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D. John Kidd
District Ranger
Lowman Ranger District
Boise National Forest
7359 Highway 21
Lowman, Idaho 83637

MAY 04 2012

Subject: Wapiti and Long Creek Water Systems Special Use Reissuance—Boise County, Idaho—Biological Opinion
In Reply Refer to: 01EIFW00-2012-F-0152 Internal Use: CONS-100b

Dear Mr. Kidd:

Enclosed is the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) regarding the U.S. Forest Service's (Forest) determination of effect on bull trout (*Salvelinus confluentus*) and its designated critical habitat, listed under the Endangered Species Act (Act) of 1973, as amended, for the proposed Wapiti and Long Creek Water Systems Special Use Reissuance in Boise County, Idaho. In a letter dated February 21, 2012, and received by the Service on February 22, 2012, the Forest requested formal consultation on the determination under section 7 of the Act that the proposed project is likely to adversely affect bull trout and bull trout critical habitat.

The enclosed Opinion is based primarily on our review of the proposed action, as described in your February 16, 2012 Biological Assessment (Assessment), and the anticipated effects of the action on listed species, and were 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 result in the destruction or adverse modification of bull trout critical habitat. A complete record of this consultation is on file at this office.

Clean Water Act Requirement Language:

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

1. The action considered by the COE in their 404 permitting process must be consistent with the proposed project as described in the Assessment such that no detectable difference in the effects of the action on listed species will occur.

2. Any terms applied to the 404 permit must also be consistent with conservation measures and terms and conditions as described in the Assessment and addressed in this letter and Biological Opinion.

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

Sincerely,

Russell R. Holder

for Brian T. Kelly
State Supervisor

Enclosure

cc: BNF, Lowman (Brandt, Baconrind)
BNF, Boise (Faurot)
NOAA, Boise (Sandow)
COE, Boise (Martinez)

BIOLOGICAL OPINION
FOR THE
WAPITI AND LONG CREEKS
SPECIAL USE PERMIT REISSUANCE PROJECT

May 2012

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

Supervisor Russell R. Holden for Brian T. Kelly

Date MAY 04 2012

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1. BACKGROUND AND INFORMAL CONSULTATION

1.1 Introduction

The U.S. Fish and Wildlife Service (Service) has prepared this Biological Opinion (Opinion) to address the effects of the Wapiti and Long Creek Water Systems Special Use Reissuance (Project) on bull trout (*Salvelinus confluentus*) and its designated critical habitat. In a letter dated February 21, 2012, and received the next day, the U.S. Forest Service (Forest) requested formal consultation with the Service under section 7 of the Endangered Species Act (Act) of 1973, as amended, for its proposal to authorize the action. The Forest determined that the proposed action is likely to adversely affect bull trout and bull trout critical habitat. As described in this Opinion, and based on the Biological Assessment (USFS 2012, entire) developed by the Forest and other information, the Service has concluded that the action, as proposed, is not likely to jeopardize the continued existence of bull trout nor will the action destroy or adversely modify critical habitat.

1.2 Consultation History

The following correspondence and meetings have taken place between the Forest and the Service prior to issuance of this Opinion.

October 14, 2011	The Forest presented the Project to the Level 1 team.
November 29, 2011	The Forest submitted a draft biological assessment to the Service for review.
December 15, 2011	The Service provided comments on the draft biological assessment to the Forest.
January 25, 2012	The Project was discussed during a Level 1 meeting and both agencies agreed that the Project could be submitted for formal consultation.
February 22, 2012	The Service received a final consultation package from the Forest including a final biological assessment (Assessment) and a letter requesting consultation.
April 10, 2012	The Forest was given a draft of this Opinion for review.
April 14, 2012	The Forest sent comments on the draft Opinion back to the Service.

2. BIOLOGICAL OPINION

2.1 Description of the Proposed Action

This section describes the proposed Federal action, including any measures that may avoid, minimize, or mitigate adverse effects to listed species or critical habitat, and the extent of the geographic area affected by the action (i.e., the action area). The term "action" is defined in the implementing regulations for section 7 as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." The term "action area" is defined in the regulations as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."

2.1.1 Action Area

Both Wapiti Creek and Clear Creek are tributaries to the South Fork Payette River. Wapiti Creek flows to the South Fork Payette River near Grandjean, Idaho and Clear Creek flows in at Lowman, Idaho. The action area occurs within the Lower Clear Creek and Bear-Camp 6th field hydrologic units (HU), in the Southwest Idaho Rivers designated bull trout critical habitat area (Unit 26). Project activities will occur within the streams and the riparian conservation areas (RCA) of Wapiti and Long Creeks. For the Wapiti Creek diversion, the action area includes approximately 100 feet of stream, inclusive of the associated RCA, and for purposes of analysis extends down to the South Fork Payette River. The Wapiti diversion is located at T10N, R10E, NW Section 33. For the unnamed tributary associated with the Wapiti Creek water system, located at T10N, R10E, NW Section 33, the action area includes 50 feet of stream and the RCA and Wapiti Creek. For the Long Creek water system the action area includes approximately 50 feet of Long Creek, the associated RCA and extends to Clear Creek and the South Fork Payette River. The Long Creek water system is located at T7N, R7E, SW section 12.

2.1.2 Proposed Action

The proposed action is to authorize two in-stream water diversions special use permits (SUPs) for summer home associations (Associations) on the Lowman Ranger District. Permit reissuance will authorize the existing structures and annual maintenance and would require the permit holder to improve existing structures to minimize effects to bull trout. Improvement includes ensuring the intakes are screened appropriately to minimize effects to fish and regular clearing of the screens to prevent impingement of fish. Improvement also includes placing water meters inside the pipes near the storage tanks to measure the amount of flow being removed from the stream (Brandt 2012c, *in litt.)*. This work would not take place in the stream. If needed improvements also include changes made to the intake or the diversion dam to adjust the volume of water being withdrawn. Maintenance includes allowing the permit holders to access their systems via roads and trails and perform occasional, minor ground disturbance using hand tools. Maintenance also includes clearing debris from the intake screens to keep them clean and free flowing. Major system upgrades, replacement, or removal are not included in this Federal

Action. Access for the Long Creek Summer Homes Association is via a foot trail. The Wapiti Summer Home Association is accessed via all-terrain vehicle (ATV) or on existing non-system trails and roads and includes two points of diversion - one on Wapiti Creek and one on an unnamed tributary to Wapiti Creek.

The Wapiti Summer Homes Association in-stream diversion has a water right to remove 0.03 cubic feet/second (cfs) from Wapiti Creek, tributary to South Fork Payette River, and 0.12 cfs from an unnamed tributary to Wapiti Creek. This system consists of two diversions (Wapiti Creek and unnamed tributary to Wapiti Creek), an artesian well, two underground transmission systems, and two underground storage tanks. According to the Assessment (p. 7) the system on Wapiti Creek was originally built in 1970 and includes an intake pipe, corrugated metal tank, well, pumphouse, water storage tanks, and drinking lines. The Wapiti Creek intake consists of an 8 inch intake pipe located in a plunge pool formed naturally just below a log in the creek (Figures 1 and 2).

The water system on the unnamed tributary consists of a smaller collection box with a screened top. Water enters the collection box from top and is transported from there to Wapiti Creek summer homes. There is no fish survey data available for this tributary. Because of this tributary's small size, it is not anticipated that bull trout are utilizing this habitat. See Figure 3 for location of diversions on Wapiti Creek.

The Long Creek Summer Homes Association in-stream diversion has a water right to remove 0.25 cfs from Long Creek, tributary to Clear Creek. It is unclear when the system was initially built, however the first special use permit was issued in 1978. The water system consists of a small low-board diversion dam, an 8 inch intake pipe, a sediment box and drain, a collection box with overflow, and approximately 2615 feet of 2 inch pipeline. The water diversion in the creek consists of an 8 inch intake pipe located just upstream of the low-board diversion dam (see Figures 5 and 6).

The following mitigation measures from the Assessment (pp. 11-12) are proposed to reduce the potential effects to bull trout.

- Any alterations to the stream channel to maintain the water system must be approved by the District Ranger prior to implementation; this would trigger re-initiation of ESA consultation.

