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Jason R. Giard
U.S. Department of Transportation
Federal Highway Administration
3050 Lakeharbor Lane, Suite 126
Boise, Idaho 83703-6354

APR 23 2013

Subject: US 95 Clearwater River Bridge Scour Mitigation (Key No. 12333)—Nez Perce County, Idaho—Biological Opinion
In Reply Refer to: 01EIFW00-2013-F-0137

Dear Mr. Giard:

Enclosed is the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) on the Federal Highway Administration's (FHWA) and the Idaho Transportation Department's (ITD) – the Agencies – determinations of effect on species listed under the Endangered Species Act (Act) of 1973, as amended, for the proposed US 95 Clearwater Bridge Scour Mitigation project in Nez Perce County, Idaho. In a letter dated January 15, 2013, and received by the Service on January 18, the Agencies requested formal consultation on the determination under section 7 of the Act that the proposed project is likely to adversely affect the bull trout (*Salvelinus confluentus*) and its critical habitat. The Agencies also determined that the proposed project will have no effect on the Canada lynx (*Lynx canadensis*) and the Spalding's catchfly (*Silene spaldingii*). The Service acknowledges these no effect determinations.

The enclosed Opinion is based primarily on our review of the proposed action, as described in your December 2012 Biological Assessment (Assessment), and the anticipated effects of the action on listed species, and was prepared in accordance with section 7 of the Act. Our Opinion concludes that the proposed project will not jeopardize the survival and recovery of bull trout or destroy or adversely modify its critical habitat. A complete record of this consultation is on file at this office.

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 Opinion to document that the Army Corps of Engineers (Corps) has fulfilled its responsibilities under section 7 of the Act is contingent upon the following conditions:

1. The action considered by the Corps 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 Opinion.

Thank you for your continued interest in the conservation of threatened and endangered species. Please contact Clay Fletcher at (208) 378-5256 if you have questions concerning this Opinion.

Sincerely,

for Brian T. Kelly
State Supervisor

Enclosure

cc: NOAA, Moscow (Reis)
ITD, Boise (Sullivan)
COE, Boise (Braspennickx)
IDFG, Lewiston (Hennekey)
NPT, Lapwai (Lopez)

BIOLOGICAL OPINION
FOR THE
US 95 CLEARWATER BRIDGE SCOUR MITIGATION

01EIFW00-2013-F-0137

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

Supervisor Russell R. Holder for Brian T. Kelly

Date APR 23 2013

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1. BACKGROUND

1.1 Introduction

The U.S. Fish and Wildlife Service (Service) has prepared this Biological Opinion (Opinion) on the effects of the US 95 Clearwater Bridge Scour Mitigation project (Key No. 12333) on bull trout (*Salvelinus confluentus*) and its critical habitat. In a letter dated January 15, 2013, and received by the Service on January 18, the Federal Highway Administration (FHWA) and the Idaho Transportation Department (ITD) (together Agencies) requested formal consultation with the Service under section 7 of the Endangered Species Act (Act) of 1973, as amended, for its proposal to implement the action. The Agencies determined that the proposed action is likely to adversely affect bull trout and its critical habitat. As described in this Opinion, and based on the Biological Assessment prepared by the Agencies' consultant (Eisenbarth 2012, entire) and other information, the Service has concluded that the action, as proposed, is not likely to jeopardize the continued existence of bull trout and not likely to destroy or adversely modify bull trout critical habitat.

1.2 Consultation History

The Service and the Agencies have had the following communications and coordination in the development of the final Assessment.

June 6, 2012:	The Service received an email from ITD with a draft Assessment attached.
August 8, 2012:	The Service sent comments on the draft Assessment to the ITD via email.
January 18, 2013:	The Service received the final Assessment and request for formal consultation from the ITD.
February 14, 2013:	The Service requested additional information on underwater grout application from the ITD via email. The Service received clarification on this aspect from the ITD via email.
March 4, 2013	The Service sent an email to the ITD requesting additional information on the work at Pier 1. The ITD responded back with clarification via telephone.
March 7, 2013	The Service sent the draft Opinion, via email, to the Agencies for review.
March 11, 2013	The Service received an email from FHWA stating they had no comments on the draft Opinion.
March 20, 2013	The Service received an email from ITD District 2 (Environmental Planner) providing clarification on one Minimization Measure in the draft Opinion. The email indicated that the draft Opinion was still under review by the Design Engineer.
April 5, 2013	The Service received an email from ITD Headquarters stating that they had no comments on the draft Opinion.

April 10, 2013	The Service received an email from ITD District 2 stating that there were no additional comments.

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 Clearwater River Bridge occurs along US 95 at approximate milepost (MP) 304 between the towns of Spalding and Lewiston in Nez Perce County, Idaho.

The action area for the project includes the following:

- The existing Clearwater River Bridge.
- The mainstem Clearwater River channel from approximately 500 feet upstream of the bridge (i.e., potential barge anchor location) to approximately 1,500 feet downstream of the bridge (i.e., the potential extent of turbidity effects).
- The barge launch area located at an existing public boat ramp 0.73 mile downstream of the bridge site along the north bank of the Clearwater River.
- The off-site project components (e.g., staging areas, source and waste sites, and refueling areas). These areas will be designated by the contractor and will follow the ITD restrictions as outlined *in Best Management Practices (BMPs), Project Design Criteria, and Other Measures to Minimize Impacts* section below.

2.1.2 Proposed Action

The proposed maintenance work includes installing Armortec A-Jacks around eight bridge piers to protect the piers from ongoing scour damage. A-Jacks are three-dimensional concrete armor units (see Plan Sheet 8, Appendix A, Assessment). The A-Jacks will be constructed at the manufacturer's location and trucked to the project site. All concrete material will be cured and ready for installation at the time of arrival at the project site. No concrete for the A-Jacks will be poured on-site. The proposed A-Jacks mats will be 50 feet x 35 feet x 1.3 feet deep. The proposed plan calls for a total of approximately 450 cubic yards of A-Jacks to be installed. Prior to installing the A-Jacks, the channel bed around each pier will be excavated. The A-Jacks will be placed slightly below the channel bed elevation using an excavator equipped with an opposable thumb or a crane with a clamshell working from a barge deck. It is expected the river rock excavated from some areas will be used to fill in other areas that have scoured as shown in the plans or as directed. If rock excavated from the river bed is not available to fill in other areas, river rock that has similar characteristics as the existing stream bed will be used to fill in scoured areas. Once placed, the A-Jacks should not require future maintenance.

An undermined void beneath Pier 7 will be repaired/filled using Scour Protection Bags (SPB) constructed of geo-fabric and filled with grout (see Plan Sheet 7, Appendix A, Assessment). Typically, the grout bags are placed by hand by a diver/dive crew, and anchored in place using rebar, ensuring that the grout pumping port on the bags is placed for easy injection. The pumping port is designed to self-seal upon removal of the grout injection pipe. The grout will be specially formulated for underwater placement with anti-washout admixtures (the contractor is required to submit a mix design for approval by the ITD). The grout pump will be located on the barge deck with a pumping line running between the pump and the grout bag being filled. Approximately one cubic yard of grout will be applied under Pier 7 and the whole procedure should take less than one day, with the actual pumping of grout taking less than one hour. (Smith 2013, *in litt*).

Any woody debris that is trapped on the upstream face of the piers will be removed using an excavator working from the barge deck. The woody debris will be placed on the barge and transported to shore for disposal at an upland location.

The work described above will all be conducted in the flowing river channel. Dewatering was considered, but discounted for logistical reasons (e.g., the very large flow volume in the Clearwater River) and the much higher probability for environmental impacts. The proposed plan instead calls for all work to be completed in live water from a barge. This plan to use a barge is based on (1) U.S. Geological Survey (USGS) recorded flows for 2009, 2010, and 2011 from the gauging station at Spalding, Idaho; (2) water level elevations from the Spalding gauging station; (3) water surface elevations related to an acoustic imaging river contour map; and (4) the ITD bridge inspection plan sheet showing depths to the water surface elevation at 17,000 cubic feet per second (cfs), the water flow when the acoustic imaging was completed. These materials can be found in Appendix B of the Assessment. The barge will have the capabilities and equipment necessary to maneuver around the bridge piers and complete the necessary work in the designated locations as shown on Plan Sheet 7, Appendix A of the Assessment. The barge must maintain a minimum of two feet of clearance above the bottom of the Clearwater River at all times.

The Contractor may begin in-water work when the flow of the Clearwater River reaches 25,000 cfs and is falling. Work at Piers 2, 3, 4, and 5 shall be completed when river flows are between 25,000 cfs and 9,000 cfs (late June or early July through early to mid-September). Work at Pier 7 shall be completed when river flows are below 9,000 cfs (mid-September to mid-October). Work at Piers 6 and 8 shall be completed when river flows are below 25,000 cfs (late June or early July to mid-October).

