round within this reach in addition to riparian and in-channel spring water contribution. Downstream of Whitehawk Creek natural flow is increased and connectivity between in-channel pool habitat is maintained.

Bull trout captured in the stilling basin will be transported immediately upstream of Deadwood Dam into the first available suitable habitat. If water temperatures and dissolved oxygen conditions are suitable (Idaho Department of Environmental Quality (IDEQ) cold water suitability standards; IDEQ 2010) bull trout will be released into the reservoir. If conditions in the reservoir are not suitable for bull trout, then Trail or Deer creeks will be used as alternative release locations. Trail and Deer creeks were selected because bull trout are known to be present in both tributaries, the transport time to each location is less than 30 minutes, and a vehicle can be driven to the release site. Genetic testing on all bull trout captured in the stilling basin between 2007 and 2009 have identified that bull trout captured there were most closely related to other bull trout in tributaries to Deadwood Reservoir, and were likely entrained over/through the dam. Therefore, it is likely that bull trout captured in the stilling basin and relocated upstream of Deadwood Dam to suitable habitat will be able to re-adjust to the environment. Bull trout captured below the stilling basin in the main channel will be returned to the nearest habitat that is suitable and connected; no bull trout captured downstream of the stilling basin will be relocated above the dam.

All bull trout will be transported in 36 quart coolers equipped with an aerator and air stone. If water temperature between the capture and receiving water differs by more than 5 degrees Fahrenheit (IDFG transport recommendation), then the transport water will be buffered with cooler water from the closest instream source. Fish capture and transport authorization is covered under Section 6 permitting with IDFG including a sampling permit (F-02-07-10) and transport permit (HQ-10-037).

Construction Activities

Construction activities will consist of building an access ramp to the channel, excavating old rip rap material around the bridge abutment, pouring concrete forms to repair damaged areas of the bridge abutment, returning rip rap, and removing the access ramp.

An access ramp will be built to gain access for construction equipment to the foot of the bridge abutment. The ramp will be constructed immediately downstream of the bridge on the west side of the river channel and constructed by pushing over excess bank material and filling the recessed area to get a smooth surface after the area has been dewatered. A small track-hoe will gain access to the channel bottom via the ramp and be used to remove riprap material adjacent to the undercut area. All riprap material will be stored on the river bank within the construction area and returned to its previous location after the repairs are completed. Excavation is expected to be minimal and will involve removing only enough material to allow a solid base to which the concrete could adhere. Any old concrete removed during excavation will be removed from the site and any loose material will be removed from the channel. Forms will be constructed and concrete placed under the abutment and upstream approximately 3 feet. The overall dimensions of the concrete block will be approximately 30 feet long and 3 feet high. The proposed Project

will involve repairing a larger area to better prevent future undercutting of the east bridge abutment.

After the concrete cures and forms are removed, large riprap material removed from the area during construction preparations will be placed immediately upstream of the new concrete to offer further erosion protection. After concrete repairs are completed, the access ramp will be completely removed and the bank will be restored to the original grade and seeded with native grasses. Construction is expected to last approximately 35 days from the time the work area is sufficiently dewatered for use by heavy equipment.

The river channel will not be excavated as it was in 1993 for similar repair work. A small track hoe will be the only equipment in the channel and will be able to maneuver over the natural stream bottom without excavating or filling an access road.

Reclamation will obtain an Army Corps of Engineers permit under Section 404 of the Clean Water Act prior to beginning construction and will abide by any conditions contained in that permit. Permit terms and conditions should be compatible with the action described here. Since the construction area is less than 1 acre in size, a Construction Stormwater Permit will not be required.

Biological Data Collections

Biological data collections associated with the proposed action will include two phases. One phase will take place when the flows are at 5 cfs and one phase will take place when flows are at 0 cfs. Sampling locations will include the Deadwood River from the Dam downstream to Whitehawk Creek and other previously selected locations spatially distributed between Deadwood Dam and the SF Payette River. Data collections will include an estimate of available fish habitat in the main channel at 5 cfs, macro invertebrate species composition, validating the mass balance equation (flow), fish sampling to determine relative species densities, gut content and aging of salmonid fishes, ground validation of green LiDAR data, and modified R1/R4 habitat surveys.

Biological data collections occurring during the shut off period are covered under State of Idaho permits. Non-lethal data collection methods will be employed for all species handled. Data collections will be used for the formulation of predictive models that will be used to address Terms and Conditions 3a – 3e in the Service's 2005 Opinion associated with operations at the Deadwood Project (Fish and Wildlife Service 2005a, pp. 259-260), and will assist in determining the operational flexibility at Deadwood Reservoir. Study objectives can be referenced in the Deadwood Reservoir Flexibility Study Proposal submitted with the Assessment (Bureau of Reclamation 2008a, p. 2).

2.2 Analytical Framework for the Jeopardy and Adverse Modification Determinations

2.2.1 Jeopardy Determination

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

1. The *Status of the Species*, which evaluates the bull trout rangewide condition, the factors responsible for that condition, and its survival and recovery needs.
2. The *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.
3. The *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the bull trout.
4. *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's 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 Opinion places an emphasis on consideration of the rangewide 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.

2.2.2 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 Act to complete the following analysis with respect to critical habitat.

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

1. The *Status of Critical Habitat*, which evaluates the rangewide 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.
2. The *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.
3. The *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected critical habitat units.
4. *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 rangewide condition of the critical habitat, taking into account any cumulative effects, to determine if the critical habitat rangewide will remain functional (or will 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.

Please note that there is no designated bull trout critical habitat located within the action area for this Project. Proposed bull trout critical habitat, however, does occur within the action area. Because none was requested, and no analysis in the Assessment was provided, we are not conducting an adverse modification analysis in this Opinion.

2.3 Status of the Species

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

2.3.1 Regulatory Status

The coterminous United States population of the bull trout was listed as threatened on November 1, 1999 (64 FR 58910). The threatened bull trout occurs in the Klamath River Basin of south-central Oregon, the Jarbidge River in Nevada, north to various coastal rivers of Washington to the Puget Sound, east throughout major rivers within the Columbia River Basin to the St. Mary-Belly River, and east of the Continental Divide in northwestern Montana (Cavender 1978, pp. 165-166; Bond 1992, p. 4; Brewin and Brewin 1997, pp. 209-216; Leary and Allendorf 1997, pp. 715-720). The Service completed a 5-year Review in 2008 and concluded that the bull trout should remain listed as threatened (Fish and Wildlife Service 2008, p. 53).

The bull trout was initially listed as three Distinct Population Segments (DPSs) (63 FR 31647, 64 FR 17110). The preamble to the final listing rule for the United States coterminous population of the bull trout discusses the consolidation of these DPSs, plus two other population segments, into one listed taxon and the application of the jeopardy standard under section 7 of the Act relative to this species (64 FR 58930):

> "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 above 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 (Fish and Wildlife Service 2006, pp. 1-2).

2.3.2 Reasons for Listing

Though wide-ranging in parts of Oregon, Washington, Idaho, and Montana, bull trout in the interior Columbia River basin presently occur in only about 45 percent of the historical range (Quigley and Arbelbide 1997, p. 1177; Rieman et al. 1997, p. 1119). Declining trends due to the combined effects of habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, angler harvest and poaching, entrainment into diversion channels and dams, and introduced nonnative species (e.g., brook trout, *Salvelinus fontinalis*) have resulted in declines in rangewide bull trout distribution and abundance (Bond 1992, p. 4; Schill 1992, p. 40; Thomas 1992, pp. 9-12; Ziller 1992, p. 28; Rieman and McIntyre 1993, pp. 1-18; Newton and Pribyl 1994, pp. 2, 4, 8-9; Idaho Department of Fish and Game in litt. 1995, pp. 1-3). Several local extirpations have been reported, beginning in the 1950s (Rode 1990, p. 1; Ratliff and Howell 1992, pp. 12-14; Donald and Alger 1993, p. 245; Goetz 1994, p. 1; Newton and Pribyl 1994, p. 2; Berg and Priest 1995, pp. 1-45; Light et al. 1996, pp. 20-38; Buchanan and Gregory 1997, p. 120).