- Any proposed major alterations (re-design work) must be approved by the Forest Service and meet current Forest Plan Standards and Guidelines.

- In general, bull trout deposit their eggs from late August through November; therefore in-stream routine maintenance (cleaning intake pipe of debris) and corrective actions are authorized from December to July only, to avoid bull trout disturbance.

- Water intake pipelines must be screened with a mesh size no bigger than 3/32 inch.

- Install upgrades to the existing water systems which include a water meter to accurately record current intake flow. This involves placing a water meter in the pipe near the collection box; it does not involve work within the stream (Brandt 2012c, *in litt.*).

- The Long Creek water system is equipped with a low-board dam; permittees shall not allow the height of the perch to exceed 3 inches with an outlet pool depth of at least 5 inches to allow juvenile fish passage. This is not applicable for either Wapiti Creek water diversions.

- Minimize operational disturbance to wetland and riparian vegetation when maintaining water developments. Riparian vegetation may be trimmed, but not removed, within 15 feet of the water intake. Any additional needs for riparian vegetation removal or alteration must be approved by the Forest Service prior to implementation.

- All trash and construction materials must be removed from the riparian areas.

- Access to the water system must be maintained to reduce any potential sediment inputs to streams. This includes trail maintenance to the intake pipe and collection box. Since these are existing water systems, the pre-existing trail is expected to be maintained.

- Existing roads and trails will be maintained for operation and maintenance of the water systems and are authorized in special use permit. Permit holders must stay on the identified permitted roads and trails for roads and trails to lessen the impact to riparian vegetation. In addition, permit holders are expected to maintain (wood chips, slash, or water bars) path to prevent soil erosion and any potential sediment input to streams.

- Permit holders should monitor for the presence of noxious weeds and must receive prior written approval from an authorizing officer before applying any pesticides or herbicides to Natural Forest lands to minimize risk of non-targeted species and to minimize risk of delivery to water sources. Permit holders will comply with the Forest Service pesticide use policy.

- To limit the possibility of petroleum based product from reaching streams during project activities, these measures will be followed:

    1. Off – highway vehicle fueling and servicing will occur outside the RCA.
    2. A spill containment kit (the size of which will be commensurate with the amount of fuel) must be readily available in the event of a fuel spill when operating equipment in RCAs.