It is anticipated that project work will occur at any time from late June to mid-October, depending on water levels. Although it is not possible to definitively state the length of time necessary to complete the in-water work around each pier (excavation and/or fill, and the placement of the A-Jacks mat), it is anticipated that 2-4 days per pier will be sufficient. Work will occur at one pier at a time. Therefore, work in live water is estimated at 14-28 days during the 4-month timeframe. Although work at Pier 1 will occur outside of the wetted channel, the pier is located below the Ordinary High Water Mark (OHWM) and may result in delayed sediment effects when inundated during higher flows. No work is proposed for Piers 9 and 10.

Best Management Practices (BMPs), Project Design Criteria, and Other Measures to Minimize Impacts

In order to minimize impacts, the following guidelines would be followed:

- Washing heavy equipment before coming on site, and when moving from an infected to a non-infected area, will be done to reduce the construction-generated spread of invasive plant seeds. Equipment shall not have damaged hoses, fittings, lines, or tanks that have the potential to release pollutants into the waterways. Additionally, the traditional hydraulic fluid in the excavator will be replaced with environmentally friendly hydraulic fluid.
- All imported materials (e.g., A-Jacks) will be washed and free from fines.
- An erosion and sediment control plan will be prepared by the construction contractor and approved by ITD prior to construction. As well as complying with all applicable laws and regulations, the plan must contain:
    1. Practices to prevent erosion and sedimentation associated with access roads, construction sites, borrow site operations, equipment and material storage sites, fueling operations, and staging areas (e.g., silt fence and/or fiber wattles placed between the access areas and the river channel).
    2. Practices to prevent construction debris from dropping in to any stream or water body, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.
    3. Inspections of erosion controls during construction to ensure they are working correctly (daily inspections during rainy periods and weekly during the dry seasons); and, if inspections show controls are ineffective, work crews must be mobilized immediately to make repairs, install replacements, or install additional controls as necessary. Sediment must be removed from erosion controls once it has reached one-third of the exposed height of the control
- A spill prevention and contingency plan and a storm water pollution prevention plan [SS1] will be prepared by the construction contractor and approved by ITD prior to commencement of construction activities. Spill kits and absorption pads will be stored in the machinery.
- Off-site project components, including the staging, material source and waste sites, and refueling areas, will be determined by the construction contractor and approved by ITD prior to commencement of construction activities. The contractor will be required to submit off-site use plans to ITD for approval. Such plans will identify the proposed location on a scaled map, type of activity and equipment to be used, and specifications for all necessary sediment and erosion control BMPs. These plans will also include

copies of any permits and approvals issued by applicable federal, state or local agencies. ITD will not allow the contractor to utilize any site or construction practice that will result in an effect to listed species or associated habitat that is not otherwise identified in the Assessment (or this Opinion), unless a reinitiated consultation has been concluded. ITD will consider the use of only those sites that avoid impacts to waters of the U.S. These sites must be located in upland area(s) at least 150 feet from any stream, water body, or wetland. If fuel storage areas cannot be located greater than 150 feet due to topographical constraints, these areas will utilize BMPs and containments to capture 125 percent of the stored fuel. All vehicles operated within 150 feet of any water body will be inspected daily for leaks and, if necessary, repaired before leaving the staging and refueling area. In addition, ITD will consider the use of only those sites that avoid impacts to cultural resources.

NOTE: The construction contractor will not be allowed to use the Idaho Fish and Game access on the north abutment as the primary staging or assembly area. Public access to this area must be maintained. The ITD maintenance area at Hog Island (US 95, MP 305.1, approximately one mile downstream from the bridge) may be used as a staging area.

- Off-site project components, including staging areas, source and waste sites (if any), and refueling areas, will not be located within mapped Lynx Analysis Units.
- The projected implementation time frame is the summer and fall of 2014 (late June or early July to mid-October) dependent on river flows. This timeframe would avoid most critical salmonid activities. All resource agencies (NOAA Fisheries, the Service, Corps) will be notified at least one week prior to work commencing.

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 Opinion relies on four components:

1. The *Status of the Species*, which evaluates the bull trout's 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.

As discussed below under the *Status of the Species*, interim recovery units have been designated for the bull trout for purposes of recovery planning and application of the jeopardy standard. Per Service national policy (USFWS 2006, entire), it is important to recognize that the establishment of recovery units does not create a new listed entity. Jeopardy analyses must always consider the impacts of a proposed action on the survival and recovery of the species that is listed. While a proposed Federal action may have significant adverse consequences to one or more recovery units, this will only result in a jeopardy determination if these adverse consequences reduce appreciably the likelihood of both the survival and recovery of the listed entity; in this case, the coterminous U.S. population of the bull trout.

The joint Service and National Marine Fisheries Service (NMFS) *Endangered Species Consultation Handbook* (USFWS and NMFS 1998, p. 4-38), which represents national policy of both agencies, further clarifies the use of recovery units in the jeopardy analysis:

> When an action appreciably impairs or precludes the capacity of a recovery unit from providing both the survival and recovery function assigned to it, that action may represent jeopardy to the species. When using this type of analysis, include in the biological opinion a description of how the action affects not only the recovery unit's capability, but the relationship of the recovery unit to both the survival and recovery of the listed species as a whole.

The jeopardy analysis in this Opinion conforms to the above analytical framework.

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.

The analysis in this Opinion places an emphasis on using the intended rangewide recovery function of bull trout critical habitat and the role of the action area relative to that intended function as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the adverse modification determination.

2.3 Status of the Species and Critical Habitat

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

2.3.1 Bull Trout

2.3.1.1 Listing Status

The coterminous United States population of the bull trout was listed as threatened on November 1, 1999 (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 (USFWS 2008, p. 53).

The bull trout was initially listed as three separate Distinct Population Segments (DPSs) (63 FR 31647, 64 FR 17110). The preamble to the final listing rule for the U.S. 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.

Thus, as discussed above under the *Analytical Framework for the Jeopardy and Adverse Modification Determinations*, the Service's jeopardy analysis for the proposed project will involve consideration of how the project is likely to affect the Columbia River interim recovery unit for the bull trout based on its uniqueness and significance as described in the DPS final listing rule cited above, which is herein incorporated by reference. However, in accordance with Service national policy, the jeopardy determination is made at the scale of the listed species. In this case, the coterminous U.S. population of the bull trout.

2.3.1.1.1 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 range-wide 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 (USFWS 2002a, p. 13).

2.3.1.2 Species Description

Bull trout (*Salvelinus confluentus*), 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.

2.3.1.3 Life History

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 give rise to offspring exhibiting both resident and migratory behavior (Rieman and McIntyre 1993, p. 2).

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, thus resulting in patchy distributions even in pristine habitats.

Bull trout are found primarily in colder streams, although individual fish are migratory in larger, warmer river systems throughout the range (Fraley and Shepard 1989, 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).

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 (mi)) 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, macro zooplankton 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).

2.3.1.3.1 Population Dynamics

The draft bull trout Recovery Plan (USFWS 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 (USFWS 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 nonnatal 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, and (4) connectivity (as represented by the migratory life history form).

2.3.1.4 Status and Distribution

As noted above, in recognition of available scientific information relating to their uniqueness and significance, five interim recovery units 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, and (5) Columbia River. Each of these units 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 (USFWS 2002a, entire; 2004a, b; entire).

Central to the survival and recovery of the bull trout is the maintenance of viable core areas (USFWS 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 interim recovery units 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 (USFWS 2005, 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 (USFWS 2008, p. 29).

2.3.1.4.1 Jarbidge River

This interim recovery unit currently contains a single core area with six local populations. Less than 500 resident and migratory adult bull trout, representing about 50 to 125 spawners, are estimated to occur within the core area. 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 (USFWS 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, and (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 (USFWS 2004a, p. 62-63). Currently this core area is at high risk of extirpation (USFWS 2005, p. 9).

2.3.1.4.2 Klamath River

This interim recovery unit currently contains three 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 (USFWS 2002b, p. iv). The draft bull trout Recovery Plan (USFWS 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, and (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 (USFWS 2002b, p. vi).

2.3.1.4.3 Coastal-Puget Sound

Bull trout in the Coastal-Puget Sound interim recovery unit exhibit anadromous, adfluvial, fluvial, and resident life history patterns. The anadromous life history form is unique to this unit. This interim recovery unit currently contains 14 core areas and 67 local populations (USFWS 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 interim recovery unit is attributed to the adverse effects of dams, forest management practices (e.g., timber harvest and associated road building activities), agricultural practices (e.g., diking, water control structures, draining of wetlands, channelization, and the removal of riparian vegetation), livestock grazing, roads, mining, urbanization, angler harvest, and the introduction of nonnative species. The draft bull trout Recovery Plan (USFWS 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, and (3) maintain or increase connectivity between local populations within each core area.