Land and water management activities such as dams and other diversion structures, forest management practices, livestock grazing, agriculture, road construction and maintenance, mining, and urban and rural development continue to degrade bull trout habitat and depress bull trout populations (Fish and Wildlife Service 2002a, p. 13).

2.3.3 Species Description and Life History

Bull trout, member of the family Salmonidae, are char native to the Pacific Northwest and western Canada. The bull trout and the closely related Dolly Varden (*Salvelinus malma*) were not officially recognized as separate species until 1980 (Robins et al. 1980, p. 19). Bull trout historically occurred in major river drainages in the Pacific Northwest from the southern limits in the McCloud River in northern California (now extirpated), Klamath River basin of south central Oregon, and the Jarbidge River in Nevada to the headwaters of the Yukon River in the Northwest Territories, Canada (Cavender 1978, p. 165-169; Bond 1992, p. 2-3). To the west, the bull trout's current range includes Puget Sound, coastal rivers of British Columbia, Canada, and southeast Alaska (Bond 1992, p. 2-3). East of the Continental Divide bull trout are found in the headwaters of the Saskatchewan River in Alberta and the MacKenzie River system in Alberta and British Columbia (Cavender 1978, p. 165-169; Brewin and Brewin 1997, pp. 209-216). Bull trout are wide-spread throughout the Columbia River basin, including its headwaters in Montana and Canada.

Bull trout exhibit resident and migratory life history strategies throughout much of the current range (Rieman and McIntyre 1993, p. 2). Resident bull trout complete their entire life cycle in the streams where they spawn and rear. Migratory bull trout spawn and rear in streams for 1 to 4 years before migrating to either a lake (adfluvial), river (fluvial), or, in certain coastal areas, to saltwater (anadromous) where they reach maturity (Fraley and Shepard 1989, p. 1; Goetz 1989, pp. 15-16). Resident and migratory forms often occur together and it is suspected that individual bull trout may produce offspring exhibiting both resident and migratory behavior (Rieman and McIntyre 1993, p. 2).

The size and age of bull trout at maturity depend upon life history strategy. Growth of resident fish is generally slower than migratory fish; resident fish tend to be smaller at maturity and less fecund (Goetz 1989, p. 15). Bull trout normally reach sexual maturity in 4 to 7 years and live as

long as 12 years. Bull trout are iteroparous (they spawn more than once in a lifetime), and both repeat- and alternate-year spawning has been reported, although repeat-spawning frequency and post-spawning mortality are not well-documented (Leathe and Graham 1982, p. 95; Fraley and Shepard 1989, p. 135; Pratt 1992, p. 8; Rieman and McIntyre 1996, p. 133).

Bull trout typically spawn from August to November during periods of decreasing water temperatures. Migratory bull trout frequently begin spawning migrations as early as April, and have been known to move upstream as far as 250 kilometers (km) (155 miles) to spawning grounds (Fraley and Shepard 1989, p. 135). Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992, p.1) and, after hatching, juveniles remain in the substrate. Time from egg deposition to emergence may exceed 200 days. Fry normally emerge from early April through May depending upon water temperatures and increasing stream flows (Pratt 1992, p. 1).

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

Bull trout are opportunistic feeders with food habits primarily a function of size and life history strategy. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macrozooplankton and small fish (Boag 1987, p. 58; Goetz 1989, pp. 33-34; Donald and Alger 1993, pp. 239-243). Adult migratory bull trout are primarily piscivores, known to feed on various fish species (Fraley and Shepard 1989, p. 135; Donald and Alger 1993, p. 242).

2.3.4 Habitat Characteristics

Bull trout have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993, p. 4). Watson and Hillman (1997, p. 248) concluded that watersheds must have specific physical characteristics to provide habitat requirements for bull trout to successfully spawn and rear. It was also concluded that these characteristics are not necessarily ubiquitous throughout these watersheds resulting in patchy distributions even in pristine habitats.

Bull trout are found primarily in colder streams, although individual fish are migratory in larger, warmer river systems throughout the range (Fraley and Shepard 1989, pp. 135-137; Rieman and McIntyre 1993, p. 2 and 1995, p. 288; Buchanan and Gregory 1997, pp. 121-122; Rieman et al. 1997, p. 1114). Water temperature above 15°C (59°F) is believed to limit bull trout distribution, which may partially explain the patchy distribution within a watershed (Fraley and Shepard 1989, p. 133; Rieman and McIntyre 1995, pp. 255-296). Spawning areas are often associated with cold water springs, groundwater infiltration, and the coldest streams in a given watershed (Pratt 1992, p. 6; Rieman and McIntyre 1993, p. 7; Rieman et al. 1997, p. 1117). Goetz (1989, pp. 22, 24) suggested optimum water temperatures for rearing of less than 10°C (50°F) and optimum water temperatures for egg incubation of 2 to 4°C (35 to 39°F).

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools (Goetz 1989, pp. 22-25; Pratt 1992, p. 6; Thomas 1992, pp. 4-5; Rich 1996, pp. 35-38; Sexauer and James 1997, pp. 367-369; Watson and

Hillman 1997, pp. 247-249). Jakober (1995, p. 42) observed bull trout overwintering in deep beaver ponds or pools containing large woody debris in the Bitterroot River drainage, Montana, and suggested that suitable winter habitat may be more restrictive than summer habitat. Bull trout prefer relatively stable channel and water flow conditions (Rieman and McIntyre 1993, p. 6). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Sexauer and James 1997, pp. 368-369).

2.3.5 Population Dynamics

The draft bull trout Recovery Plan (Fish and Wildlife Service 2002a, pp. 47-48) defined core areas as groups of partially isolated local populations of bull trout with some degree of gene flow occurring between them. Based on this definition, core areas can be considered metapopulations. A metapopulation is an interacting network of local populations with varying frequencies of migration and gene flow among them (Meefe and Carroll 1994, p. 188). In theory, bull trout metapopulations (core areas) can be composed of two or more local populations, but Rieman and Allendorf (2001, p. 763) suggest that for a bull trout metapopulation to function effectively, a minimum of 10 local populations are required. Bull trout core areas with fewer than 5 local populations are at increased risk of local extirpation, core areas with between 5 and 10 local populations are at intermediate risk, and core areas with more than 10 interconnected local populations are at diminished risk (Fish and Wildlife Service 2002a, pp. 50-51).

The presence of a sufficient number of adult spawners is necessary to ensure persistence of bull trout populations. In order to avoid inbreeding depression, it is estimated that a minimum of 100 spawners are required. Inbreeding can result in increased homozygosity of deleterious recessive alleles which can in turn reduce individual fitness and population viability (Whitesel et al. 2004, p. 36). For persistence in the longer term, adult spawning fish are required in sufficient numbers to reduce the deleterious effects of genetic drift and maintain genetic variation. For bull trout, Rieman and Allendorf (2001, p. 762) estimate that approximately 1,000 spawning adults within any bull trout population are necessary for maintaining genetic variation indefinitely. Many local bull trout populations individually do not support 1,000 spawners, but this threshold may be met by the presence of smaller interconnected local populations within a core area.

For bull trout populations to remain viable (and recover), natural productivity should be sufficient for the populations to replace themselves from generation to generation. A population that consistently fails to replace itself is at an increased risk of extinction. Since estimates of population size are rarely available, the productivity or population growth rate is usually estimated from temporal trends in indices of abundance at a particular life stage. For example, redd counts are often used as an indicator of a spawning adult population. The direction and magnitude of a trend in an index can be used as a surrogate for growth rate.