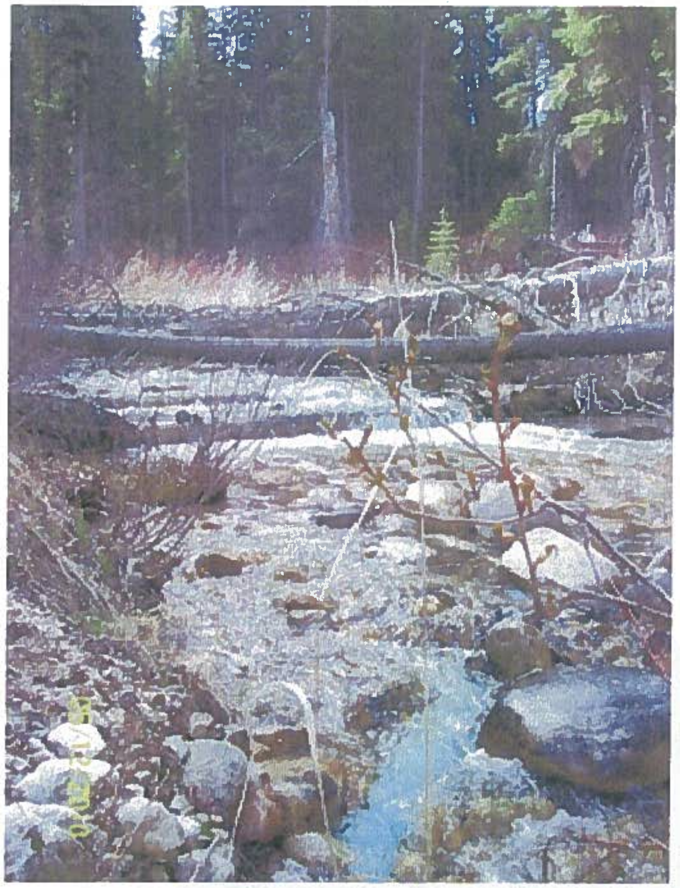

Figure 1. In-stream intake on Wapiti Creek

Figure 2. Close-up of in-stream intake on Wapiti Creek

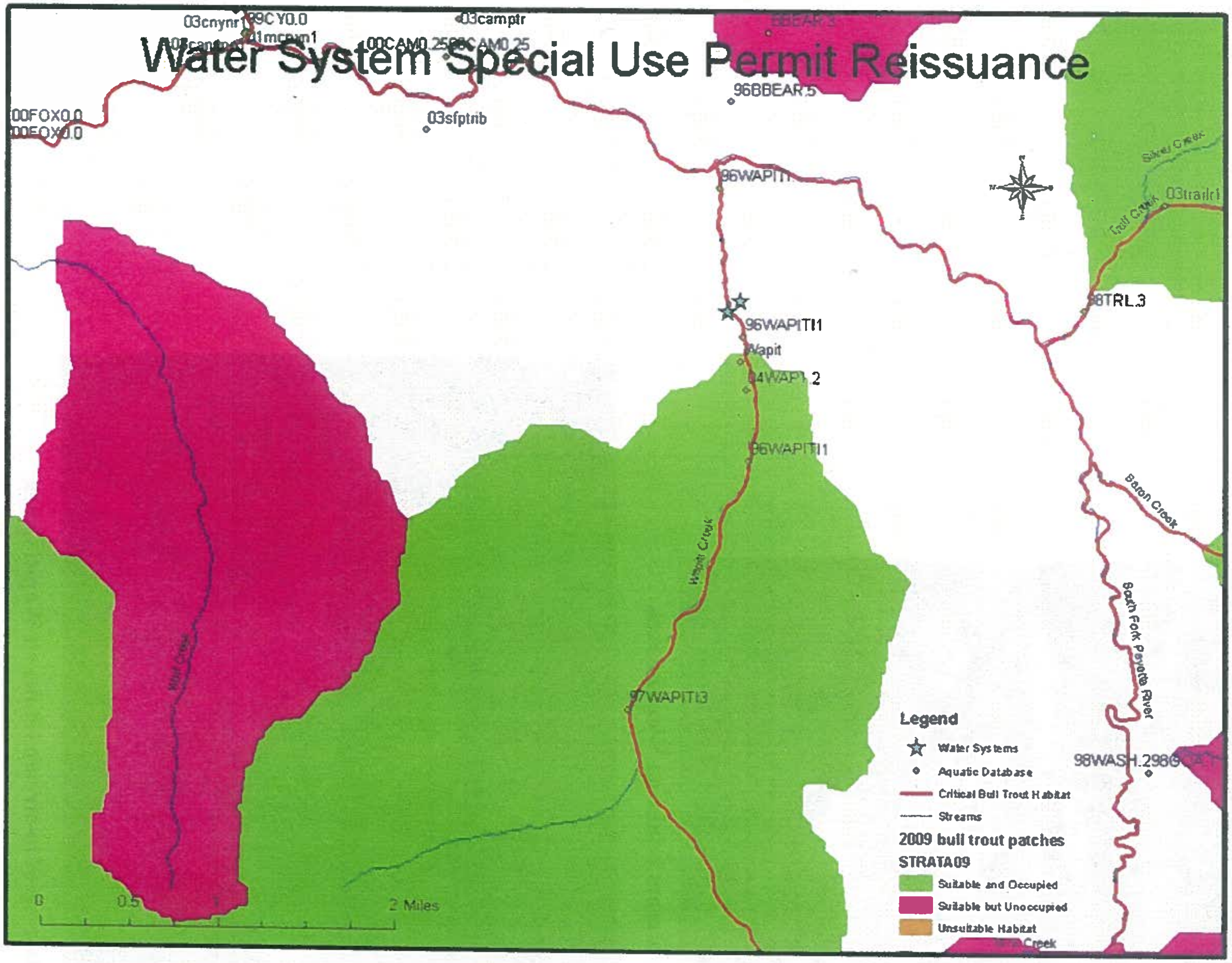

Figure 3. Wapiti Summer Homes Association Water System

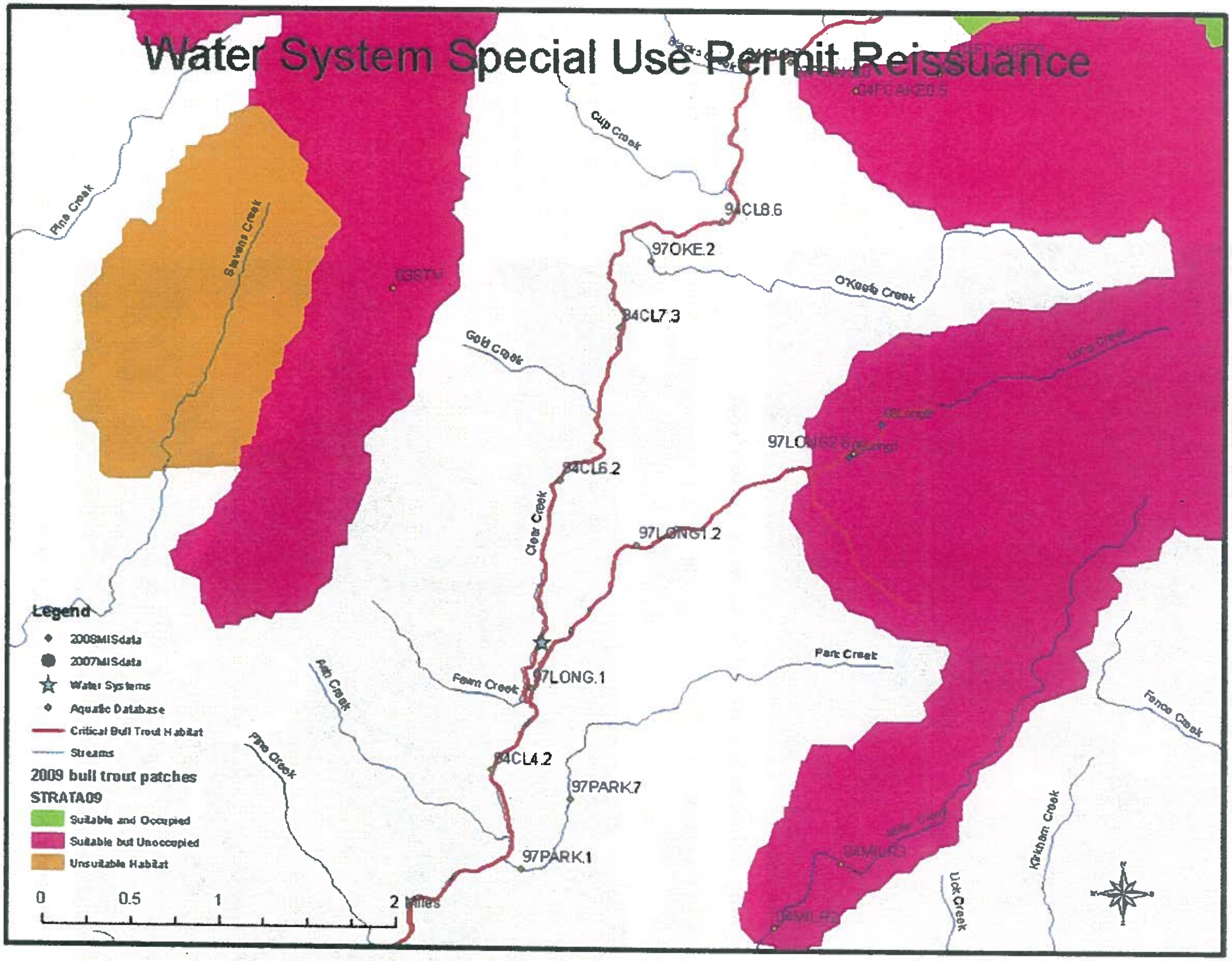

Figure 4. Long Creek Summer Homes Association Water System

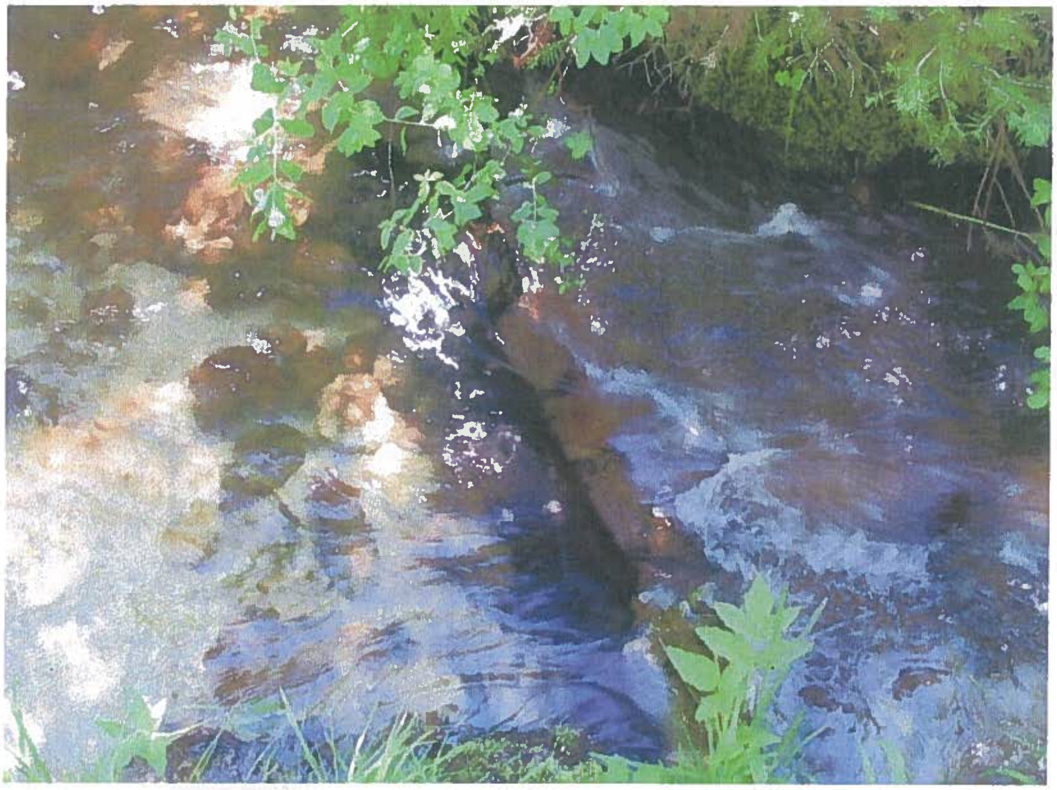

Figure 5. Close-up of low-board diversion dam on Long Creek

Figure 6. Low-board diversion dam on Long Creek

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 would 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 would remain functional (or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the bull trout.

The analysis in this Opinion places an emphasis on using the intended 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 population segments of the coterminous United States population of the bull trout are considered essential to the survival and recovery of this species and are identified as: (1) Jarbidge River, (2) Klamath River, (3) Coastal-Puget Sound, (4) St. Mary-Belly River, and

(5) Columbia River. Each of these segments is necessary to maintain the bull trout's distribution, as well as its genetic and phenotypic diversity, all of which are important to ensure the species' resilience to changing environmental conditions.

A summary of the current status and 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 population segments listed below consists of one or more core areas. One hundred and twenty one core areas are recognized across the United States range of the bull trout (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 population segment currently contains a single core area with six local populations. Less than 500 resident and migratory adult bull trout, representing about 50 to 125 spawners, are estimated to occur within the core area. The current condition of the bull trout in this segment is attributed to the effects of livestock grazing, roads, angler harvest, timber harvest, and the introduction of nonnative fishes (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 population segment 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 population segment exhibit anadromous, adfluvial, fluvial, and resident life history patterns. The anadromous life history form is unique to this unit. This population segment currently contains 14 core areas and 67 local populations (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 population segment is attributed to the adverse effects of dams, forest management practices (e.g., timber harvest and associated road building activities), agricultural practices (e.g., diking, water control structures, draining of wetlands, channelization, and the removal of riparian vegetation), livestock grazing, roads, mining, urbanization, angler harvest, and the introduction of nonnative species. The draft bull trout Recovery Plan (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 population segment 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 population segment 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 population segment includes bull trout residing in portions of Oregon, Washington, Idaho, and Montana. Bull trout are estimated to have occupied about 60 percent of the Columbia River Basin, and presently occur in 45 percent of the estimated historical range (Quigley and Arbelbide 1997, p. 1177). This population segment currently contains 97 core areas and 527 local populations. About 65 percent of these core areas and local populations occur in Idaho and northwestern Montana.