2.3.1.4.4 St. Mary-Belly River

This interim recovery unit currently contains six core areas and nine local populations (USFWS 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 (USFWS 2002c, p. 37). The current condition of the bull trout in this interim recovery unit is primarily attributed to the effects of dams, water diversions, roads, mining, and the introduction of nonnative fishes (USFWS 2002c, p. vi). The draft bull trout Recovery Plan (USFWS 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, and (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.

2.3.1.4.5 Columbia River

The Columbia River interim recovery unit 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 interim recovery unit 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 interim recovery unit, 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 (USFWS 2005, pp. 1-94).

The draft bull trout Recovery Plan (USFWS 2002a, p. v) identifies the following conservation needs for this interim recovery unit: (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, and (4) conserve genetic diversity and provide opportunities for genetic exchange.

2.3.1.4.5.1 Columbia River Recovery/Management Units

Achieving recovery goals within each management unit is critical to recovering the Columbia River interim recovery unit. 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 an interim recovery unit (USFWS 2002a, p. 54).

The draft bull trout Recovery Plan (USFWS 2002a, p. 2) identified 22 recovery units within the Columbia River interim recovery unit. 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 interim recovery units. The action area is encompassed by the Clearwater River management unit.

2.3.1.4.5.1.1 Clearwater River Management Unit

Bull trout are distributed throughout most of the large rivers and associated tributary systems within the Clearwater River management unit (USFWS 2002d, p. 16) and exhibit adfluvial, fluvial, and resident life history patterns. There are two naturally occurring adfluvial bull trout populations within the Clearwater River management unit; one is associated with Fish Lake in the upper North Fork Clearwater River drainage, and the other is associated with Fish Lake in the Lochsa River drainage (USFWS 2002d, p. 16). The Bull Trout Recovery Team has identified seven core areas and 35 local bull trout populations within the Clearwater management unit (USFWS 2002d, p. 17). The core areas include the North Fork Clearwater River, Lochsa River, South Fork Clearwater River, Selway River, and Lower-Middle Fork Clearwater Rivers. The action area is within the Lower-Middle Fork Clearwater River core area.

Lower-Middle Fork Clearwater River Core Area

Bull trout use the lower (mainstem) Clearwater River, Middle Fork Clearwater River, and their tributaries primarily as foraging, migratory, rearing, and overwintering (FMO) habitat. No tributary streams within the core area have current documentation of bull trout spawning; however, Lolo Creek has documented occurrence of juvenile bull trout and is considered a local population. Clear Creek is the only potential local population. The larger tributaries, such as Orofino Creek and the Potlatch River, may be used incidentally for subadult/adult rearing and foraging when stream conditions are suitable but such use is considered to be at a very low level. Bull trout may also use some tributaries of the Middle Fork and lower Clearwater Rivers as thermal refuge habitat during high water temperatures in summer, although many tributaries may have even higher temperatures than these mainstem river segments (USFWS 2002d, pp. 38-39).

Threats to this core area include the past presence of a nearly impassable dam that existed at Lewiston between 1927 and 1972. This dam reduced returns of anadromous fish and extirpated coho salmon (*Oncorhynchus kisutch*). The resulting reduced populations of anadromous salmonids historically impacted bull trout through reduced abundance of prey, and continues to impact bull trout in the Clearwater River Management Unit. Other threats include timber harvest, roads with a density of 1.9 miles/square mile (USFWS 2005, p. 48), mining, and agriculture which all contribute to very high sediment loads during high flow events in the Clearwater River (USFWS 2002d, pp. 44-82).

As discussed above, in the draft Recovery Plan four factors are used to examine the risk of extinction for a core area: number of local populations, adult abundance, productivity, and connectivity. Lolo Creek is the only local populations within the Lower-Middle Fork Clearwater River core area. Because this core area has only one local population, the core area is at an increased risk of extinction from stochastic events. Current abundance and distribution of bull trout in the core area are considered lower than historic levels. It is estimated that there are fewer than 500 spawners present (USFWS 2002d, p. 97), so this core area is at an increased risk from deleterious effects of genetic drift. Population trend data are lacking for the core area, so the draft Recovery Plan determined that until such data are available, the core area is at an increased risk of extinction (USFWS 2002d, pp. 98-99). Migratory bull trout are believed to be absent in core area tributaries, so the core area is at an increased risk of extinction due to loss of connectivity (USFWS 2002d, p. 99).

The Service's Five Year Status Review (USFWS 2008, p. 34) concluded that the Lower-Middle Fork Clearwater River core area is at risk of extirpation. We found that the short-term population trend was unknown, numbers of adult bull trout are low (50-250) and threats to the population are moderate and imminent (USFWS 2008, p. 34).

2.3.1.5 Previous Consultations and Conservation Efforts

2.3.1.5.1 Consultations

Consulted-on effects are those effects that have been analyzed through section 7 consultation as reported in a biological opinion. These effects are an important component of objectively characterizing the current condition of the species. To assess consulted-on effects to bull trout, we analyzed all of the biological opinions received by the Region 1 and Region 6 Service Offices from the time of bull trout's listing until August 2003; this summed to 137 biological opinions. Of these, 124 biological opinions (91 percent) applied to activities affecting bull trout in the Columbia Basin interim recovery unit, 12 biological opinions (9 percent) applied to activities affecting bull trout in the Coastal-Puget Sound interim recovery unit, 7 biological opinions (5 percent) applied to activities affecting bull trout in the Klamath Basin interim recovery unit, and one biological opinion (< 1 percent) applied to activities affecting the Jarbidge and St. Mary-Belly interim recovery units (Note: these percentages do not add to 100, because several biological opinions applied to more than one interim recovery unit). The geographic scale of these consultations varied from individual actions (e.g., construction of a bridge or pipeline) within one basin to multiple-project actions occurring across several basins.

Our analysis showed that we consulted on a wide array of actions which had varying levels of effect. Many of the actions resulted in only short-term adverse effects, some with long-term beneficial effects. Some of the actions resulted in long-term adverse effects. No actions that have undergone consultation were found to appreciably reduce the likelihood of survival and recovery of the bull trout. Furthermore, no actions that have undergone consultation were anticipated to result in the loss of local populations of bull trout.

2.3.1.5.2 Regulatory mechanisms

The implementation and effectiveness of regulatory mechanisms vary across the coterminous range. Forest practices rules for Montana, Idaho, Oregon, Washington, and Nevada include streamside management zones that benefit bull trout when implemented.

2.3.1.5.3 State Conservation Measures

State agencies are specifically addressing bull trout through the following initiatives:

- Washington Bull Trout and Dolly Varden Management Plan developed in 2000.
- Montana Bull Trout Restoration Plan (Bull Trout Restoration Team appointed in 1994, and plan completed in 2000).
- Oregon Native Fish Conservation Policy (developed in 2004).
- Nevada Species Management Plan for Bull Trout (developed in 2005).
- State of Idaho Bull Trout Conservation Plan (developed in 1996). The watershed advisory group drafted 21 problem assessments throughout Idaho which address all 59 key watersheds. To date, a conservation plan has been completed for one of the 21 key watersheds (Pend Oreille).

2.3.1.5.4 Habitat Conservation Plans

Habitat Conservation Plans (HCP) have resulted in land management practices that exceed State regulatory requirements. Habitat conservation plans addressing bull trout cover approximately 472 stream miles of aquatic habitat, or approximately 2.6 percent of the Key Recovery Habitat across Montana, Idaho, Oregon, Washington, and Nevada. These HCPs include: Plum Creek Native Fish HCP, Washington Department of Natural Resources HCP, City of Seattle Cedar River Watershed HCP, Tacoma Water HCP, and Green Diamond HCP.

2.3.1.5.5 Federal Land Management Plans

PACFISH is the "Interim Strategy for Managing Anadromous Fish-Producing Watersheds and includes Federal lands in Western Oregon and Washington, Idaho, and Portions of California." INFISH is the "Interim Strategy for Managing Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana, and Portions of Nevada." Each strategy amended Forest Service Land and Resource Management Plans and Bureau of Land Management Resource Management Plans. Together PACFISH and INFISH cover thousands of miles of waterways within 16 million acres and provide a system for reducing effects from land management activities to aquatic resources through riparian management goals, landscape scale interim riparian management objectives, Riparian Habitat Conservation Areas (RHCAs), riparian standards, watershed analysis, and the designation of Key and Priority watersheds. These interim strategies have been in place since 1992 and are part of the management plans for Bureau of Land Management and Forest Service lands.