Survival of bull trout populations is also dependent upon connectivity among local populations. Although bull trout are widely distributed over a large geographic area, they exhibit a patchy distribution even in pristine habitats (Rieman and McIntyre 1993, p. 7). Increased habitat fragmentation reduces the amount of available habitat and increases isolation from other populations of the same species (Saunders et al. 1991, p. 22). Burkey (1989, p. 76) concluded that when species are isolated by fragmented habitats, low rates of population growth are typical in local populations and their probability of extinction is directly related to the degree of isolation and fragmentation. Without sufficient immigration, growth of local populations may be low and probability of extinction high. Migrations also facilitate gene flow among local

populations because individuals from different local populations interbreed when some stray and return to non-natal streams. Local populations that are extirpated by catastrophic events may also become reestablished in this manner.

In summary, based on the works of Rieman and McIntyre (1993, pp. 9-15) and Rieman and Allendorf (2001, pp 756-763), the draft bull trout Recovery Plan identified four elements to consider when assessing long-term viability (extinction risk) of bull trout populations:

1. Number of local populations
2. Adult abundance (defined as the number of spawning fish present in a core area in a given year)
3. Productivity, or the reproductive rate of the population
4. Connectivity (as represented by the migratory life history form)

2.3.6 Rangewide Status and Distribution

As noted above, in recognition of available scientific information relating to their uniqueness and significance, five population 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:

1. Jarbidge River
2. Klamath River
3. Coastal-Puget Sound
4. St. Mary-Belly River
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 conservation needs of the bull trout within these units is provided below. A comprehensive discussion of these topics is found in the draft bull trout Recovery Plan (Fish and Wildlife Service 2002, entire; 2004a, b; entire).

Central to the survival and recovery of the bull trout is the maintenance of viable core areas (Fish and Wildlife Service 2002a, p. 54). A core area is defined as a geographic area 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, their use of spawning habitat. Each of the population segments listed below consists of one or more core areas. One hundred and twenty one core areas are recognized across the United States range of the bull trout (Fish and Wildlife Service 2005b, p. 9).

A core area assessment conducted by the Service for the 5-year bull trout status review determined that of the 121 core areas comprising the coterminous listing, 43 are at high risk of extirpation, 44 are at risk, 28 are at potential risk, 4 are at low risk and 2 are of unknown status (Fish and Wildlife Service 2008, p. 29).

2.3.6.1 Jarbidge River

This population segment 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. The current condition of the bull trout in this segment is attributed to the effects of livestock grazing, roads, angler harvest, timber harvest, and the introduction of nonnative fishes (Fish and Wildlife Service 2004a, p. iii). The draft bull trout Recovery Plan identifies the following conservation needs for this segment:

1. Maintain the current distribution of the bull trout within the core area.
2. Maintain stable or increasing trends in abundance of both resident and migratory bull trout in the core area.
3. Restore and maintain suitable habitat conditions for all life history stages and forms.
4. Conserve genetic diversity and increase natural opportunities for genetic exchange between resident and migratory forms of the bull trout.

An estimated 270 to 1,000 spawning fish per year are needed to provide for the persistence and viability of the core area and to support both resident and migratory adult bull trout (Fish and Wildlife Service 2004a, p. 62-63). Currently this core area is at high risk of extirpation (Fish and Wildlife Service 2005b, p. 9).

2.3.6.2 Klamath River

This population segment 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 degradation caused by reduced water quality, timber harvest, livestock grazing, water diversions, roads, and the introduction of nonnative fishes. Bull trout populations in this unit face a high risk of extirpation (Service 2002b, p. iv). The draft bull trout Recovery Plan (Fish and Wildlife Service 2002b, p. v) identifies the following conservation needs for this unit:

1. Maintain the current distribution of the bull trout and restore distribution in previously occupied areas.
2. Maintain stable or increasing trends in bull trout abundance.
3. Restore and maintain suitable habitat conditions for all life history stages and strategies.
4. Conserve genetic diversity and provide the opportunity for genetic exchange among appropriate core area populations.

Eight to 15 new local populations and an increase in population size from about 3,250 adults currently to 8,250 adults are needed to provide for the persistence and viability of the three core areas (Fish and Wildlife Service 2002b, p. vi).

2.3.6.3 Coastal-Puget Sound

Bull trout in the Coastal-Puget Sound population segment exhibit anadromous, adfluvial, fluvial, and resident life history patterns. The anadromous life history form is unique to this unit. This population segment currently contains 14 core areas and 67 local populations (Fish and Wildlife Service 2004b, p. iv; 2004c, pp. iii-iv). 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. The current condition of the bull trout in this population segment 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 nonnative species. The draft bull trout Recovery Plan (Fish and Wildlife Service 2004b, pp. ix-x) identifies the following conservation needs for this unit:

1. Maintain or expand the current distribution of bull trout within existing core areas.
2. Increase bull trout abundance to about 16,500 adults across all core areas.
3. Maintain or increase connectivity between local populations within each core area.

2.3.6.4 St. Mary-Belly River

This population segment currently contains six core areas and nine local populations (Fish and Wildlife Service 2002c, p. v). Currently, bull trout are widely distributed in the St. Mary River drainage and occur in nearly all of the waters that were 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 (Fish and Wildlife Service 2002c, p. 37). The current condition of the bull trout in this population segment is primarily attributed to the effects of dams, water diversions, roads, mining, and the introduction of nonnative fishes (Fish and Wildlife Service 2002c, p. vi). The draft bull trout Recovery Plan (Fish and Wildlife Service 2002c, pp. v-ix) identifies the following conservation needs for this unit:

1. Maintain the current distribution of the bull trout and restore distribution in previously occupied areas.
2. Maintain stable or increasing trends in bull trout abundance.
3. Maintain and restore suitable habitat conditions for all life history stages and forms.
4. Conserve genetic diversity and provide the opportunity for genetic exchange.
5. Establish good working relations with Canadian interests because local bull trout populations in this unit are comprised mostly of migratory fish whose habitat is mainly in Canada.

2.3.6.5 Columbia River

The Columbia River population segment includes bull trout residing in portions of Oregon, Washington, Idaho, and Montana. Bull trout are estimated to have occupied about 60 percent of the Columbia River Basin, and presently occur in 45 percent of the estimated historical range (Quigley and Arbelbide 1997, p. 1177). This population segment currently contains 97 core areas and 527 local populations. About 65 percent of these core areas and local populations occur in Idaho and northwestern Montana.

The condition of the bull trout populations within these core areas varies from poor to good, but generally all have been subject to the combined effects of habitat degradation, fragmentation and

alterations associated with one or more of the following activities: dewatering, road construction and maintenance, mining and grazing, blockage of migratory corridors by dams or other diversion structures, poor water quality, incidental angler harvest, entrainment into diversion channels, and introduced nonnative species.

The Service has determined that of the total 97 core areas in this population segment, 38 are at high risk of extirpation, 35 are at risk, 20 are at potential risk, 2 are at low risk, and 2 are at unknown risk (Fish and Wildlife Service 2005b, pp. 1-94).

The draft bull trout Recovery Plan (Fish and Wildlife Service 2002a, p. v) identifies the following conservation needs for this population segment:

1. Maintain or expand the current distribution of the bull trout within core areas.
2. Maintain stable or increasing trends in bull trout abundance.
3. Maintain and restore suitable habitat conditions for all bull trout life history stages and strategies.
4. Conserve genetic diversity and provide opportunities for genetic exchange.

2.3.6.5.1 Columbia River Recovery/Management Units

The draft bull trout Recovery Plan (Fish and Wildlife Service 2002a, p. 2) identified 22 recovery units within the Columbia River population segment. These units are now referred to as management units. Management units are groupings of bull trout with historical or current gene flow within them and were designated to place the scope of bull trout recovery on smaller spatial scales than the larger population segments. The Project action area occurs within the Salmon River Management Unit.

Achieving recovery goals within each management unit is critical to recovering the Columbia River population segment. Recovering bull trout in each management unit will maintain the overall distribution of bull trout in their native range. Individual core areas are the foundation of management units and conserving core areas and their habitats within management units preserves the genotypic and phenotypic diversity that will allow bull trout access to diverse habitats and reduce the risk of extinction from stochastic events. The continued survival and recovery of each individual core area is critical to the persistence of management units and their role in the recovery of a population segment (Fish and Wildlife Service 2002a, p. 54).