The condition of the bull trout populations within these core areas varies from poor to good, but generally all have been subject to the combined effects of habitat degradation, fragmentation and alterations associated with one or more of the following activities: dewatering, road construction and maintenance, mining and grazing, blockage of migratory corridors by dams or other diversion structures, poor water quality, incidental angler harvest, entrainment into diversion channels, and introduced nonnative species.

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

The draft bull trout Recovery Plan (USFWS 2002a, p. v) identifies the following conservation needs for this population segment: (1) maintain or expand the current distribution of the bull trout within core areas, (2) maintain stable or increasing trends in bull trout abundance, (3) maintain and restore suitable habitat conditions for all bull trout life history stages and strategies, 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 population segment. Recovering bull trout in each management unit would maintain the overall distribution of bull trout in their native range. Individual core areas are the foundation of management units and conserving core areas and their habitats within management units preserves the genotypic and phenotypic diversity that will allow bull trout access to diverse habitats and reduce the risk of extinction from stochastic events. The continued survival and recovery of each individual core area is critical to the persistence of management units and their role in the recovery of a population segment (USFWS 2002a, p. 54).

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

2.3.1.4.5.1.1 Southwest Idaho Management Unit

The Southwest Idaho Management Unit includes the Boise River, Payette River, and Weiser River basins and is one of 22 units in the Columbia Basin population segment identified in the draft bull trout Recovery Plan (USFWS 2002d, p. iv). Although there were likely no barriers to bull trout moving among the three basins via the Snake River, today bull trout occupy areas in the basins upstream of unsuitable habitat and dams. In the draft bull trout Recovery Plan, the basins were included as a single recovery unit because they likely functioned as a unit historically, and they collectively encompass nine key watersheds (USFWS 2002d, p. iv). The Project takes place in the Payette River Recovery Subunit.

The Boise, Payette, and the Weiser rivers are tributaries to the Snake River, and are entirely within the State of Idaho. The river basins encompass about 5,742,174 acres in southwestern Idaho. The Boise River basin contains the largest area (2,567,147 acres), followed by the Payette River basin (2,113,676 acres) and the Weiser River basin (1,061,351 acres). The three basins flow south to southwest from mountains in central Idaho. Elevations range from over 10,000 feet in the Sawtooth Mountains to 2,631 feet near the confluence of the Weiser River with the Snake River. About half of the Weiser River basin is under private ownership and 43.4 percent is managed by the Forest Service and the Bureau of Land Management.

Federal and State resource agencies have documented the occurrence of bull trout throughout the Southwest Idaho Management Unit. Distribution of bull trout in the management unit comes primarily from presence-absence surveys and basin-wide surveys using electrofishing and snorkeling techniques. Comprehensive data on bull trout abundance through time in the management unit does not exist.

Within the Southwest Idaho Management Unit, anadromous fishes historically occurred in each of the three river basins. Construction of impassable dams, first within the basins and later downstream from the confluences of the three basins in the Snake River, eliminated natural runs of anadromous fishes from the recovery unit. Habitat fragmentation and degradation are likely the most limiting factors for bull trout throughout the unit currently (USFWS 2002d, p.v). Although reservoirs formed by dams in some basins have allowed bull trout to express adfluvial life histories, dams, irrigation diversions, and road crossings are often impassable barriers to fish movement.

2.3.1.4.5.1.1.1 Upper South Fork Payette River Core Area

In the Payette River Recovery Subunit, bull trout are distributed in five core areas throughout the basin: the North Fork Payette River; the Middle Fork Payette River; the upper South Fork Payette River; the Deadwood River Core Area; and the Squaw Creek Core Area.

The Upper South Fork Payette River Core Area supports 9 local populations, including Wapiti Creek and Clear Creek (USFWS 2002d, p.34). The Service, in the bull trout 5-year review (USFWS 2008, p. 34), ranked the core area as being "At Risk" of extirpation. The population trend of the core area is unknown and the threat rank is moderate and imminent (USFWS 2008, p. 35).

2.3.1.5 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 would 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 population segments (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 would impair their relationship with the Service; or (3) waters where impacts to national security have been identified (75 FR 63898). Excluded areas are approximately 10 percent of the stream/shoreline miles and 4 percent of the lakes and reservoir acreage of designated critical habitat. Each excluded area is identified in the relevant 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 population segment. These CHUs contain marine nearshore and freshwater habitats, outside of core areas, that are used by bull trout from one or more core areas. These habitats, outside of core areas, contain 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

Bull trout are currently known to use spawning habitat in at least nine streams or stream complexes (local populations) in the upper South Fork Payette River core area. Local populations include: Scott Creek, Whitehawk Creek, Clear Creek, Eightmile Creek, Wapiti

Creek, Canyon Creek, Upper South Fork Payette River, Tenmile Creek, and Chapman Creek (USFWS 2002d, p. 34).

Wapiti Creek, Figure 3, a tributary to the South Fork Payette River, has been surveyed by the Forest five times since 1996 and fish were observed in four of the locations, above and below the point of diversion. According to the Assessment (p. 49), the bull trout population estimate for the Wapiti Creek patch is approximately 274 fish (95% CI± 211 fish). The adult population is estimated to be 69 fish. These estimates are based on 4.50 miles of occupied spawning and rearing habitat within the Wapiti Creek patch and a mean density of 61 bull trout/mile (n=4). Wapiti Creek contains sections of occupied spawning and rearing habitat within the Bear-Camp 6th field HU.

Long Creek, a tributary to Clear Creek, has been sampled five times by the Forest between 1997 and 2008 and bull trout were not documented. A culvert on Long Creek at the confluence of Clear Creek has been surveyed by the Forest and is considered by them to be a migration barrier. The Forest has conducted five fish surveys on Clear Creek and has captured three bull trout total during those surveys several miles upstream from the Long Creek confluence. The diversion system is approximately 0.5 mile from the confluence of Clear Creek and is below the modeled suitable but unoccupied habitat of the Long Creek "patch" (see Figure 4).

2.4.1.2 Factors Affecting the Bull Trout in the Action Area

As previously described in the Status of the Species section of this Opinion, bull trout distributions, 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, entrainment, and introduced non-native fish species such as brook trout. Brook trout are present in the South Fork Payette River; no brook trout detections have been documented in the Bear-Camp 6th field HU or the Lower Clear Creek 6th field HU.

Within the action area, migratory corridors and connectivity are partially limited because of culvert barriers within the core area. The Upper South Fork Payette River Core Area includes nine local populations, and three potential local populations, only two of which, the Canyon Creek and Scott Creek populations, are considered strong. Habitat in the South Fork Payette River is migratory and provides connection between local populations upstream and downstream on the South Fork Payette River and tributaries.

The bull trout population in Wapiti Creek is not connected to other populations located in nearby patches (Canyon Creek and Chapman Creek populations) because of an impassable culvert located at mile marker 0.2 below Forest Road 525. This connectivity is important because it could allow for re-colonization, and would permit the local population to recover from short-term disturbances.

Site specific habitat conditions for Wapiti Creek are not known, but watershed condition indicators for the Bear-Camp 6th field hydrologic unit (HU) were provided in the Assessment (pp. 49-60) and conditions are likely similar in Wapiti Creek. The geomorphic integrity ratings were assessed by the Forest at the subwatershed scale to compare historic conditions to existing soil-hydrologic conditions based on the resilience of streams and wetland/riparian area, and the ability of the system to absorb and store water. Overall disturbance in the Bear-Camp HU is considered functioning at risk, due to road densities, fragmentation and past vegetation management. Road density is comparatively low for the Forest – there are 12.7 miles of roads in the subwatershed for a density of 0.53 mile/mile^2 with 2.7 miles of road within riparian conservation areas (RCA). There are two impassable culverts – the one on Wapiti Creek and another on Bear Creek. Stream temperatures are functioning at unacceptable risk and large woody debris is functioning at risk.