The Interior Columbia Basin Ecosystem Management Plan (ICBEMP) is the strategy that replaces the PACFISH and INFISH interim strategies when federal land management plans are revised. The Southwest Idaho Land and Resource Management Plan (LRMP) is the first LRMP under the strategy and provides measures that protect and restore soil, water, riparian and aquatic resources during project implementation while providing flexibility to address both short- and long-term social and economic goals on 6.6 million acres of National Forest lands. This plan includes a long-term Aquatic Conservation Strategy that focuses restoration funding in priority subwatersheds identified as important to achieving Endangered Species Act, Tribal, and Clean Water Act goals. The Southwest Idaho LRMP replaces the interim PACFISH/INFISH strategies and adds additional conservation elements, specifically, providing an ecosystem management foundation, a prioritization for restoration integrated across multiple scales, and adaptable active, passive and conservation management strategies that address both protection and restoration of habitat and 303(d) stream segments.

The Southeast Oregon Resource Management Plan (SEORMP) and Record of Decision is the second LRMP under the ICBEMP strategy which describes the long-term (20+ years) plan for managing the public lands within the Malheur and Jordan Resource Areas of the Vale District. The SEORMP is a general resource management plan for 4.6 million acres of Bureau of Land Management administered public lands primarily in Malheur County with some acreage in Grant and Harney Counties, Oregon. The SEORMP contains resource objectives, land use allocations, management actions and direction needed to achieve program goals. Under the plan, riparian areas, floodplains, and wetlands will be managed to restore, protect, or improve their natural functions relating to water storage, groundwater recharge, water quality, and fish and wildlife values.

The Northwest Forest Plan covers 24.5 million acres in Washington, Oregon, and northern California. The Aquatic Conservation Strategy (ACS) is a component of the Northwest Forest Plan. It was developed to restore and maintain the ecological health of watersheds and the aquatic ecosystems. The four main components of the ACS (Riparian Reserves, Watershed Analysis, Key Watersheds, and Watershed Restoration) are designed to operate together to maintain and restore the productivity and resiliency of riparian and aquatic ecosystems.

It is the objective of the Forest Service and the Bureau of Land Management to manage and maintain habitat and, where feasible, to restore habitats that are degraded. These plans provide for the protection of areas that could contribute to the recovery of fish and, overall, improve riparian habitat and water quality throughout the basin. These objectives are accomplished through such activities as closing and rehabilitating roads, replacing culverts, changing grazing and logging practices, and re-planting native vegetation along streams and rivers.

2.3.1.6 Conservation Needs

The recovery planning process for the bull trout (USFWS 2002a, p. 49) has identified the following conservation needs (goals) for bull trout recovery: (1) maintain the current distribution of bull trout within core areas as described in recovery unit chapters, (2) maintain stable or increasing trends in abundance of bull trout as defined for individual recovery units, (3) restore and maintain suitable habitat conditions for all bull trout life history stages and strategies, and (4) conserve genetic diversity and provide opportunity for genetic exchange.

The draft bull trout Recovery Plan (USFWS 2002a, p. 62) 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, and (8) revise management unit plans based on evaluations.

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 already at high risk, 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 will benefit bull trout include protecting high quality habitat, reconnecting watersheds, restoring flood plains, and increasing site-specific habitat features important for bull trout, such as deep pools or large woody debris (Kinsella 2005, entire).

2.3.2 Bull Trout Critical Habitat

2.3.2.1 Legal Status

Ongoing litigation resulted in the U.S. District Court for the District of Oregon granting the Service a voluntary remand of the 2005 critical habitat designation. Subsequently the Service published a proposed critical habitat rule on January 14, 2010 (75 FR 2260) and a final rule on October 18, 2010 (75 FR 63898). The rule became effective on November 17, 2010. A justification document was also developed to support the rule and is available on our website (http://www.fws.gov/pacific/bulltrout). The scope of the designation involved the species' coterminous range, which includes the Jarbidge River, Klamath River, Coastal-Puget Sound, St. Mary-Belly River, and Columbia River interim recovery units (also considered as interim recovery units)[1].

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

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[1] The Service's 5 year review (USFWS 2008, p. 9) identifies six draft recovery units. Until the bull trout draft recovery plan is finalized, the current five interim recovery units are in affect for purposes of section 7 jeopardy analysis and recovery. The adverse modification analysis does not rely on recovery units.

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

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

Compared to the 2005 designation, the final rule increases the amount of designated bull trout critical habitat by approximately 76 percent for miles of stream/shoreline and by approximately 71 percent for acres of lakes and reservoirs.

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

The final rule continues to exclude some critical habitat segments based on a careful balancing of the benefits of inclusion versus the benefits of exclusion. Critical habitat does not include: (1) waters adjacent to non-Federal lands covered by legally operative incidental take permits for habitat conservation plans (HCPs) issued under section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended, in which bull trout is a covered species on or before the publication of this final rule; (2) waters within or adjacent to Tribal lands subject to certain commitments to conserve bull trout or a conservation program that provides aquatic resource protection and restoration through collaborative efforts, and where the Tribes indicated that inclusion will impair their relationship with the Service; or (3) waters where impacts to national security have been identified (75 FR 63898). Excluded areas are approximately 10 percent of the stream/shoreline miles and 4 percent of the lakes and reservoir acreage of designated critical habitat. Each excluded area is identified in the relevant CHU text, as identified in paragraphs (e)(8) through (e)(41) of the final rule. It is important to note that the exclusion of waterbodies from designated critical habitat does not negate or diminish their importance for bull trout conservation. Because exclusions reflect the often complex pattern of land ownership, designated critical habitat is often fragmented and interspersed with excluded stream segments.

2.3.2.2 Conservation Role and Description of Critical Habitat

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

As previously noted, 32 CHUs within the geographical area occupied by the species at the time of listing are designated under the final rule. Twenty-nine of the CHUs contain all of the physical or biological features identified in this final rule and support multiple life-history requirements. Three of the mainstem river units in the Columbia and Snake River basins contain most of the physical or biological features necessary to support the bull trout's particular use of that habitat, other than those physical and biological features associated with Primary Constituent Elements (PCEs) 5 and 6, which relate to breeding habitat (see list below).

The primary function of individual CHUs is to maintain and support core areas, which (1) contain bull trout populations with the demographic characteristics needed to ensure their persistence and contain the habitat needed to sustain those characteristics (Rieman and McIntyre 1993, p. 19); (2) provide for persistence of strong local populations, in part, by providing habitat conditions that encourage movement of migratory fish (MBTSG 1998, pp. 48-49; Rieman and McIntyre 1993, pp. 22-23); (3) are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations (MBTSG 1998, pp. 48-49; Rieman and McIntyre 1993, pp. 22-23); and (4) are distributed throughout the historic range of the species to preserve both genetic and phenotypic adaptations (MBTSG 1998, pp. 13-16; Rieman and Allendorf 2001, p. 763; Rieman and McIntyre 1993, p. 23).

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

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

1. Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

2. Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including, but not limited to, permanent, partial, intermittent, or seasonal barriers.

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

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

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

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

7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departures from a natural hydrograph.

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

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

2.3.2.3 Current Rangewide Condition of Bull Trout Critical Habitat

The condition of bull trout critical habitat varies across its range from poor to good. Although still relatively widely distributed across its historic range, the bull trout occurs in low numbers in many areas, and populations are considered depressed or declining across much of its range (67 FR 71240). This condition reflects the condition of bull trout habitat.

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

There is widespread agreement in the scientific literature that many factors related to human activities have impacted bull trout and their habitat, and continue to do so. Among the many factors that contribute to degraded PCEs, those which appear to be particularly significant and have resulted in a legacy of degraded habitat conditions are as follows:

1. Fragmentation and isolation of local populations due to the proliferation of dams and water diversions that have eliminated habitat, altered water flow and temperature regimes, and impeded migratory movements (Dunham and Rieman 1999, p. 652; Rieman and McIntyre 1993, p. 7).

2. Degradation of spawning and rearing habitat and upper watershed areas, particularly alterations in sedimentation rates and water temperature, resulting from forest and rangeland practices and intensive development of roads (Fraley and Shepard 1989, p. 141; MBTSG 1998, pp. ii - v, 20-45).

3. The introduction and spread of nonnative fish species, particularly brook trout and lake trout, as a result of fish stocking and degraded habitat conditions, which compete with bull trout for limited resources and, in the case of brook trout, hybridize with bull trout (Leary et al. 1993, p. 857; Rieman et al. 2006, pp. 73-76).

4. In the Coastal-Puget Sound region where amphidromous bull trout occur, degradation of mainstem river FMO habitat, and the degradation and loss of marine nearshore foraging and migration habitat due to urban and residential development.