2.3.6.5.2 Southwest Idaho Recovery Unit

The Southwest Idaho Recovery Unit encompasses the Boise, Payette and Weiser river basins. The Project takes place in the Payette River Recovery Subunit. The Boise, Payette and Weiser rivers are tributaries to the Snake River and are entirely within the State of Idaho. The three basins flow south to southwest from mountains in central Idaho. Federal and State resource agencies have documented the occurrence of bull trout throughout the Southwest Idaho Recovery Unit (Fish and Wildlife Service 2002; Ch. 18, p.7). Elevations of the basins range from over 3,048 meters in the Sawtooth Mountains to 802 meters near the confluence of the Weiser River with the Snake River. Within the Southwest Idaho Recovery Unit, anadromous fishes historically occurred in each of the three river basins. Construction of impassable dams, first within the basins and later downstream from the confluences of the three basins in the Snake River, eliminated natural runs of anadromous fishes from the recovery unit.

In the Payette River Recovery Subunit, Deadwood Dam created Deadwood Reservoir and forms an impassable barrier to fish movement. Bull trout in the upper Deadwood River and Deadwood Reservoir are isolated from fish in the lower Deadwood River and the South Fork Payette River watersheds. The Payette River basin is an area of approximately 855,393 hectares (2,113,676 acres).

Habitat fragmentation and degradation are likely the most limiting factors for bull trout throughout the Southwest Idaho Recovery Unit (Fish and Wildlife Service 2002; Ch. 18, p.v). Although reservoirs formed by dams in some basins have allowed bull trout to express adfluvial life histories, dams, irrigation diversions, and road crossings are often impassable barriers to fish movement.

2.3.6.5.3 Deadwood River Core Area and Upper South Fork Payette River Core Area

The Deadwood River Core Area includes 5 local populations (Fish and Wildlife Service 2002; Ch. 18, p.34). It includes watersheds in the Deadwood River drainage upstream of Deadwood Dam, including Trail, Beaver, Wildbuck, Upper Deadwood River, and Deer. The Upper South Fork Payette River Core Area supports 9 local populations, including Scott Creek and Whitehawk Creek which flow into Deadwood River below Deadwood Dam (Fish and Wildlife Service 2002; Ch. 18, p.34). The Service, in the bull trout 5-year review (Fish and Wildlife Service 2008, p. 34), ranked both core areas as being at "High Risk" of extirpation. Upstream of Deadwood Dam, spawning and rearing habitat occurs in tributaries to the headwater portion of the upper Deadwood River, Deer Creek, and Trail Creek. Resident and migratory bull trout occur upstream of Deadwood Reservoir, however, the abundance of migratory fish is considered low. Low bull trout abundance appears to be related to loss of migratory individuals, isolation, past rotenone treatments, fragmented habitats, and high levels of sedimentation.

2.3.7 Recovery and Conservation Needs

Recovery for bull trout will entail reducing threats to the long-term persistence of populations and their habitats, ensuring the security of multiple interacting groups of bull trout, and providing habitat conditions and access to them that allow for the expression of various life-history forms (Fish and Wildlife Service 2002; Ch. 1, p. 43). The draft Bull Trout Recovery Plan identifies the following tasks needed for achieving recovery:

1. Protect, restore, and maintain suitable habitat conditions for bull trout.
2. Prevent and reduce negative effects of nonnative fishes, such as brook trout, and other nonnative taxa on bull trout.
3. Establish fisheries management goals and objectives compatible with bull trout recovery.
4. Characterize, conserve, and monitor genetic diversity and gene flow among local populations of bull trout.
5. Conduct research and monitoring to implement and evaluate bull trout recovery activities, consistent with an adaptive management approach using feedback from implemented, site-specific recovery tasks.
6. Use all available conservation programs and regulations to protect and conserve bull trout and bull trout habitats.
7. Assess the implementation of bull trout recovery by management units.

8. Revise management unit plans based on evaluations.

The conservation needs of the bull trout are often expressed as the four Cs: cold, clean, complex, and connected. 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 are all needed to promote conservation of bull trout at multiple scales ranging from the coterminous to local populations. The recovery planning process for the bull trout (Fish and Wildlife Service 2002a, p. vi) has also identified the following conservation 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.
4. Establish a positive population trend.

Recently, it has also been recognized that bull trout populations need to be protected from catastrophic fires across the range of each interim recovery unit.

Another threat now facing bull trout is warming temperature regimes associated with global climate change. Because air temperature affects water temperature, species at the southern margin of their range that are associated with cold water patches, such as bull trout, may become restricted to smaller, more disjunct patches or become extirpated as the climate warms (Rieman et al. 2007, p. 1560). Rieman et al. (2007, pp. 1558, 1562) concluded that climate is a primary determining factor in bull trout distribution. Some populations at high risk already, such as the Jarbidge, may require "aggressive measures in habitat conservation or restoration" to persist (Rieman et al. 2007, p. 1560). Conservation and restoration measures that would benefit bull trout include protecting high quality habitat, reconnecting watersheds, restoring floodplains, and increasing site-specific habitat features important for bull trout, such as deep pools or large woody debris (Kinsella 2005, entire).

2.4 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 which have already undergone section 7 consultations, and the impacts of state and private actions which are contemporaneous with the consultations in progress.

2.4.1 Status of the Bull Trout

The Project action area occurs within the Deadwood River Core Area and the Upper South Fork Payette River Core Area.

2.4.1.1 Deadwood River Core Area and Upper South Fork Payette River Core Area

Within the Deadwood River Core Area there are 5 local populations; no additional potential local populations were identified (Fish and Wildlife Service 2002; Ch. 18, p. 24). Project activities

may take place within the Trail Creek, Deer Creek and Upper Deadwood River local populations. The Upper South Fork Payette River Core Area supports 9 local populations, including Scott Creek and Whitehawk Creek which flow into Deadwood River below Deadwood Dam (Fish and Wildlife Service 2002; Ch. 18, p.34). In the Service's 5-year review of bull trout (Fish and Wildlife Service 2008, p. 34 and 35) it ranked both core areas as being at "High Risk" of extirpation. Upstream of Deadwood Dam, spawning and rearing habitat occurs in tributaries to the headwater portion of the upper Deadwood River, Deer Creek, and Trail Creek. Resident and migratory bull trout occur upstream of Deadwood Reservoir, however, the abundance of migratory fish is considered low. Low bull trout abundance appears to be related to loss of migratory individuals, isolation, past rotenone treatments, fragmented habitats, and high levels of sedimentation. Bull trout are considered "strong" (i.e., greater than 2,000 individuals with more than 500 adults) with an estimated 3,315 bull trout in Whitehawk and Scott creeks combined (Burton and Erickson 1999a in Fish and Wildlife Service 2008, p. 9).

Deadwood Dam, built in 1931 primarily for irrigation storage and to supplement late season flows in the Payette River, forms an impassable barrier to fish movement. Bull trout in the upper Deadwood River and Deadwood Reservoir are isolated from fish in the lower Deadwood River and the South Fork Payette River watersheds. Bull trout in the South Fork Payette River may be able to interact with fish in the Middle Fork Payette River, but a waterfall on the South Fork Payette River (Big Falls) may be a barrier to fish movement.

Bull trout have been documented throughout the Deadwood River Basin and have been captured in the stilling basin downstream of Deadwood Dam, however, efforts to sample bull trout in the Deadwood River downstream of the reservoir have been mostly unsuccessful (Table 1). Many tributaries in the Deadwood River basin support bull trout that are presumed to represent resident life history habits.