Site specific habitat information for Long Creek is not available at present, but conditions are likely similar to the Lower Clear Creek 6th field hydrologic unit (HU) which the Forest provided in the Assessment (p. 39-48). Overall disturbance (12% equivalent clear cut area) in the Lower Clear Creek 6th field HU has resulted in a moderately altered flow regime (Assessment p. 45). The total road density, considered high in this subwatershed, is 2.55 miles/mile^2 with 22 miles of road occurring within the RCA. Because of the numerous ecological effects of road construction and associated activities, such as timber harvest (Jones et al. 2000, p.76; Trombulak and Frissell 2000, p.18), road density can be used as an indicator of watershed condition. The desired condition for bull trout in terms of road density for the Forest is <0.7 miles/mile^2 with no roads in the RCA. There appears to be an inverse relationship between watershed road density and bull trout occurrence in that bull trout typically do not occur where road densities exceed 1.7 miles per square mile (USFWS 2002a, p. 18). Bull trout population strongholds occur most often in undisturbed/roadless areas (Quigley and Arbelide 1997, p. 1183).

A moderately strong population of bull trout has been documented in the Clear Creek local population. Connectivity within the Clear Creek local population is not limited by impassable culverts. Clear Creek is considered nodal habitat within the local population and provides a migration corridor for bull trout between the watershed and the rest of the core area. Riparian areas within the 6th field HU show high disturbance from past and ongoing land management activities including road construction, dispersed recreation, and developed recreation. Temperature, sediment, and RCA road density appear to be the main limiting factors within the subwatershed.

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).

The environmental baselines for the watershed condition indicators (WCIs) are summarized below in Table 2 (adapted from Assessment pp. 37-59). In the second column, a "+" means an improvement in the condition of an indicator; a "-" means a degradation in the condition of an indicator; and a "0" means no impact on the indicator. An asterisk "*" following a "+" or "-" means the impact is immeasurable or negligible or unlikely to occur.

Table 2. Subwatershed Baseline Summary and Anticipated Effects of the Project

Watershed Condition Indicator	Potential for Effects	Functionality Rating 6th Field HU	
		Lower Clear Cr.	Bear-Camp
Local Population Size	-*	Functioning at Risk	Functioning at Risk
Growth and Survival	-*	Functioning at Risk	Functioning at Risk
Life History Diversity and Isolation	0	Functioning at Risk	Functioning at Risk
Persistence and Genetic Integrity	0	Unacceptable Risk	Unacceptable Risk
Temperature	0	Functioning at Risk	Functioning Acceptable
Sediment/Turbidity	-*	Functioning Acceptable	Functioning at Risk
Chemical Contamination/Nutrients	-*	Unacceptable Risk	Unacceptable Risk
Physical Barriers	0	Unacceptable Risk	Functioning at Risk
Substrate Embeddedness	-*	Functioning at Risk	Functioning at Risk
Large Woody Debris	0	Functioning Acceptable	Functioning Acceptable
Pool Frequency and Quality	-*	Unacceptable Risk	Functioning at Risk
Large Pools/ Pool Quality	-*	Functioning at Risk	Functioning Acceptable
Off Channel Habitat	0	Functioning at Risk	Functioning at Risk
Refugia	0	Functioning at Risk	Functioning Acceptable
Width/ Max Depth Ratio	-*	Functioning Acceptable	Unacceptable Risk
Streambank Condition	-*	Unacceptable Risk	Functioning Acceptable
Floodplain Connectivity	0	Functioning at Risk	Functioning at Risk
Change in Peak/Base Flows	-	Functioning at Risk	Functioning at Risk
Change in Drainage Network	0	Functioning at Risk	Functioning at Risk
Road Density/ Location	0	Unacceptable Risk	Functioning at Risk
Disturbance History	0	Unacceptable Risk	Functioning at Risk
Riparian Conservation Areas	-*	Functioning at Risk	Functioning at Risk
Disturbance Regime	0	Unacceptable Risk	Functioning at Risk
Integration of Species and Habitat	-*	Functioning at Risk	Functioning at Risk

2.4.2 Bull Trout Critical Habitat

2.4.2.1 Status of Bull Trout Critical Habitat in the Action Area

The Service published a final rule designating critical habitat for bull trout rangewide on October 18, 2010 (effective November 17, 2010). Wapiti Creek and Long Creek are located within the Southwest Idaho River Basins Unit (critical habitat unit 26), one of 32 designated critical habitat units (CHUs). Within the CHU there are 8 subunits, or CHSUs, including the Upper South Fork Payette River. Figures 3 and 4, above, show bull trout critical habitat within the action area.

Wapiti Creek from its confluence with the South Fork Payette River upstream 5.2 miles to its headwaters provides spawning and rearing habitat. Long Creek from its confluence with Clear Creek upstream 3.2 miles provides spawning and rearing habitat. Clear Creek from its confluence with the South Fork Payette River upstream 16.6 miles contains foraging, migratory and overwintering (FMO) habitat and provides an additional 5.4 miles of spawning and rearing habitat above the 16.6 miles of FMO. Clear Creek, at and below the mouth of Long Creek, provides FMO habitat.

2.4.2.2 Factors Affecting Bull Trout Critical Habitat in the Action Area

Primary constituent elements (PCEs) (see Section 2.3.2.2) are used to describe biological and physical habitat features that are essential to the conservation of bull trout. The matrix of watershed condition indicators, as summarized in Table 2, provides a means to assess the baseline condition of the PCEs in the action area and the potential effects of the action on the PCEs. Table 3, below, illustrates the link between PCEs and the associated watershed condition indicators evaluated in the environmental baseline.

Table 3. The Primary Constituent Elements and Associated Watershed Condition Indicators

PCE	PCE Description	Associated Pathways and Indicators
1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.	Sediment, Channel Conditions and Dynamics (wetted width/maximum depth ratio, streambank condition, floodplain connectivity), riparian conservation areas.
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.	Temperature, sediment/turbidity, chemical contamination/nutrients, physical barriers, change in peak/base flow, width/depth ratio, refugia
3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Water quality (temperature, sediment, chemical and nutrient contaminants), Channel Conditions and Dynamics (wetted width/maximum depth ratio, streambank condition, floodplain connectivity), changes in peak/base flows, riparian conservation areas
4	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.	Habitat elements (substrate embeddedness, LWD, pools frequency and quality, large pools, off-channel habitat, and refugia)
5	Water temperatures ranging from 2 to 15 C (36 to 59 F), with adequate thermal refugia available for temperatures at the upper end of this range.	Temperature
6	In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence; and young of the year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.	Sediment, substrate embeddedness
7	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.	Flow/ Hydrology (Changes in Peak /Base flows and Drainage Network Increase)
8	Sufficient water quality and quantity	Floodplain connectivity, peak/base flow, water

PCE	PCE Description	Associated Pathways and Indicators
	such that normal reproduction, growth, and survival are not inhibited.	quality (Temperature, sediment/turbidity, Chemical Contaminants and Nutrients)
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.	Persistence and Genetic Integrity

Factors affecting critical habitat are similar to those described above under the species. The Assessment provides detailed information regarding the condition of the habitat in the action area and the factors that influence the habitat condition (Assessment p. 19; pp. 37-59). In summary, the baseline, as summarized in Table 2, indicates that most of the watershed condition indicators and therefore corresponding PCEs are functioning at risk in both subwatersheds. Roads, migration barriers, and stream temperatures appear to be the limiting factors for bull trout and critical habitat in the action area.

Stream temperature is an important component of nearly all the bull trout critical habitat PCEs. In the action area, summer stream temperatures have exceeded ranges described in PCE 5 and at times may pose a partial thermal barrier for bull trout, thereby affecting PCE 2.