5. Degradation of FMO habitat resulting from reduced prey base, roads, agriculture, development, and dams.

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

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

2.4.1 Bull Trout

2.4.1.1 Status of the Bull Trout in the Action Area

An unknown (but suspected low) number of adult and subadult bull trout use the Lower Clearwater River in the action area for FMO habitat (USFWS 2002d, p. 38). No bull trout spawning occurs in the action area. A summary of the location and timing of bull trout life stages in the Clearwater River subbasin is presented in Table 2.

Table 2. Timing and location of bull trout life stages in the Clearwater River subbasin (from Assessment

Life Stage	Timing and Location of Occurrence
Adult Migration	JUNE - AUG Clearwater R.
Adult Spawning	Late AUG - SEPT Trib. Streams
Adult Overwintering	NOV - MARCH Clearwater R.
Adult/Subadult Rearing	YEARLONG Clearwater R. & Trib. Streams
Incubation & Emergence	SEPT - MAY Trib. Streams
Juvenile Rearing	2 - 3 Years Trib. Streams
Smolt Emigration	N/A

2.4.1.2 Factors Affecting the Bull Trout in the Action Area

The Matrix of Pathway Indicators (MPI) (USNOAA 1996, entire) for bull trout is used to evaluate and document baseline conditions and to aid in determining whether a project is likely to adversely affect or result in the incidental take of bull trout or adversely affect critical habitat (see section 2.5 for effects to bull trout and critical habitat). The MPI for bull trout in the action area is shown in Table 3.

Table 3. MPI for the Lower Clearwater River.

Diagnostic Pathway		Baseline Condition			Effects of the Action		
	Indicator	Properly Functioning	Functioning at Risk	Functioning at Unaccept-able Risk	Restore	Maintain	Degrade (all short-term)
SPECIES (the project is expected to result in disturbance to individual bull trout but is not expected to have any population level effects)							
Subpopulation Characteristics Within Subpopulation Watersheds	Subpopulation size			X(BT)			X
	Growth and survival			X(BT)			X
	Life history diversity and isolation			X(BT)			X
	Persistence and genetic integrity			X(BT)			X
HABITAT							
Water Quality	Temperature			X(BT)		X	
	Suspended sediment		X				X
	Chemical contamination/nutrients	X					X
Habitat Access	Physical barriers	X				X	
Habitat Elements	Cobble embeddedness		X				X
	Large woody debris*	NA	NA	NA		X	
	Pool frequency	X				X	
	Pool quality	X				X	
	Off-channel habitat			X		X	
	Refugia			X		X	
Channel Condition & Dynamics	Wetted width/maximum depth ratio in scour pools in a reach		X			X	
	Streambank condition	X				X	
	Floodplain connectivity			X		X	
Flow/ hydrology	Change in peak/base flows			X		X	
	Increase in drainage network			X		X	
Watershed conditions	Watershed road density & location			X		X	
	Disturbance history			X			X
	Riparian Habitat Conservation Area		X			X	
	Disturbance regime			X		X	
Integration			X			X	

***Large Woody Debris** (LWD) is not applicable as a habitat indicator for the mainstem Clearwater River because of the river's large size and high flows. LWD does not function significantly within the channel as it is washed out with high annual flows. LWD may be deposited above and/or near ordinary high water levels, particularly in back eddy areas, but, overall fish habitat and channel stability functions associated with LWD are not a primary component for the Clearwater River (Assessment, p. 24).

The condition of the 25 indicators included in Table 2 is as follows:

- Five are properly functioning (Chemical Contamination/nutrients, Physical Barriers, Pool Frequency, Pool Quality, and Streambank Condition).
- Five are Functioning at Risk (Suspended Sediment, Cobble Embeddedness, Width/Depth Ratio and Integration (of species and habitat).
- Thirteen are Functioning at Unacceptable Risk (Subpopulation Size, Growth and Survival, Life History Diversity and Isolation, Persistence and Genetic Integrity, Off-channel Habitat, Refugia, Floodplain Connectivity, Change in Peak/Base Flows, Increase in Drainage Network, Watershed Road Density, Disturbance History, and Disturbance Regime).

We conclude that the majority (80 percent) of the bull trout indicators are in a degraded condition. As previously described in the Status of the Species section of this Opinion, bull trout distribution, abundance, and habitat quality have declined rangewide primarily from the combined effects of habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, angler harvest, poaching, entrainment, loss or reduction in runs of anadromous salmonids, and the introduction of nonnative fish species such as the brook trout.

Land and water management activities that depress bull trout populations include dams and other water diversion structures, forest management practices, livestock grazing, agriculture, road construction and maintenance, mining, and urban and rural development. All of these activities have occurred or are occurring in the action area to varying degrees with resulting adverse impacts on bull trout.

Changes in hydrology and temperature caused by changing climate have the potential to negatively impact aquatic ecosystems in Idaho, with salmonid fishes being especially sensitive. Average annual temperature increases due to increased carbon dioxide are affecting snowpack, peak runoff, and base flows of streams and rivers (Mote et al. 2003, p. 45). Increases in water temperature may cause a shift in the thermal suitability of aquatic habitats (Poff et al. 2002, p. iii). For species that require colder water temperatures to survive and reproduce, warmer temperatures could lead to significant decreases in available suitable habitat. Increased frequency and severity of flood flows during winter can affect incubating eggs and alevins in the streambed and over-wintering juvenile fish. Eggs of fall spawning fish, such as bull trout, may suffer high levels of mortality when exposed to increased flood flows (ISAB 2007, p. iv).

2.4.2 Bull Trout Critical Habitat

2.4.2.1 Status of Bull Trout Critical Habitat in the Action Area

The project is located in the Middle Fork–Lower Clearwater River Critical Habitat Subunit (CHSU). This CHSU is essential to bull trout conservation because the Clearwater River and Middle Fork Clearwater River primarily serve as migratory corridors, connecting bull trout local populations within the Clearwater River CHU as well as maintaining connectivity to other Mid-Columbia River bull trout populations. These mainstem river reaches also provide important foraging and overwintering areas for subadult and adult bull trout that originate in upstream

CHSUs. The Clearwater River is designated as FMO habitat from its confluence with the Snake River upstream 74.3 miles to its confluence with the South Fork Clearwater River.

2.4.2.2 Factors Affecting Bull Trout Critical Habitat in the Action Area

The same factors affecting rangewide status of critical habitat and the species affect critical habitat in the action area. These factors include residential and commercial development, timber harvest, roads, mining, and agriculture which all contribute to very high sediment loads in the Clearwater River during high flow events (USFWS 2002d, pp. 44-82).

Condition factors of the PCEs of critical habitat can be gleaned from habitat indicators for bull trout addressed via the MPI (Table 3). See Tables 3 and 4 to ascertain baseline conditions for critical habitat in the action area.

Changes in hydrology and temperature caused by changing climate have the potential to negatively impact aquatic ecosystems in Idaho, with salmonid fishes being especially sensitive. Average annual temperature increases due to increased carbon dioxide are affecting snowpack, peak runoff, and base flows of streams and rivers (Mote et al. 2003, p. 45). Increases in water temperature may cause a shift in the thermal suitability of aquatic habitats (Poff et al. 2002, p. iii). For species that require colder water temperatures to survive and reproduce, warmer temperatures could lead to significant decreases in available suitable habitat. Increased frequency and severity of flood flows during winter can affect incubating eggs and alevins in the streambed and over-wintering juvenile fish. Eggs of fall spawning fish, such as bull trout, may suffer high levels of mortality when exposed to increased flood flows (Independent Scientific Advisory Board 2007, p. iv).

2.5 Effects of the Proposed Action

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

2.5.1 Bull Trout

2.5.1.1 Direct and Indirect Effects of the Proposed Action

The proposed maintenance work includes installing A-Jacks mats around eight bridge piers to protect the piers from continued scour damage, placing and filling grout bags in an undermined void beneath Pier 7, and removing any woody debris that occurs on the upstream face of the piers. The proposed plan calls for all work to occur in the flowing river, with equipment working from a barge. The barge must maintain a minimum of two feet of clearance above the bottom of the Clearwater River at all times; therefore, work at Piers 2, 3, 4, and 5 shall be completed when river flows are between 25,000 cfs and 9,000 cfs (late June or early July through early to mid-September). Work at Pier 7 shall be completed when river flows are below 9,000 cfs (mid-September to mid-October). Work at Piers 6 and 8 shall be completed when river flows are below 25,000 cfs (late June or early July to mid-October). Work will occur at one pier at a time, limiting short-term impacts to the immediate work area (e.g., around Pier 2 while work is occurring at Pier 2 and around Pier 3 while work is occurring at Pier 3, etc.).

The MPI (Table 3) shows that the primary pathways for adverse effects to bull trout are increased levels of suspended sediment/turbidity, chemical contamination, and disturbance. Each of these pathways is discussed below.

Due to implementation of the Minimization Measures and BMPs, we are not expecting significant effects to bull trout from use of staging areas or the boat ramp (for the barge to access the river).