Some tributaries to the Deadwood River downstream from Deadwood Dam support strong numbers of bull trout (Burton and Erickson 1999a in Fish and Wildlife Service 2008, p. 9), although it is not known to what extent those fish may use the mainstem Deadwood River. Bull trout (assumed resident forms) have also been sampled in Scott, Warmsprings, NoMan, and Packsaddle creeks (Table 1). Based on information prior to 2005, the Service concluded that bull trout are likely to occur in depressed numbers in the Deadwood River below Deadwood Dam; data collected since 2005 continues to support this conclusion.

Fish sampling efforts concentrating on the capture of bull trout in the Deadwood River below the dam since 1998 is summarized in Table 1. All bull trout sampled have been returned to the location of capture; sampling protocols are defined in reports cited in Table 1. Sampling methodologies and low numbers of fish sampled have precluded population estimates from being calculated in any location. Since 2007, 21 bull trout (all captured in the stilling basin) have been radio tagged and their behavior monitored. Movement of the majority of radio tagged bull trout has consistently shown a tendency to stay in or near the stilling basin (Bureau of Reclamation 2007, pp. 8-11; 2008, pp. 11-14; 2010a, pp. 10-15).

The Deadwood River downstream from the dam may function as a migratory corridor and summer rearing habitat for bull trout. Water temperature downstream from the dam under past and current operations has been substantially cooler during the summer and warmer during the fall/winter and has lacked the variability of other unregulated streams within the same areas of Idaho. As noted in the Assessment (Bureau of Reclamation 2010, p. 17), recent productivity

work (Bureau of Reclamation 2008a, p. 14) in the Deadwood River below Deadwood Dam has described the macroinvertebrate fauna as having average densities as compared to other sites in the Pacific Northwest but low taxa richness.

More detailed status, distribution, and current conditions information for bull trout can be found in other documents, see Fish and Wildlife Service 2005a and Bureau of Reclamation 2004.

Table 1. Bull trout sampling efforts in the Deadwood River below Deadwood Dam, performed by the Idaho Department of Fish and Game and Bureau of Reclamation, 1998-2009.

Year	Sampling duration	Location	Gear	Bull trout sampled	Citation
1998	Aug 10-13	Deadwood Dam - Julie Creek Bridge	E-fish and snorkel	0	Allen 1998
2003	June 30-Aug 14	Headwater tributaries to Deadwood River*	E-fish and snorkel	89	Bureau of Reclamation 2004a
2004	June 17-Sept 17	Wilson and Warmsprings creeks	Weirs near mouth	0	Dare and Rose 2007
2004	Sept-October	Deadwood River at river mile 1.2	Weir	0	Bureau of Reclamation 2004a
2004	July 9-Aug 4	Wilson and Warmsprings creeks	E-fish	0	Dare and Rose 2007
2005	June 15-30 Sept 17-18	Scott, Warmsprings, Whitehawk creeks	E-fish	0	Bureau of Reclamation 2005
2006	October 4-6	Deadwood River mainstem*	E-fish	0	Bureau of Reclamation 2006
2007	Sept 19-Oct 6	Deadwood Dam stilling basin	Hook-line/ trap net	10	Bureau of Reclamation 2007
2008	July-Sept	Deadwood Dam stilling basin	Hook-line/ trap net	3	Bureau of Reclamation 2008
2009	June-Oct	Deadwood Dam stilling basin	Hook-line/ trap net	8	Reclamation 2010a

*Sampling numbers in the above table reported for 2003 included the tributaries NoMan, Scott, Warmsprings, and Packsaddle creeks. Sampling in 2006 occurred while flows were shut off from the dam and included two sections: dam to Whitehawk Creek and Julie Creek to mouth of Deadwood River.

2.4.2 Role of the Action Area in the Survival and Recovery of the Bull Trout

The Deadwood River downstream of the Deadwood Dam has the potential to be important habitat for bull trout and has the potential to be important connectivity habitat for bull trout in the South Fork Payette River system. The draft bull trout recovery plan is silent on the specific role that bull trout from the local populations in the action area play in the core area. However, understanding and developing restoration activities for local bull trout habitat are important to conserving and recovering bull trout in the core area.

2.5 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" (Fish and Wildlife Service 1986, p. 19958). "Indirect effects" are caused by or result from the agency action, are later in time, but are still reasonably certain to occur. Indirect effects may occur outside of the immediate footprint of the Project area, but would occur within the action area as defined (Fish and Wildlife Service 1986, p. 19958).

2.5.1 Direct and Indirect Effects of the Proposed Action

Direct effects are those that result from the proposed action and immediately affect the species or its habitat. Indirect effects are caused by or will result from the proposed action, are later in time, and are reasonably certain to occur.

After examining the effects discussion in the Assessment (pp. 20-23) and considering the conservation measures, the Service has determined that the Project has the potential for beneficial and detrimental effects to bull trout. The most likely negative impacts to bull trout can be categorized as habitat reduction due to decreased flows, reduced prey base, and potential for increased sediment. The effects discussion is organized with those same categories.

The proposed action will primarily impact the first 0.3 miles downstream from the stilling basin of Deadwood Dam to the confluence of Wilson Creek, however, the reduction in flow may be detectable farther downstream. Impacts will be lessened between Wilson and Whitehawk creeks (1.9 miles downstream of the dam) because of flow contributions from the creeks and from springs flowing into Deadwood River. Adverse affects below Whitehawk Creek are not expected, although a flow reduction of 50 cfs represents approximately 45-50% of the total flow at the mouth of the Deadwood River and SF Payette River. Modeling performed when the Assessment was written suggests that natural flows in the Deadwood River at the confluence with the South Fork Payette River might range between 100 – 125 cfs (Bureau of Reclamation internal data) during the time period of this action.

Potential impacts to bull trout are expected to be related to fish handling, flow reductions resulting in reduction of habitat, altered stream temperatures during Project implementation, reduced prey, and potential for increased sediment in the stream channel. Reduced flows could affect bull trout by potentially disconnecting deep pool habitats thereby limiting their ability to move between habitats, and exposing them to increased predation. A beneficial effect may result from improvement of instream water temperatures as a result of reduced flows from the reservoir. The water released from the dam during this time period is warmer than what would naturally occur in the system.

2.5.1.1 Effects associated with fish handing/salvage activities

Individual fishes captured by nets or electroshocking and then handled are subject to many different types of potential injury. These injuries include stress, tissue damage from electrical current, broken vertebrae, bruising, exposure to chemicals, and infection from wounds. Transporting fish leads to stress and may expose fish to possible infections. Fish salvage efforts will occur below the dam immediately following the reduction of flows to 5 cfs. Efforts will be concentrated in the stilling basin and downstream of the dam to Whitehawk Creek. Bull trout

captured in the stilling basin will be relocated to above the dam in suitable habitat. Other bull trout captured below the stilling basin will be relocated to the nearest suitable and connected habitat.

Injury or mortality that may occur as a result of the electroshocking, handling through capture with seines or nets, or any other direct fish handling that may occur are regulated by the IDFG's scientific collection permit program. Reclamation will be conducting fish salvage and transportation operations under their scientific collection permit from IDFG and will comply with all requirements therein. To avoid and minimize adverse effects to bull trout, Reclamation must adhere to all conservation measures in their IDFG collection permit relating to the capture and handling of bull trout. The Service has already analyzed the effects to bull trout from this activity and consulted on this permit at a programmatic level (Fish and Wildlife Service 2000, pp. 5-10).

2.5.1.2 Habitat impacts due to reduction of flow

Reduced flow from Deadwood Dam will potentially affect bull trout by reducing or eliminating migration corridors between pool habitats, increasing the potential for predation while migrating between habitats, and resource competition with other fishes. However, very few bull trout are expected to be in the mainstem river and, if present, are likely holding in the stilling basin immediately below the dam. Bull trout present in the stilling basin are likely to be entrained from the reservoir and will be captured during the proposed salvage effort and relocated to suitable habitat upstream of the dam.