Within the action area, migratory corridors and connectivity are partially limited because of culvert barriers within the core area. The Upper South Fork Payette River Core Area includes nine local populations, and three potential local populations, only two of which, the Canyon Creek and Scott Creek, are considered strong populations. The bull trout population in Wapiti Creek is not connected to other populations located in nearby patches (Canyon Creek and Chapman Creek populations) because of an impassable culvert located at mile marker 0.2 below Forest Road 525. Connectivity within Lower Clear Creek subwatershed is also considered at risk due to nine impassable culverts, although there are no impassable culverts on Clear Creek. Connectivity is important because it could allow for re-colonization, and would permit local populations to recover from short-term disturbances. The presence of barrier culverts and high water temperatures may suggest there is currently little connectivity opportunity for re-founding subpopulations; thus, the discontinuity in critical habitat. Given these conditions, PCE 2 is degraded in the analysis area.

Roads within the riparian conservation areas also reduce floodplain connectivity, which influences primarily PCEs 1 and 8. The road density within riparian conservation areas in the Lower Clear Creek subwatershed is 3.9 miles road/mile^2. In the Bear-Camp subwatershed road density is much lower (0.53 miles road/mile$^{2)}$ and is not as a big a factor as in Lower Clear Creek. The high road density has led to loss of shade, large woody debris recruitment, and lowered sediment buffering ability.

PCE #9 is not affected by brook trout in either Long Creek or Wapiti Creek.

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

Determining the impacts of water diversion and changes in stream flow on stream habitat and fish populations are often difficult because the interrelationships between habitat and fish are complex and result from mechanisms that are interconnected. In other words, a single environmental impact may affect several portions of a fish's life history through more than one pathway or mechanism. Figure 7 shows some examples of the interconnectedness of the mechanisms and effects; in the following narrative, details about these mechanisms pertinent to the proposed water diversion special use permits and effects will be discussed. This project will not result in all the effects shown on this figure due to project design features developed to minimize effects to bull trout.

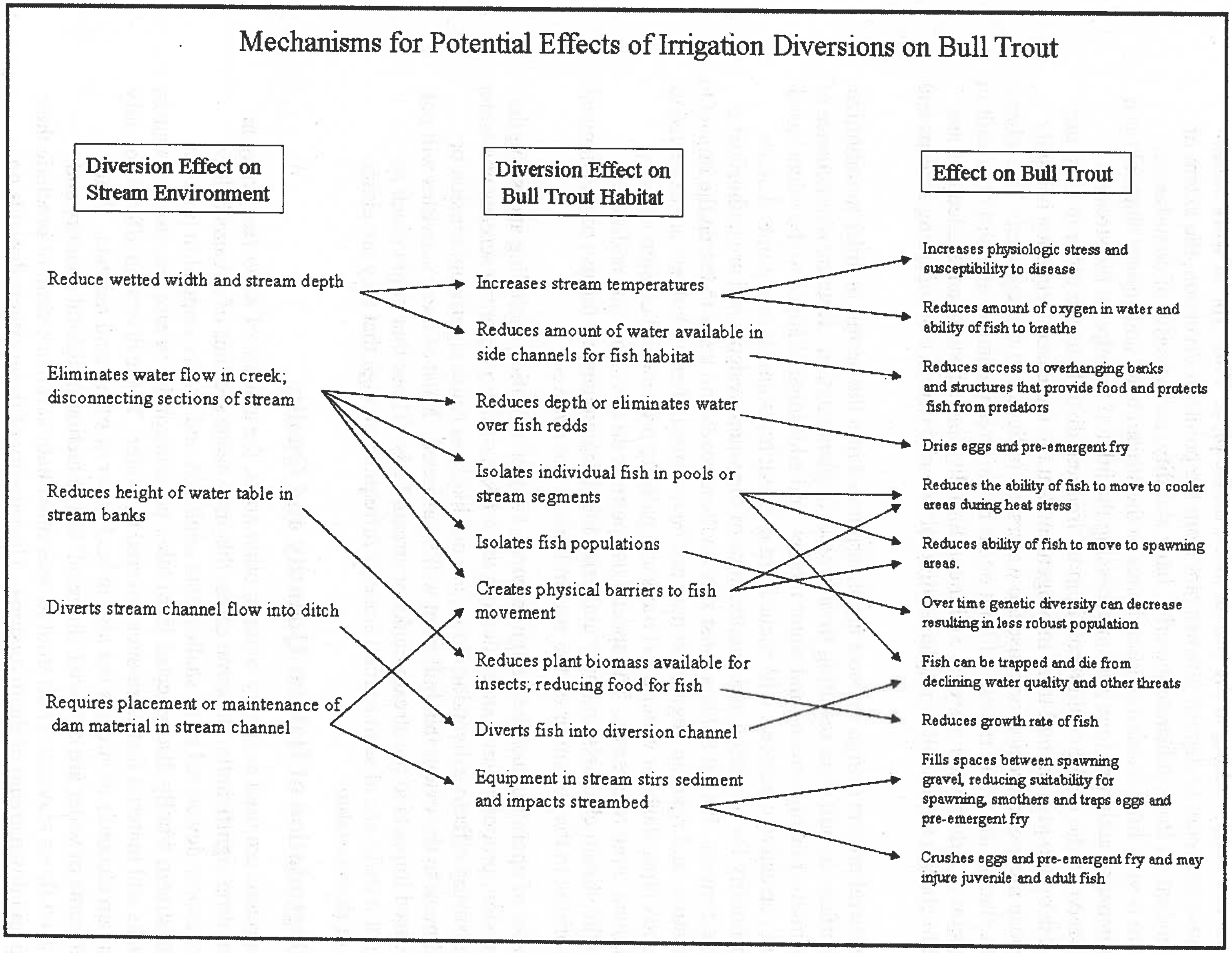

Figure 7. Mechanisms for potential effects of water diversions on bull trout

2.5.1.1.1 Sediment Effects

Work within the streams and along the stream banks has potential to cause minor stream bank erosion and release sediments at the points of diversion from permit holders accessing the diversion points (ATV trail for Wapiti Creek and foot path for Long Creek), installing and maintaining screens, and walking in the stream to the intake pipe. This type of work could potentially cause sediment to deposit downstream from the points of diversion, the extent of which is dependent on flow, substrate material, bank stability, and severity of disturbance. Currently there is very little erosion or disturbance to the stream bank and stream channels as a result of maintenance activities (one person accessing the inlet of the pipe in the stream). Installing a screen on the intake could result in more frequent disturbance in order to keep the screen free of debris to prevent bull trout impingement, but the increased frequency is highly unlikely to cause increased erosion or cause the watershed indicator to be degraded. The labor involved with placing the water meters will not occur in the stream channel and will not result in increased erosion at either water system. Sediment, turbidity and substrate embeddedness are not expected to change as a result of implementing routine maintenance or installing screens and meters.

In addition, several project design features are incorporated into the permit in order to minimize the potential effects to bull trout resulting from project implementation. Routine maintenance of the diversion inlets, placing screens and water meters, and additional changes to the inlets based on subsequent corrective measures, will occur from existing trails and access points that are maintained primarily for operation and maintenance of the water systems and are authorized in the special use permits. Permit holders must stay on these roads and trails to lessen the impact to riparian vegetation, and riparian vegetation may not be removed. Permit holders are expected to maintain (wood chips, slash, or water bars) trails and paths to prevent soil erosion and any potential sediment input to streams. The special use permits do not allow any additional alterations to the stream channels and only authorize hand-maintenance—the use of mechanized equipment working in the stream or on the stream bank is not allowed.

Given the scales of operation and the design features, Project activities, including accessing the points of diversion, proper maintenance, clearing the intakes of debris, placing screens and water meters, and ensuring effective diversion flows, are not likely to cause significant erosion or increased sediment to the extent that bull trout will be affected. Most of these activities will not result in increased impacts to the stream banks or stream beds. Those that might (such as moving a log or a rock) are of such a small scale or infrequent enough that they are either insignificant or discountable.