2.5.1.1.1 Sediment Effects

The proposed work in live water includes excavating the river channel around each pier and installing the A-Jacks mat slightly below the channel bed elevation. This activity is anticipated to release stored sediment from the channel bed for short periods of time (e.g., 2-4 days per pier). The sediment plumes are expected to be limited to the immediate work area (e.g., around Pier 2 while work is occurring at Pier 2, around Pier 3 while work is occurring at Pier 3, etc.) and to dissipate (reach background levels) within a distance of less than 1,500 feet downstream from the immediate work area. Localized downstream settling of the released/displaced sediment would occur with the potential for minor embedment increases in those areas. However, as all imported materials (e.g., the A-Jacks and any necessary additional rock) would be washed and free from fines, the sediment yield to the Clearwater River would not increase (only displaced from the existing site). Additionally, the large flow volume of the Clearwater River is likely to quickly dilute any suspended sediment. Significant effects to sediment and cobble embeddedness are expected to be site-specific (e.g., contained near Pier 2 while work is occurring at Pier 2) and temporary (e.g., 1-2 days to complete the excavation/fill and 1-2 days to place and secure the A-Jacks mat around Pier 2).

The Assessment does not provide any prediction of suspended sediment/turbidity levels expected during instream work activities. We do however expect that the project will attempt to adhere to Idaho State Water Quality Standards. One of these standards requires that turbidity not instantaneously exceed 50 nephelomeric turbidity units (NTUs) during project implementation. Suspended sediment and turbidity are correlated, but this correlation can vary by watershed and even within the same watershed (Henley et al. 2000, pp. 128-129). Although we do not know the relationship between suspended sediment and turbidity in the Clearwater River we used a regression equation developed by Dodds and Whiles (2004, p. 357)[2] to estimate the suspended

[2] Dodds and Whiles (2004) conducted a regression analysis using data from 622 water quality stations located throughout the U.S. The resulting equation has an r squared value of 0.89. The equation is $\log_{10} \text{TSS (mg/L)} = 0.606 + 0.960*(\log_{10} \text{NTU})$, where TSS equals Total Suspended Solids.

sediment concentration associated with 50 NTUs. The equation yields a suspended sediment concentration of 173 mg/l.

According to Newcombe and Jensen (1996, p. 698), bull trout exposed to suspended sediment concentrations of 173 mg/l for one hour are likely to be negatively impacted as expressed by minor physiological stress, increased coughing, increased respiration, and reduced feeding rate. Therefore, we expect adult and subadult bull trout within 600 feet[3] (our expectation of the extent of significant suspended sediment) downstream of instream sediment producing activities to be adversely affected by significant increases in suspended sediment/turbidity. We expect that beyond 600 feet sediment/turbidity effects will be insignificant.

Sediment deposition will occur downstream of the project area. The extent of deposition is dependent upon stream size and flow but we expect significant sediment deposition to occur within the same distance as significant suspended sediment; that is, within 600 feet[4] downstream of instream work activities (i.e., immediately downstream of each pier that is being worked on). There is no evidence that bull trout spawn in the action area, so the risk to spawning bull trout, eggs, and alevins or to rearing juveniles from sediment deposition is discountable. However, other juvenile salmonids (potential prey for the piscivorous bull trout) may be in the action area and be adversely affected by deposited sediment. Based on their experiments with juvenile rainbow trout (*Oncorhynchus mykiss)*, Suttle et al. (2004, p. 973) concluded that "fine sediment deposition, even at low concentrations, can decrease growth and survival of juvenile salmonids." They found "no threshold below which fine-sediment additions are harmless." Therefore, the Service concludes that because sediment deposition will reduce the abundance of juvenile salmonids (and other fish) present in the action area, adult and subadult bull trout may be adversely affected by a reduction in abundance of an important food resource.

The sediment/turbidity effects described above will occur while working inwater at Piers 2, 3, 4, 5, 6, and 7. Work at Pier 1 will occur outside the flowing channel when flows have decreased below 17,000 cfs. However, Pier 1 is located below the OHWM and any accumulated sediment from excavating around the pier will be mobilized when the pier is inundated during higher flows. These high flows will occur during spring runoff when baseline suspended sediment/turbidity levels are expected to be high (Smith 2013, pers. comm.). The addition of sediment from work at Pier 1 will be insignificant compared to baseline suspended sediment/turbidity levels and will not significantly affect bull trout.

2.5.1.1.2 Chemical Contamination

Proposed work in live water also includes the placement (by hand) and filling (via a pump staged on the barge) of grout bags in an undermined void beneath Pier 7. The Assessment contains monitoring results for a similar activity upstream of the project (Kamiah Bridge piers). The monitoring shows that this activity is anticipated to affect water quality by increasing pH during the filling (pumping grout) of the grout bags resulting in a discharge plume approximately 10

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[3] Suspended sediment/turbidity may extend beyond 600 feet, but will be diluted to such an extent that expected effects to bull trout will be insignificant.

[4] The Service does not expect significant sediment deposition beyond 600 feet.

feet wide and 300 feet long with a maximum increase in pH of 2.0 over baseline levels. The monitoring results show that pH reached levels as high as 9.89.

Serafy and Harrel (1993, p. 58) report that fish exposed to pH levels of above 9.0 experience physiological stress as expressed by damaged surface tissues and "excessive secretion of mucus at the gills." We therefore predict that any bull trout within the plume of suspended grout will be injured by increases in pH and will be disturbed to such an extent that they will leave or attempt to avoid the area of elevated pH (see Disturbance discussion below). Because bull trout are expected to attempt to avoid the contaminated area, no bull trout mortality is expected during grout application.

It is important to note that grout bags will only be placed beneath one pier (Pier 7), which occurs near the left/south bank of the Clearwater River, and pH effects are expected to be restricted to that section of the river channel immediately downstream of Pier 7 (i.e., not extending across the entire channel width). In addition, the large flow volume of the Clearwater River would likely dilute pH impacts, but not eliminate them.

Additional chemical contamination is not expected as all fuels, etc. would be stored properly and a spill prevention and contingency plan would be developed and adhered to by the construction contractor.

2.5.1.1.3 Disturbance

In addition to disturbance to bull trout from elevated suspended sediment and impacts to water quality from applying grout underwater at pier 7, excavating for and placement of A-Jacks is likely to disturb any bull trout in the immediate vicinity of the pier being worked on. In addition, the removal of any accumulated large wood from around the piers with an excavator will result in additional disturbance to bull trout. Although disturbance is relatively short-term in that it is expected to last only up to four days at each pier, and population level effects are not expected, the effects to individual bull trout will be significant.

A reasonable expectation would be that, in order to avoid adverse disturbance effects, bull trout would move away from areas with elevated levels of suspended sediment, suspended uncured grout (i.e., high pH), and construction noise, if possible. Bison and Bilby (1982, p. 372) found that juvenile coho salmon (*Oncorhynchus kisutch*) avoided increasingly turbid waters in a laboratory setting. But, relocating to avoid sediment (or other sources of disturbance) may have indirect adverse effects on bull trout. Salmonids exhibit a dominance hierarchy where the dominant fish (usually the largest) maintain the most desirable territories (i.e., defended area) in terms of available cover and food sources (Gilmour et al. 2005, p. 263). Subordinate fish may be excluded from food and cover resources and show reduced fitness and mortality (Gilmour et al. 2005, p. 263). Berg and Northcote (1985, p. 1410) found that dominance hierarchies broke down and territories were not defended when juvenile coho salmon were exposed to short term sediment pulses. We assume that bull trout behave similarly to other studied salmonids. Based on this assumption we expect bull trout that abandon territories in order to avoid any disturbance associated with the project, may suffer increased competition, predation (through loss of cover), stress, and reduced feeding efficiency. Although bull trout may be adversely disturbed during these construction activities, no mortality is expected.

Because bull trout migrate predominately during the night (Homel and Budy 2008, p. 876), any construction activities conducted after sunset or before sunrise will have a greater potential for disturbance.

2.5.1.2 Effects of Interrelated or Interdependent Actions

The Service has not identified any actions that are interrelated or interdependent with the project.

2.5.2 Bull Trout Critical Habitat

2.5.2.1 Direct and Indirect Effects of the Proposed Action

As discussed in section 2.4.1.2, the MPI is used to evaluate and document baseline habitat conditions and aid in determining whether a project is likely to adversely affect or result in the incidental take of bull trout.

Analysis of the affected MPI habitat indicators can provide a thorough evaluation of the existing baseline condition and potential project impacts to the PCEs of bull trout critical habitat (see Table 3 below).