Effects to habitat due to reduction of flow are expected to occur throughout Project implementation but will vary within the action area. Habitat disconnect at zero flow (plus groundwater seepage into the channel) will occur from the base of the dam to Wilson Creek (0.3 miles). Wilson Creek provides an average inflow of 2.1 cfs during the time of the proposed action. The river channel downstream of Wilson Creek is rocky and constricted, concentrating thalweg flows into a narrow channel allowing access between deep pool habitats during reduced flows. Reclamation staff performed habitat surveys in 2009 and identified 17 pool habitats within the first 1.9 miles downstream of the dam that are assumed to provide cover at reduced flows (Bureau of Reclamation internal data). Inflows within the first 1.9 miles downstream of the dam also minimize affects of low flow including approximately 11.5 cfs combined from Wilson (2.1 cfs), Warmsprings (6.2 cfs) and Whitehawk (4.2 cfs) creeks, seepage from the dam, and multiple riparian springs between Warmsprings and Whitehawk creeks.

Bull trout present in the area upstream of the Wilson Creek confluence will likely be confined to the stilling basin. Bull trout present downstream of the stilling basin will likely search out pool habitat while the flow is reduced. Reduced flows could indirectly affect bull trout by exposing them to increased predation risk as they move through migration corridors with shallower cover. The greatest likelihood of impacts to bull trout is expected to occur between the base of the dam to Wilson Creek where flows will be the lowest within the action area.

The effects associated with reduced habitat as a result of dewatering will be minimized by conducting two separate fish salvage efforts. Reclamation proposes to transport and release bull trout salvaged from the stilling basin into suitable habitat in the Deadwood Reservoir, Trail Creek, or Deer Creek. The decision to relocate bull trout from the stilling basin to above the dam is based on genetic sampling suggesting a high probability that any bull trout found in the stilling basin has been entrained from the reservoir. Salvage efforts between Wilson and Whitehawk

creeks will include collecting fish from stranding pools and relocating them to main channel habitat that is suitable and connected to avoid additional stress associated with prolonged handling and transport.

While adverse effects to individual bull trout as a result of flow reductions are expected immediately below the dam (downstream to Whitehawk Creek), the Service anticipates these impacts will affect only a small number of bull trout and will not result in bull trout mortality. Effects from reduced flows from the dam below Whitehawk Creek (at 1.9 miles) will be ameliorated by seepage below the dam, tributary flows, and riparian springs, which combined provide sufficient flows to sustain adequate habitat for bull trout. From Whitehawk Creek down to the confluence with the South Fork Payette River effects from reduced flows will be insignificant.

2.5.1.3 Water temperature impacts due to a reduction of flow

Reduced flow from Deadwood Dam is likely to positively affect bull trout by reducing water temperatures to a level within the bull trout preferred range. Deadwood Reservoir is known to discharge warmer temperature water than unregulated tributaries during the time the action will be implemented. By reducing discharge, water temperatures in the Deadwood River downstream of the dam will be lower because flows will no longer be mixing with warmer reservoir outflow. As noted in the Assessment (p. 21), based on current water forecasts for 2010, discharge water temperatures will likely exceed 15° C during August, similar to the conditions in 2007. Tributary inflows below the dam over the last four years have averaged 10.5 °C during the month of September compared to 13.5 °C from the reservoir. After the proposed construction and study activities are complete and outflow from Deadwood Dam is increased (late September/early October), water temperatures in the reservoir will have cooled and will likely be similar to temperatures in the tributaries.

Reduced flows from Deadwood Dam should decrease water temperatures in the Deadwood River to within the preferred range of bull trout, however, very few bull trout are expected to be in the mainstem river outside of the stilling basin. Bull trout present in the stilling basin downstream to Wilson Creek are likely entrained and, if captured during the proposed salvage effort, will be relocated to suitable habitat upstream of the dam.

Effects to bull trout from changes in water temperature are expected to be temporary and insignificant.

2.5.1.4 Prey base impacts due to a reduction of flow

Reduced flow is expected to have minor impacts to benthic, immobile biota and fishes other than bull trout throughout the action area resulting in mixed effects for bull trout. Minor impacts are anticipated for benthic, immobile biota within the first 0.3 miles of the Deadwood River due to dewatering of portions of the channel. Effects from reduced prey in this stretch will be mitigated by bull trout salvage efforts. Downstream of Wilson Creek prey may be reduced as habitat is reduced, however, effects from reduced prey to any bull trout in that area is expected to be immeasurable and discountable.

Any reduction to the prey base resulting from reduced flows will have only insignificant effects to bull trout.

2.5.1.5 Sediment Related Effects

Ground disturbing activities have the potential to indirectly affect fish and/or fish habitat through effects to water quality and alteration of in-stream habitat. Increased sediment delivery to Deadwood River could increase turbidity levels and increase fine sediment deposition in downstream habitats affecting bull trout habitat. The magnitude of these effects will vary as a result of the nature, extent, and duration of the construction activities and whether bull trout are present within 600 feet of the dam at the time of re-watering (October). Best Management Practices will be followed to mitigate and reduce potential impacts to bull trout habitats or individuals.

General sediment related effects

Sediment and turbid water may be produced when flows out of the dam resume and wash over disturbed areas. Increased sediment and suspended solids have the potential to affect primary production and benthic invertebrate abundance due to reductions in photosynthesis within murky waters resulting in decreased food availability for fish (Cordone and Kelley 1961, pp. 189-190; Lloyd et al. 1987, p. 18). Pools, which are an essential habitat type, can be filled by sediment and degraded or lost (Megahan 1982, p. 114). Increases in suspended sediment have been shown to affect salmonid behavior in several ways. Fish may avoid high concentrations of suspended sediments altogether (Hicks et al. 1991, p. 483-485). Social (Berg and Northcote 1985, p. 1410) and feeding behavior can be disrupted by increased levels of suspended sediment. Even small elevations in suspended sediment may reduce feeding efficiency and growth rates of some salmonids (Sigler et al. 1984, p. 142).

Sediment introduced into streams does not just adversely affect fish at an individual physical level, but can adversely affect fish populations. Deposition of silt on spawning beds can fill interstitial spaces in spawning areas with sediment (Phillips et al. 1975, p. 461; Myers and Swanson 1996, p. 245; Wood and Armitage 1997, p. 203) impeding water flow, reducing dissolved oxygen levels, and restricting waste removal which reduces the survival of fish embryos (Chapman 1988, pp. 1-5; Bjornn and Reiser 1991, p. 98).

Newcomb and Jensen (1996, pp. 720-727) and Bash et al. (2001, p. 24) provide syntheses of research that has been conducted on the effects of suspended sediment on the physical condition of salmonids. Newcomb and Jensen used their syntheses of field and laboratory data on effects from sediment to develop a dose response model and described 14 severity levels of effects, ranging from "no behavioral effects" (0) to greater than 80 to 100 percent mortality (14). This range is divided into four major categories, including "nil effect," "behavioral effects," "sublethal effects," and "lethal and Para lethal effects." Bash et al. (2001, p. 2) further refine the categories by describing whether the effect is behavioral, physiological, or habitat-based. For example, Newcomb and Jensen (1996, pp. 694-698) report that suspended sediment concentrations of 500 mg/l for 3 hours caused signs of sublethal stress in adult steelhead, which we will also expect for bull trout. If suspended sediment concentrations reach 3,000 mg/l for up to an hour it may cause moderate physiological stress (Newcomb and Jensen 1996, pp. 698-702), and could result in gill trauma and/or temporary adverse changes in blood physiology such as elevated blood sugars, plasma glucose, or plasma cortisol (Servizi and Martens 1987 in Bash et al. 2001, p. 16; Servizi and Martens 1992, pp. 1389-1390; Bash et al. 2001, p. 17). Lethal effects can occur if suspended sediment concentrations reach 22,026 mg/l at any one time, or remain at concentrations of 3,000 mg/l for 3 hours (Newcomb and Jensen 1996, pp. 698-702).