2.5.1.1.2 Degradation of Habitat Quantity and Quality

When small streams are used to supply water to other areas, the amount of water remaining in the stream can drop significantly. In some cases, this may cause sections of streams below diversions to become dewatered or so shallow that adult fish and fry are trapped in pools or sections of the stream wholly disconnected from other portions of the stream because fish cannot move over rocks and material that were once covered by water. These diversion effects not only occur on the main channels of streams but also in backwater or off-stream habitats. When substantial amounts of water are removed, the result is a reduction of habitat quantity and quality. Reduced flows may cause bull trout to seek other habitat downstream, or preclude their movement up and downstream of the diversions. The severity of these effects depends on natural stream flow levels. In extreme low flows, habitat may be rendered unsuitable for bull trout; however at such low flows, fish may be affected with or without the water diversions.

Diverting water from a bull trout stream has a negative effect on all times frames for useable areas required for all life stages of bull trout by reducing the amount of habitat available for bull trout. This loss in bull trout habitat directly relates to a loss in cover, pool depth, food source, rearing space, and spawning habitat. The significance of the effect, or loss of habitat, depends on the amount of water diverted, the density of fish in the area, habitat features, size of the watershed, and importance of the tributary. Tennant (1976, p. 6) found that if 60 percent of the average stream flow remains in the stream, this amount provides excellent to outstanding habitat for most aquatic life forms during their primary periods of growth.

Bull trout weighted usable area curves, which would define how much habitat was removed from each stream, were not provided in the Assessment and without which the Service is not able to accurately predict the amount of habitat reduced by each water system. The Wapiti Creek Summer Homes Association system (both diversions combined) diverts 0.15 cfs, or 3.75 percent of base flows of Wapiti Creek, which averages 4.0 cfs. The Wapiti diversions, the only diversions in the watershed, are located approximately 0.5 mile from the confluence with the South Fork Payette River, low in the watershed and below the Forest's bull trout patch model boundaries where bull trout are likely to occur. There does not appear to be any significant tributaries to Wapiti Creek below the points of diversion to ameliorate loss of flows downstream of the diversions. The Forest has surveyed Wapiti Creek five times since 1996, but has focused primarily on stream reaches above the diversion; sites where their model shows are more suitable for bull trout. The stream was surveyed (snorkeled) once below the diversion, near the confluence with the river, and bull trout were not observed (Assessment, p. 36).

Although bull trout have not been sampled below the diversion on Wapiti, the potential for their presence should not be discounted. Withdrawing 0.15 cfs from Wapiti Creek, therefore, reduces the amount of habitat available for bull trout. Although it is not reduced by a great amount, it is likely to cause any bull trout that may be present to make behavioral changes to adapt to the altered habitat during the period when water is withdrawn (late April to mid- October). Spawning is not known to occur downstream of the diversions (Brandt 2012a, *in litt.*) and will not be affected by the Project.

Wapiti Creek is not a significant tributary to the South Fork Payette River and at 4 cfs during base flows would be contributing about 1 percent of the lowest mean monthly (occurs in January) discharge of the South Fork Payette River – 333 cfs (United States Geological Survey website: URL: http://waterdata.usgs.gov/nwis/monthly), assuming the 4.0 cfs of Wapiti persists during the low flow periods in the South Fork Payette River. Effects to the South Fork Payette River from the diversions on Wapiti Creek are, therefore, considered insignificant.

The Long Creek Summer Homes Association system diverts 0.25 cfs, or 12.5 percent of total water of base flows of Long Creek, which averages 2.0 cfs. It flows into Clear Creek low in the watershed, approximately 4 miles upstream of the confluence with the South Fork Payette River. Clear Creek flows during August and September average 30 cfs (Grover-Weir 2012, *in litt.)* as measured near the South Fork Payette River. There are 4 small tributaries to Clear Creek downstream of Long Creek which combined may contribute 2.0 cfs to Clear Creek (Grover-Weir 2012, *in litt.*). Using this information, the Service estimates that Long Creek provides approximately 7 percent of the flow in Clear Creek. Reducing the flow in Long Creek by 12.5

percent therefore results in a 3.5 percent reduction of flow in Clear Creek. Similar to Wapiti, the withdrawal of water may affect bull trout to a degree in Clear Creek by reducing available habitat and therefore is likely to cause any bull trout that may be present to make behavioral changes to adapt to the altered habitat during the period when water is withdrawn (late April to mid- October). This reach of Clear Creek, from Long Creek downstream 4 miles to the South Fork Payette River, is considered FMO habitat for bull trout, so they would be present in the Clear Creek when the water systems are in use. Bull trout have not been surveyed in Long Creek and due to the impassable culvert barrier near the mouth it is unlikely they would recolonize the stream. Given that they are not present in Long Creek, effects to bull trout from the reduction in habitat associated with the Long Creek water system are only expected in Clear Creek. Clear Creek contributes about 10 percent of the base flows of the South Fork Payette River. Reducing this amount by 3.5 percent is not likely to have significant effects to the South Fork Payette River.

2.5.1.1.3 Potential Effects to Bull Trout Eggs and Fry

In general, bull trout deposit their eggs in late August through November depending on stream temperature. They take particular care in choosing sites where the gravel size, water temperature, dissolved oxygen, water depth, and water velocity are appropriate for protecting the eggs and promoting incubation. The eggs incubate for four to five months and after hatching in late winter or early spring fry remain in the gravel for up to 3 weeks before emerging. This long association with the spawning site means any substantial reduction of water flow during the period from late August through April puts bull trout eggs or fry at risk in the following ways.

Eggs/fry that are no longer submerged or not submerged deeply enough in water become desiccated and die. Because fry are less capable of swimming, they would be less likely to avoid stranding and drying because they would not be able to move over normally submerged material to rearing areas for food and protection. This situation could lead to fry starvation or their being eaten by predators. Under conditions where stream volume is reduced and water movement slows, temperature in rearing areas is likely to rise above optimum temperatures and can result in the death of fry from lower oxygen levels and lowered resistance to disease and parasites (Spence et al. 1996, pp. 144-145). These effects, however, are not expected to occur because the volume of water withdrawn at both locations will not cause a significant reduction of water flow or result in any areas of stream being dewatered. We do not expect the surface area of inundation, where redds are most likely to be built, to change in a manner that would affect potential or available spawning areas. Water withdrawal is not expected to shrink wetted surface area. In addition, water withdrawal during the spawning period through October is not expected to change, therefore water levels will not fluctuate during that time. When the systems are shut down for the winter (October) the increase in water flow is also not expected to be severe enough to wash away any redds or eggs.

Both Long Creek and Wapiti Creek are designated as spawning and rearing habitat for bull trout, although spawning is not currently known to occur in the vicinity of either diversion (Brandt 2012a, *in litt*.). Long Creek beginning approximately 1.5 miles above the water system is modeled as suitable but unoccupied bull trout habitat by the Forest. Long Creek has been surveyed five times by the Forest since 1997 and bull trout were not encountered. The location of the diversion on Long Creek is below the elevation where bull trout would be likely to spawn and the stream temperature at the site is not suitably cold enough for bull trout spawning. In addition, the impassable culvert on Long Creek above the confluence with Clear Creek makes it highly unlikely that bull trout would recolonize Long Creek. Effects to spawning bull trout, redds, eggs, and alevins are therefore not expected in Long Creek.

Wapiti Creek has also been surveyed five times by the Forest, above and below the diversion, with bull trout sampled above the diversion. The diversion on Wapiti is approximately 1/3 mile below what the Forest has modeled as suitable bull trout habitat, but given the proximity it is likely bull trout come down near the diversion. According to the Forest, as noted above, they have not identified bull trout spawning below the diversion (Brandt 2012a, *in litt.*) and due to the location in the watershed, they are probably not likely to spawn there.

The Forest, however, has proposed that to avoid any potential effects to spawning bull trout, even though their presence is highly unlikely, routine maintenance and corrective actions (i.e. placing screens and water meters) are authorized from December to July only. The Service assumes, based on information provided in Brandt 2012c (*in litt.)*, the permit holders cap the intake pipes and drain the systems in mid-October before the streams freeze over and do not recharge the systems again until late April or early May, depending on weather conditions. Although the permit holders would be allowed to perform maintenance activities, it is highly unlikely that they would be doing so between mid-October to mid-April. If spawning were to occur in Wapiti Creek at the diversion, there may still be some fry remaining in the gravel in the spring when the system is charged. In-stream work associated with charging the system entails one person walking in a small reach of stream (approximately 10–15 feet) and taking the cap off the intake pipe and walking out of the stream. If a redd is walked on during this process, fry could be injured. The likelihood of this occurring, given the location of the diversion in the watershed, the scale of disturbance, is discountable.