As previously noted, we expect the project to result in a short term degradation to the suspended sediment/turbidity, cobble embeddedness, chemical contamination/nutrients, and disturbance indicators. As shown in Table 4, a "degrade" in the condition of these indicators may correlate with adverse effects to the PCEs of bull trout critical habitat. Based on this correlation, we anticipate that the project will result in short-term adverse effects to PCEs 1 (springs, seeps etc.), 2 (migration habitats), 3 (abundant food base), and 8 (water quality). As there is no spawning habitat in the action area there will be no effect to PCE 6 (substrate in spawning habitat). Similarly, due to the presence of non-native fish, PCE 9 is not present and will not be affected by the project. There will be insignificant/discountable effects to PCEs 4 (complex habitat), 5 (water temperature), and 7 (natural hydrograph). The adverse effects will be short-term during project implementation and will not significantly affect the functionality in providing FMO habitat for bull trout.

Table 4. Anticipated effects to the PCEs of bull trout critical habitat from project implementation. Underlined Habitat Indicators will be adversely affected by the project. Effects Determinations: LAA = Likely to Adversely Affect, NLAA = Not Likely to Adversely Affect, and NE = No Effect.

	Primary Constituent Elements (PCEs)	Associated Habitat Indicators	Environmental Baseline Present or Absent	Effects of the Actions (Restore, Maintain, or Degrade)	Determination of Effect
1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.	Flood plain connectivity, changes in peak/base flows, <u>cobble embeddedness</u>, road density, streambank stability, <u>chemical contamination/nutrients</u>	Present	Degrade short-term	LAA short term due to localized cobble embeddedness affecting hyporheic flows
2	Migration habitats with minimal physical, biological, or water quality	Temperature, <u>sediment</u>, <u>chemical</u>	Present	Degrade short term	LAA short term due to localized

	Primary Constituent Elements (PCEs)	Associated Habitat Indicators	Environmental Baseline Present or Absent	Effects of the Actions (Restore, Maintain, or Degrade)	Determination of Effect
	impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	contamination/nutrients, physical barriers, peak/base flow, width/depth ratio, refugia			increases in suspended sediment/turbidity and increases in pH from underwater grout application
3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Floodplain connectivity, riparian vegetation condition, pool frequency and quality, cobble embeddedness, temperature, chemical contaminants and nutrients	Present	Degrade short term)	LAA short term due primarily to reductions in abundance of forage fish from cobble embeddedness
4	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and un-embedded substrates, to provide a variety of depths, gradients, velocities, and structure.	Large woody debris, pool frequency and quality, width/depth ratio, off-channel habitat, streambank stability, riparian vegetation condition, floodplain connectivity, disturbance history and regime, refugia	Present	Maintain	NLAA due to insignificant removal of large woody debris from bridge piers
5	Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.	Temperature, refugia, pool frequency and quality, width/depth ratio, change in peak/base flows, streambank stability, floodplain connectivity, road density	Present	Maintain	NE – the project will have no effect on water temperature
6	In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.	Sediment, cobble embeddedness, large woody debris, pool frequency and quality, streambank stability	Absent	N/A	NE – bull trout do not spawn in the mainstem Clearwater River
7	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departures from a natural hydrograph.	Peak/base flow, road density, riparian vegetation condition, floodplain connectivity,	Present	Maintain	NE – the project will have no effect on any of the associated indicators

	Primary Constituent Elements (PCEs)	Associated Habitat Indicators	Environmental Baseline Present or Absent	Effects of the Actions (Restore, Maintain, or Degrade)	Determination of Effect
8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	Floodplain connectivity, peak/base flow, temperature, sediment, chemical contaminant and nutrients	Present	Degrade short term	LAA short term due to localized increases in suspended sediment/turbidity and increases in pH from underwater grout application
9	Sufficiently low levels of occurrence of nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.	Physical barriers	Absent	N/A	NE as this PCE is not present due to the presence of non-native fish species

2.5.2.2 Effects of Interrelated or Interdependent Actions

The Service has not identified any actions that are interrelated or interdependent with the proposed action.

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.

2.6.1 Bull Trout

Within the action area there are numerous State, Tribal, local, and private actions that potentially affect bull trout. Many of the categories of on-going activities with potential effects to bull trout and bull trout habitat were identified in the Status of the Species and Environmental Baseline sections of this Opinion. These activities include timber harvest and road building, grazing, water diversion, residential development, and agriculture. The Service assumes that future private and State actions will continue within the action area, increasing as population density rises. As the human population in the action area continues to grow, demand for agricultural, commercial, or residential development is also likely to grow. The effects of new development caused by that demand are likely to reduce the conservation value of bull trout habitat within the action area.

City, state, and county governments have ongoing weed spraying programs, some with less-stringent measures to prevent water contamination. Unknown amounts of herbicides are sprayed annually along road right-of-ways by state and county transportation departments, sometimes several times a year. Private landholders also spray unknown chemicals in unknown amounts. Any private herbicide use could potentially combine with contaminants from other Federal and non-Federal activities, and could contribute to formation of chemical mixtures or concentrations that could kill or harm bull trout. In addition, fish stressed by elevated sediment and temperatures are more susceptible to toxic effects of herbicides. While the mechanisms for cumulative effects are clear, the actual effects cannot be quantified due to a lack of information about chemical types, quantity and application methods used.

Illegal and inadvertent harvest of bull trout is also considered a cumulative effect. Harvest can occur through both misidentification and deliberate catch. Schmetterling and Long (1999, p. 1) found that only 44 percent of the anglers they interviewed in Montana could successfully identify bull trout. Being aggressive piscivores, bull trout readily take lures or bait (Ratliff and Howell 1992, pp. 15-16). Idaho Department of Fish and Game report that 400 bull trout were caught and released in the regional (Clearwater administrative region) waters of the Salmon and Snake Rivers during the 2002 salmon and steelhead fishing seasons. In the Little Salmon River, 89 bull trout were caught and released during the same fishing seasons (Idaho Department of Fish and Game 2004, p. 11). Spawning bull trout are particularly vulnerable to harvest because the fish are easily observed during autumn low flow conditions. Hooking mortality rates range from 4% for non-anadromous salmonids with the use of artificial lures and flies (Schill and Scarpella 1997, p. 1) to a 60 percent worst-case scenario for bull trout taken with bait (Cochnauer et. al. 2001, p. 21). Thus, even in cases where bull trout are released after being caught, some mortality can be expected.

An additional cumulative effect to bull trout is global climate change. Warming of the global climate seems quite certain. Changes have already been observed in many species' ranges consistent with changes in climate (ISAB 2007, p. iii; Hansen et al. 2001, p. 767). Global climate change threatens bull trout throughout its range in the coterminous United States. Downscaled regional climate models for the Columbia River basin predict a general air temperature warming of 1.0 to 2.5 °C (1.8 to 4.5 °F) or more by 2050 (Rieman et al. 2007, p. 1552). This predicted temperature trend may have important effects on the regional distribution and local extent of habitats available to salmonids (Rieman et al. 2007, p. 1552), although the relationship between changes in air temperature and water temperature are not well understood. Bull trout spawning and early rearing areas are currently largely constrained by low fall and winter water temperatures that define the spatial structuring of local populations or habitat patches across larger river basins; habitat patches represent networks of thermally suitable habitat that may lie in adjacent watersheds and are disconnected (or fragmented) by intervening stream segments of seasonally unsuitable habitat or by actual physical barriers (Rieman et al. 2007, p. 1553).

2.6.2 Bull Trout Critical Habitat

We assume that many of the threats to critical habitat (and the species) identified previously in this Opinion will continue to impact critical habitat, including climate change.

Warming of the global climate seems quite certain. Changes have already been observed in many species' ranges consistent with changes in climate (ISAB 2007, p. iii; Hansen et al. 2001, p. 767). Global climate change threatens bull trout throughout its range in the coterminous United States. Downscaled regional climate models for the Columbia River basin predict a general air temperature warming of 1.0 to 2.5 °C (1.8 to 4.5 °F) or more by 2050 (Rieman et al. 2007, p. 1552). This predicted temperature trend may have important effects on the regional distribution and local extent of habitats available to salmonids (Rieman et al. 2007, p. 1552), although the relationship between changes in air temperature and water temperature are not well understood. Bull trout spawning and early rearing areas are currently largely constrained by low fall and winter water temperatures that define the spatial structuring of local populations or habitat patches across larger river basins; habitat patches represent networks of thermally suitable habitat that may lie in adjacent watersheds and are disconnected (or fragmented) by intervening stream segments of seasonally unsuitable habitat or by actual physical barriers (Rieman et al. 2007, p. 1553). With a warming climate, thermally suitable bull trout spawning and rearing areas are predicted to shrink during warm seasons, in some cases very dramatically, becoming even more isolated from one another under moderate climate change scenarios (Rieman et al. 2007, pp. 1558–1562; Porter and Nelitz 2009, pp. 5–7). Climate change will likely interact with other stressors, such as habitat loss and fragmentation (Rieman et al. 2007, pp. 1558–1560; Porter and Nelitz 2009, p. 3); invasions of nonnative fish (Rahel et al. 2008, pp. 552–553); diseases and parasites (McCullough et al. 2009, p. 104); predators and competitors (McMahon et al. 2007, pp. 1313–1323; Rahel et al. 2008, pp. 552–553); and flow alteration (McCullough et al. 2009, pp. 106–108), rendering some current spawning, rearing, and migratory habitats marginal or wholly unsuitable. Over a period of decades, climate change may directly threaten the integrity of the essential physical or biological features described in PCEs 1, 2, 3, 5, 7, 8 and 9.