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

While there is a relationship between suspended solids measured in mg/l and NTUs, it is highly variable because of differences in many factors including water temperature and particle size. While developing Total Maximum Daily Load (TMDL) criteria for the Umatilla River Basin, Oregon used regression analysis to express the suspended solids (in mg/l) that represented 30 NTU for 14 watersheds (Oregon Department of Environmental Quality 2001, p. A6-3). Values ranged from 60 to 110 mg/l for the target value of 30 NTUs. If a similar relationship existed with Newcomb and Jensen's data, their 3 hour lethal range of 3,000 mg/l could equate to an NTU reading of between 833 and 1,764 which is a very wide potential range of values.

Increasing suspended sediment in rivers and streams during low-flow periods, when background levels of sediment in the stream system are generally very low or absent, has greater potential to affect fish. Bash et al. (2001, p. 16) reported that background mucus levels of fish are lower during this time period, which may result in amplified effects to fish, associated with the increased sediment inputs. This is in contrast to sediments that may be mobilized during the first high-flow events following a construction activity, when background sediment levels are higher. Higher flows within the year following Project implementation are expected to remobilize sediments, carrying them further downstream to be deposited. Eventually, most sediments mobilized during Project implementation will be carried downstream to larger streams, rivers, or water bodies within the watershed. Because high-flows that re-mobilize Project-related sediments are expected to occur when background sediment levels are naturally elevated, they are expected to have less potential for effects to bull trout.

Project Specific Effects

The bridge repair work is expected to have minor impacts to water quality, including sediment input and increased turbidity, downstream of the dam. The Service, however, does not have data on the amount of sediment that will be released by these activities. Work associated with site preparation, concrete placement along the eroded bridge abutment and the construction of the temporary access ramp will result in a very small amount of sediment that cannot be effectively removed from the river channel. After concrete repairs are completed, the access ramp and disturbed areas will be completely removed and the bank restored to the pre-Project grade and seeded with native grasses. Sediment associated with the Project will be mobilized once dam releases are returned to 50 cfs. Effects to water quality from bridge repair work will be mitigated by following BMPs throughout the construction period and restoring the construction site at Project completion. Overall, the amount of sediment introduced to the Deadwood River will be negligible and probably undetectable and is not likely to adversely affect bull trout or proposed bull trout critical habitat.

Bull trout not removed from the Deadwood River and that remain downstream of the dam during Project implementation and rewatering are expected to have only minor behavior and physiological effects due to short periods of elevated suspended sediment and turbidity levels. These effects are associated with avoidance or moving to areas with less suspended sediment.

Bull trout present downstream of the bridge access repair site are expected to be able to avoid or reduce their exposure to turbid water by swimming to adjacent habitat that is less turbid. During movement, some bull trout may be exposed to a greater risk of predation, particularly juvenile bull trout. Adult bull trout are not at risk of increased predation and it is unlikely they will abandon habitat even if they temporarily move out of turbid conditions. The likelihood of bull trout being present in the Deadwood River is low based on survey information presented in the Assessment (p. 18) and due to salvage efforts during the Project implementation.

In addition, the sediment plume released during rewatering will be temporary and will move through the river quickly. Based on studies examining culvert removal projects, which involve streambank disturbance, it is likely that most of the sediment from this Project will be suspended during the first 30 minutes following resumption of flows out of the dam and most of the turbidity will clear within 90 minutes. Based on review of the literature regarding turbidity and increased suspended sediment resulting from culvert replacements, increases in turbidity should be limited to less than 600 feet below the Project work site and should dissipate within 3-4 hours (Casselli et al. 2002, pp. 8-9; Jakober 2002, p. 6; Fish and Wildlife Service 2004, p. 30). The amount and extent of sediment associated with this Project will not rise to the levels normally seen during culvert replacements, however, due to the bedrock substrate of the river channel, the large fill at the bridge repair site, the gradient of the river channel below the dam, and the general nature of the Project.

Mortality of bull trout due to suspended sediment is not expected to occur as a result of Project implementation. An unquantifiable number of bull trout that may be in the action area may be exposed to increased suspended sediments, however effects will be temporary and insignificant.

2.5.1.6 Chemical contamination related effects

Bull trout could also be affected through impacts on water quality through chemical contamination. Heavy machinery use adjacent to stream channels raises concern for the potential of an accidental spill of fuel, lubricants, hydraulic fluid and similar contaminants into the riparian zone, or directly into the water where they could adversely affect habitat, injure or kill aquatic food organisms, or directly impact bull trout.

General Chemical Related Effects

Petroleum-based contaminants such as fuel, oil, and some hydraulic fluids, contain poly-cyclic aromatic hydrocarbons, which can cause chronic sublethal effects to aquatic organisms (Neff 1985, p. 420). Fuels and petroleum products are moderately-to-highly toxic to salmonids, depending on concentrations and exposure time. Free oil and emulsions can adhere to gills and interfere with respiration, and heavy concentrations of oil can suffocate fish. Evaporation, sedimentation, microbial degradation, and hydrology act to determine the fate of fuels entering fresh water (Saha and Konar 1986, p. 506). Ethylene glycol (the primary ingredient in antifreeze) has been shown to result in sublethal effects to rainbow trout at concentrations of 20,400 mg/L (Staples 2001, p.377). Brake fluid is also a mixture of glycols and glycol ethers, and has about the same toxicity as antifreeze.

The likelihood of a fuel spill occurring on travel routes is low due to the limited potential for refueling or maintenance of motorized vehicles. The likelihood of adverse effects related to a fuel spill is dependent upon the size and proximity of the fuel spill to action area streams.

Project Specific Chemical Related Effects

Petroleum products can directly poison salmonids and their aquatic invertebrate food source. The proposed Project has the potential to introduce petroleum products into the Project area's waterways during access ramp construction and repair work. The relevant mechanism of effect is the accidental spill of petroleum-based products during fueling and equipment operations. It is unlikely that antifreeze, brake or transmission fluid will be spilled in volumes or concentrations large enough to harm salmonids in or downstream from the Project area. If a spill occurs, amounts will likely be small because they will typically be related to individual vehicles and not associated with larger fuel transport and related transfer operations. BMPs should be followed to reduce the likelihood of a spill and to reduce the potential of possible spills from reaching live water. In the area where equipment will be working, seepage flow from the dam will be limited so the likelihood of chemical contaminants entering water is low. Effects to bull trout associated with chemical contamination are expected to be insignificant. Concrete will be used to repair the access bridge, but work will take place in the dewatered channel and concrete will be allowed to cure prior to flows resuming. There will be no effects to bull trout associated with the concrete.

2.5.2 Effects of Interrelated or Interdependent Actions

The implementing regulations for section 7 of the Act define interrelated as those that are a part of the 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. There are no such actions pertinent to this Project.

2.6 Cumulative Effects

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

2.7 Conclusion

The Service has reviewed the current status of bull trout, the environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to jeopardize the species' continued existence. Although the proposed action may result in some short-term adverse effects to individual bull trout in the form of harm or harassment, these effects are not expected to result in direct mortality. Additionally, these effects are not likely to cause a measurable reduction in the numbers, distribution, and reproduction of bull trout, as listed in the final rule [64 FR 58932 (November 1, 1999)], at the level of the local population, Deadwood River Core Area, Southwest Idaho management unit, or the Columbia River Distinct Population Segment. We believe this because the effects of the proposed action on the bull trout at the local population scale are likely to be small, both absolutely and relatively, and are not expected to cause a negative population trend at the local scale and because it is unlikely bull trout will remain in the action area after fish salvage occurs.

Most of the population in the core area will not be affected by the Project or exposed to the activities.

The only mortality that is possible is associated with salvage operations where activities (e.g., electro-fishing) may result in direct or indirect mortality. Effects and any associated take of bull trout resulting from the salvage operations has been analyzed as part of the Service's consultation with the IDFG on their section 6/10 permit. The associated Opinion (Fish and Wildlife Service 2000) addresses bull trout take, thus, it is not considered in this Opinion. We assume all relevant conservation measures and terms and conditions will be implemented by Reclamation as they function as an agent of State under IDFGs scientific collection permit.