2.7 Conclusion

2.7.1 Bull Trout

The Service has reviewed the current status of bull trout, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects. The Service concludes that direct effects to adult and subadult bull trout in the Lower Clearwater River in the action area will be limited to disturbance and short-term physiological stress from increased levels of suspended sediment and turbidity, suspended uncured grout, and noise from equipment working in the river channel. These anticipated effects should be minimized, but not eliminated, by the Minimization Measures and BMPs incorporated into the project. Project activities will not occur in bull trout spawning areas; therefore, spawning bull trout, eggs, or alevins are not expected to be affected by the project. We also anticipate that the number of bull trout present in the action area will be low and the project will result in no bull trout mortality. Given these considerations, the Service concludes that the numbers, distribution, and reproduction of bull trout in the action area, the Lower-Middle Fork Clearwater River core area, or in the Columbia Basin interim recovery unit will not be significantly changed as a result of this project. Therefore, it is the Service's biological opinion that the proposed action will not jeopardize the coterminous population of bull trout.

2.7.2 Bull Trout Critical Habitat

The Service has reviewed the current status of bull trout critical habitat, the environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to destroy or adversely modify designated critical habitat for bull trout. The project will result in short-term adverse effects to some PCEs of critical habitat. We expect that project Minimization Measures should reduce the magnitude of adverse effects, but not eliminate them. The project will not impact the functionality of the Clearwater CHU or, by extension, critical habitat rangewide in providing for the conservation of the bull trout.

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 an intentional or negligent act or omission which creates the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering.

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

The Agencies have a continuing duty to regulate the activity covered by this incidental take statement. If the Agencies fail 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, the Agencies 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 Form and Amount or Extent of Take Anticipated

Based on documented use of the Lower Clearwater River by bull trout for FMO habitat, the Service assumes the presence of bull trout in the action area (Table 2). However, because survey data is lacking, it is difficult for us to anticipate the exact number of individual bull trout that will be taken as a result of the project. Therefore, to address take associated with the project we will use the amount of habitat affected as a surrogate. We anticipate that all adult and subadult bull trout 600 feet[5] downstream of instream construction sites (i.e., the assumed downstream extent of significant sediment effects) will be subject to take in the form of harm from direct exposure to the increased levels of suspended sediment and turbidity and reduced availability of juvenile salmonids as a food resource resulting from deposited sediment. Incidental take of bull trout associated with sediment effects from project construction activities is only anticipated to occur during a maximum of 28 days between late June/early July and mid-October, 2014.

We expect all adult and subadult bull trout within the extent of the expected plume of suspended grout (i.e., 300 feet downstream of Pier 7) associated with placement of grout bags under Pier 7 to be harmed by increases in pH and associated physiological distress. Suspended grout is expected to occur for one hour while the grout bags are filled under Pier 7. This work will occur during a period of one day between late June/early July and mid-October.

Adult and subadult bull trout will be harassed by equipment (including the work barge) placing the A-Jacks around seven piers (Pier 1 is outside of the wetted channel and there will be no work on Piers 9 and 10), by equipment staged for pumping grout under Pier 7, and by equipment removing large woody debris that has accumulated on the upstream side of the piers. This work will occur during a maximum period of 28 days between late June/early July and mid-October.

Minimization Measures and BMPs incorporated into the project are expected to reduce the level of anticipated take. No lethal take of bull trout is expected and none is authorized.

If incidental take anticipated by this document is exceeded, all project activities will cease and the Agencies will immediately contact the Service to determine if consultation should be reinitiated. Authorized take will be exceeded if:

1. Turbidity exceeds 50 NTUs in the mixing zone, 600 feet downstream of suspended sediment producing activities (i.e., downstream of each pier that is being worked on), for more than one hour; or
2. Deposited sediment extends (i.e., is visible) for a distance greater than 600 feet downstream of any pier; or
3. The plume of suspended uncured grout extends more than 300 feet downstream of Pier 7 or pH in the mixing zone exceeds a level of 9 at any time; or
4. Any in channel work occurs outside of the late June/early July to mid-October work window; or
5. The project results in any bull trout mortality.

2.8.2 Effect of the Take

In the accompanying Opinion, the Service determined that this level of anticipated take is not likely to jeopardize the continued existence of the bull trout across its range.

[5] Effects to bull trout from suspended sediment/turbidity and deposited sediment are expected to be insignificant at distances greater than 600 feet downstream of instream work sites.

The Columbia River interim recovery unit is comprised of 22 management units including the Clearwater River management unit. The Clearwater River management unit consists of seven core areas, with a total of 36 local populations distributed among the core areas. There is one local population (Lolo Creek) and one potential local population (Clear Creek) in the Lower-Middle Fork Clearwater River core area. The project will not impact the viability of these populations. The Service expects that the numbers, distribution, and reproduction of bull trout in the action area, the Lower-Middle Fork Clearwater River core area, or in the Columbia River interim recovery unit will not be changed as a result of this project. Anticipated take may be reduced because the project includes Minimization Measures and BMPs to avoid and reduce adverse effects.

2.8.3 Reasonable and Prudent Measures

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

1. Minimize the potential for harm to bull trout resulting from project-related sediment effects.
2. Minimize the potential for harm to bull trout from increases in pH associated with applying grout underwater to repair Pier 7.
3. Minimize the potential for harassment of bull trout from inwater construction activities including placement of A-Jacks, underwater grout application, and removal of large woody debris.

2.8.4 Terms and Conditions

1a. The Agencies will monitor turbidity in the mixing zone 600 feet downstream of turbidity producing activities (i.e., excavating around the base of each pier prior to A-Jacks placement), and adjust the project to ensure that turbidity levels do not, at any time, reach a level of 50 NTUs for a duration of one hour.

1b. The Agencies will visually monitor deposited sediment to ensure that sediment deposition does not occur beyond 600 feet downstream of inwater work sites.

2a. The Agencies will monitor pH within the plume of suspended grout at Pier 7 (in the mixing zone, 300 feet downstream of Pier 7) and adjust grout pumping rate to ensure that pH does not exceed a level of 9.0 at any time.

3a. The Agencies will only conduct work in the flowing channel during daylight hours to minimize disturbance to migrating bull trout.

3b. The Agencies will conduct a snorkel survey for bull trout in the immediate vicinity of each pier prior to commencing excavation, A-Jacks placement, or underwater grout placement. If bull trout are observed, the agencies will "herd" the fish away from the area prior to commencing work.

2.8.5 Reporting and Monitoring Requirement

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

1. Upon project completion, the Agencies shall provide a report detailing project implementation that will include results of applicable implementation and effectiveness monitoring, including pH, turbidity, and deposited sediment monitoring, and a summary of bull trout observed. The monitoring report will be sent to the Idaho Fish and Wildlife Office, 1387 South Vinnell Way, Suite 368, Boise, Idaho 83709 by December 31 the year the project is completed.
2. Upon locating dead, injured, or sick bull trout, or upon observing destruction of redds as a result of project activities, such activities shall be terminated and notification must be made within 24 hours to the Service's Division of Law Enforcement at (208) 442-9551. Additional protection measures will be developed through discussions with the Service.
3. During project implementation the Agencies shall promptly notify the Service of any emergency or unanticipated situations arising that may be detrimental for bull trout relative to the proposed activity.

2.9 Conservation Recommendations

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

1. Use turbidity curtains around Pier 7 during grout pumping to minimize downstream increases in pH.
2. Measure suspended sediment (in addition to measuring turbidity as per Term and Condition 1a) and provide the results to the Service in order to assist with determining their correlation in the action area.
3. Assess the feasibility of using any large woody debris collected from around the bridge piers for bull trout habitat improvement.
4. Upon completion of work at Pier 1, consider removing excess sediment from the work site to minimize downstream sediment effects when the pier is inundated during higher flows.
5. To the extent practicable minimize the duration of inwater work and complete work during that period when adult bull trout are least likely to be present in the action area (i.e., by the end of September).

2.10 Reinitiation Notice

This concludes formal consultation on the US 95 Clearwater Bridge Scour Mitigation 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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