While designated bull trout critical habitat does not exist in the action area, proposed bull trout critical habitat, however, does occur within the action area. Reclamation did not provide an effects analysis or determination for proposed critical habitat. Therefore, we are not conducting an adverse modification analysis in this Opinion. We acknowledge that Reclamation concluded that the proposed action would not adversely modify bull trout proposed critical habitat on page 16 of the Assessment.

2.8 Incidental Take Statement

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

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

Reclamation has a continuing duty to regulate the activity covered by this incidental take statement. If Reclamation fails to assume and implement the terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Reclamation must report the progress of the action and its impact on the species to the Service, as specified in the incidental take statement [50 CFR §402.14(i)(3)].

2.8.1 Amount or Extent of Take Anticipated

It is difficult to anticipate the exact number of individual bull trout that will be taken as a result of implementation of the Project. Bull trout salvage efforts concentrated in the stilling basin below the dam have occurred yearly since 2007 (implemented under IDFGs scientific collection permit) and a total of 21 bull trout were sampled. Data show that those fish remain in or near the

stilling basin when they were released and did not move very far downstream. Likewise, surveys conducted of the Deadwood River downstream of the dam have not documented any bull trout. Because we lack a bull trout density estimate to address take associated with Project implementation, we will use the amount of habitat affected downstream of the dam by the Project as a surrogate.

We anticipate that if bull trout are present in the action area, they will be subject to take from reduced habitat within the mainstem of Deadwood River below the Deadwood Dam for approximately the first 1.9 miles below the dam, as a result of reduced flows from the reservoir. Downstream of Whitehawk Creek (approximately 1.9 miles below the dam) the effects to bull trout from reduced flows will be insignificant. Take, in the form of harassment, of bull trout may occur as they are displaced from habitat as a result of reduced flows. The likelihood, however, of bull trout being below the stilling basin is very low based on past surveys. Capturing bull trout from the stilling basin and relocating them to suitable habitat upstream of the dam will prevent those fishes from being impacted by the reduced flows.

The Service expects no direct lethal take of bull trout associated with Project activities, outside of the salvage operations. Incidental take is limited to harassment of bull trout associated with reduced flows downstream of the dam to Whitehawk Creek. Authorized take will be exceeded if Project activities result in bull trout mortality, if activities occur outside of the identified work window, or if take occurs below the confluence of Whitehawk Creek.

2.8.2 Effect of the Take

In the accompanying Opinion, the Service determined that take as a result of this Project is not likely to jeopardize the Columbia River Distinct Population Segment (DPS) of bull trout. The proposed action is not expected to reduce the reproduction, status, and distribution of bull trout in the action area, and will not appreciably reduce the likelihood of survival and recovery of the Columbia River DPS.

The Columbia River DPS comprises 22 management units including the Southwest Idaho management unit. The Southwest Idaho management unit encompasses the Boise, Payette and Weiser river basins in Southwest, Idaho. In the Payette River Recovery Subunit, bull trout are distributed in five core areas throughout the basin, including the Deadwood River Core Area and Upper South Fork Payette River Core Area. Bull trout in these core areas are primarily resident fish, with relatively low numbers of migratory fish. A total of 18 local populations exist in the Payette River Recovery Subunit. The Service considers this core area as being at a "Low Risk" of extirpation (Fish and Wildlife Service 2008, p. 34-35).

The likelihood that the proposed action will impact the local populations of bull trout in the Deadwood River Core Area or the Upper South Fork Payette River Core Area is discountable. Bull trout densities and distribution in the local populations are not expected to be significantly altered. Since Whitehawk Creek and Scott Creek local populations exist well upstream of their confluences with the Deadwood River, there will be no anticipated effect to these populations from the Project. In addition, any bull trout relocated from the Deadwood River upstream to Trail Creek or Deer Creek likely originally came from those streams and their relocation will not cause an adverse effect to those populations. It is unlikely that the proposed action will impair productivity or population numbers of bull trout in the Southwest Idaho management unit or in the Columbia River population segment. The proposed action is designed to repair the bridge

access and to study the operational flexibility of Deadwood Dam to determine if operations can be modified to minimize negative impacts to bull trout. In the long-term, the Project may benefit the local population of bull trout by increasing our knowledge of habitat downstream of the reservoir.

2.8.3 Reasonable and Prudent Measures

The Reasonable and Prudent Measures (RPMs) are nondiscretionary measures to avoid or minimize take that must be carried out by cooperators for the exemption in section 7(o)(2) to apply. Reclamation has the continuing duty to regulate the activities covered in this incidental take statement where discretionary Federal involvement or control over the action has been retained or is authorized by law. The protective coverage of section 7(o)(2) will lapse if Reclamation fails to exercise its discretion to require adherence to terms and conditions of the incidental take statement, or to exercise that discretion as necessary to retain the oversight to ensure compliance with these terms and conditions. Similarly, if any applicant fails to act in accordance with the terms and conditions of the incidental take statement, protective coverage will lapse.

The Service believes that full application of BMPs included as part of the Project, together with use of the RPMs and terms and conditions described below, are necessary and appropriate to minimize the likelihood of incidental take of bull trout due to completion of the Project. The Service requests that Reclamation shall:

1. Limit water quality degradation associated with erosion and sediment from the Project.
2. Prevent and contain potential chemical spills.

2.8.4 Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, Reclamation must fully comply with conservation measures described as part of the proposed action and the following terms and conditions that implement the RPMs described above. Partial compliance with these terms and conditions may invalidate this take exemption, result in more take than anticipated, and lead the Service to a different conclusion regarding whether the Project will result in jeopardy.

To implement RPM #1, Reclamation shall ensure that:

1. Erosion control structures are in place and maintained during construction and repair activities associated with the Project. Erosion control material will be installed to minimize downstream transport of sediment. Where feasible, straw waddles, silt fences or similar erosion control material will be placed to capture sediment. After Project activities are completed, accumulations of dirt and sediment captured by the straw waddles and/or silt fences will be pulled back away from the river and dispersed into the floodplain. Straw waddles and/or silt fences will remain in place until stabilization of the site, particularly the access ramp, has occurred.

To implement RPM #2, Reclamation shall ensure the following measures will be followed to limit the possibility of petroleum-based products reaching the river during Project activities:

1. Storage of fuels or other toxicants will not be allowed within the stream channel or immediately adjacent to the stream channel. On-site refueling of equipment will occur where the danger of fuel spill is minimal.
2. A spill containment kit (commensurate in size with the amount of fuel) must be readily available in the event of a fuel spill.

2.8.5 Reporting and Monitoring Requirement

In order to monitor the impacts of incidental take, Reclamation must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement (50 CFR 402.14 (i)(3). Reporting associated with this Project can be included in the annual monitoring report submitted in accordance with the 2005 Opinion for Reclamation's Operations and Maintenance Activities in the Snake River Basin above Brownlee Reservoir. During Project implementation, Reclamation shall promptly notify the Service of any emergency or unanticipated situations arising that may be detrimental for bull trout relative to the proposed activity. Survey and salvage efforts, implemented under the IDFGs scientific collection permit, shall be reported as per that permit's terms and conditions.

2.9 Conservation Recommendations

Section 7(a)(l) 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 that Reclamation implement the following conservation measures:

1. Continue to survey and monitor bull trout populations and habitat in the Deadwood River Core Area to gather baseline and population trend information.
2. Continue to develop studies to comply with the Service Opinion (Fish and Wildlife Service 2005a) terms and conditions relating to the operation of Deadwood Dam.

To keep the Service informed of actions that minimize or avoid adverse effects or that benefit listed species or their habitats, the Service requests notification on implementation of any conservation recommendations.

2.10 Reinitiation-Closing Statement

This concludes formal consultation on the Repairs to Deadwood Dam Access Bridge Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if:

1. The amount or extent of incidental take is exceeded.
2. New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion.

3. The agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion.
4. A new species is listed or critical habitat designated that may be affected by the action.

In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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