The Service, therefore, does not expect either diversion will result in effects to spawning adults, eggs or fry. Bull trout have not been surveyed in Long Creek and there are very few in Wapiti Creek, most of which have been surveyed upstream of the diversion and spawning is highly unlikely to occur at the diversion on Wapiti or immediately below. Clear Creek below Long Creek is not considered spawning and rearing habitat, therefore, there are no anticipated effects to spawning bull trout, redds, eggs, or fry from reduction in habitat in Clear Creek.

2.5.1.1.4 Impingement and Disturbance Effects

Operation of the screened diversion may result in injury or death to bull trout through impingement of the fish against the diversion screen in Wapiti Creek. Screen design criteria and routine maintenance should reduce the risk of impingement. However, if debris accumulates on the screens because of insufficient or inadequate cleaning, this may pose a hazard to bull trout and exceed the swimming ability of bull trout in the vicinity of the intake. Potential injury or death could occur from impingement.

The chances of direct disturbance of bull trout due to entrainment are considered insignificant because as part of the Project all diversion pipes will be screened with 3/32 inch mesh. This screening has been shown to mitigate effects to salmonids, and it is assumed that the same applies to bull trout. In addition, bull trout are not present in Long Creek or in the tributary to Wapiti Creek and bull trout have not been found in the lower reaches of Wapiti Creek where the diversion is located. Most bull trout in Wapiti Creek are expected to be higher in the drainage where habitat is more suitable.

The presence of persons walking along the stream bank and in Wapiti Creek to the inlet pipe for maintenance purposes, charging and draining the system, placing the screen and clearing debris from the screen, will result in human disturbance at the site. If bull trout are present during these activities, they could be startled and move away from the general vicinity of the disturbance. Effects to bull trout are expected to result in only minor disturbances to fish overall, with potential avoidance behaviors initially. Bull trout are typically most active at night (Homel and Budy 2008, p. 876), so daytime activities could result in bull trout moving from cover to avoid perceived threats associated with human presence. The response will be minimal, with fish moving to other available cover in the immediate area. These effects are not considered a significant disruption to normal feeding, holding or sheltering behavior and will not rise to the level of take.

2.5.1.1.5 Chemical Contamination Effects

Although this matrix indicator is expected to be maintained through the proposed action, there is the potential for spillage of fuel from vehicles used to access the diversions. Fish, their habitat, and aquatic organisms can be harmed or killed by accidental release of fuel or oil. The potential risk of petroleum products spilling and reaching live water is minimized because the action includes precautionary conservation measures that help safeguard against spillage and runoff. To limit the possibility of petroleum based product from reaching streams during project activities, these measures will be followed: ATV fueling and servicing will occur outside the riparian conservation and a spill containment kit (the size of which will be commensurate with the amount of fuel) must be readily available in the event of a fuel spill when operating equipment in RCAs. Effects are expected to be insignificant or discountable.

2.5.1.2 Effects of Interrelated or Interdependent Actions

The Service did not identify any interrelated or interdependent actions associated with the proposed action.

2.5.2 Bull Trout Critical Habitat

2.5.2.1 Direct and Indirect Effects of the Proposed Action

Primary Constituent Elements (PCEs) are those habitat components that are essential for the primary biological needs of foraging, reproducing, rearing of the young, dispersal, genetic exchange, or sheltering. Table 4 below summarizes the relationship between the PCEs in the designated critical habitat for bull trout, and the corresponding Pathway/WCI, and the anticipated effects of the action on the PCE.

Table 4. Description of PCE, Corresponding WCI Indicator, and Anticipated Effect to PCE.

PCE #	PCE Description	Corresponding Pathway Indicator (WCI)	Anticipated Effect to PCE
1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.	Sediment, Channel Conditions and Dynamics (wetted width/maximum depth ratio, stream bank condition, floodplain connectivity), riparian conservation areas.	There may be slight, temporary increases in suspended sediment during routine maintenance and corrective actions. However, effects to this PCE will be temporary and insignificant. Overall, the PCE will be maintained.
2	Migratory 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.	Temperature, physical barriers, refugia	This PCE will be maintained.
3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Water quality (temperature, sediment, chemical and nutrient contaminants), Channel Conditions and Dynamics (wetted width/maximum depth ratio, stream bank condition, floodplain connectivity), changes in peak/base flows, riparian conservation areas	This PCE may be affected by the water systems, but it is unlikely effects would be measurable or significant. A temporary increase in suspended sediment may occur during routine maintenance and corrective actions. There is a slight chance that sediment deposited on substrate downstream of the water system may impact benthic macroinvertebrates. Fines are currently very low in both watersheds. Width/maximum depth ratio may also be impacted by reduced flows. Base flows are reduced at the points of diversion and below, but this will not result in a measureable impact to PCE3.

PCE #	PCE Description	Corresponding Pathway Indicator (WCI)	Anticipated Effect to PCE
4	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.	Habitat elements (substrate embeddedness, LWD, pools frequency and quality, large pools, off-channel habitat, and refugia)	Stream complexity, water depths, pool quality, and velocities, are likely altered by reduced flows. The amount, or volume, of stream complexity seasonally lost is difficult to predict, but the withdrawal is likely an adverse effect to the PCE in Wapiti, Long and Clear creeks below the diversions.
5	Water temperatures ranging from 2 to 15 C (36 to 59 F), with adequate thermal refugia available for temperatures at the upper end of this range.	Temperature	This PCE will be maintained. The current designs in both Wapiti and Long Creeks do not create pools or over-widen the stream channels which would allow additional solar radiation. And flows will not be reduced to such an extent that stream temperatures would be measurably affected.
6	Substrates 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 (e.g., less than 12%) of fine substrate less than 0.85 mm (0.03in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.	Sediment, substrate embeddedness	This PCE may be affected by the water systems. A temporary increase in sediment is expected from routine maintenance and corrective actions. These pulses of increased sediment plumes or deposits are expected to be temporary in duration and amount (time required to do maintenance and number of times maintenance is conducted). This potential entry of sediment into these creeks is discrete and immeasurable; effects are considered insignificant.
7	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if	Flow/ Hydrology (Changes in Peak /Base flows and Drainage Network Increase)	This PCE will be affected by the water systems due to the withdrawal of water from base flows from April - October. The natural hydrograph (peak,

PCE #	PCE Description	Corresponding Pathway Indicator (WCI)	Anticipated Effect to PCE
	flows are controlled, they minimize departures from a natural hydrograph.		high and low) will not be altered, however, base flows will be reduced in Wapiti, Long and Clear creeks, having a negative effect from April-October on useable area for bull trout.
8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	Water Quality (Temperature, sediment, Chemical Contaminants and Nutrients)	The Wapiti Creek Summer Home Association is accessed from existing non-system trails and roads on ATV vehicles. This authorization has the potential to deliver chemicals to RCAs and streams. The corrective action section identifies mitigation to reduce the possibility of a spill. Effects to this PCE are therefore expected to be insignificant.
9	Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.	Persistence and Genetic Integrity	This PCE will be maintained.

Potential effects from project activities on the PCEs of bull trout designated critical habitat are largely sediment and habitat loss related (flow-related). Sediment entering the stream or released during project activities has the potential to affect PCEs 1, 3, 4, 6, and 8. However, the quantity of sediment released during routine maintenance and corrective actions (such as installation of mesh screens over intake and water meters) is not expected to be significant at either Wapiti Creek or Long Creek. The amount of water diverted (0.15 cfs of Wapiti Creek and 0.25 cfs of Long Creek) does have a measurable negative effect on all time frames for useable area required for all life stages of bull trout. It is likely that PCEs 4 (stream complexity) and PCE 7 (a natural hydrograph) are adversely affected on Wapiti, Long and Clear creeks due to the reduction of stream complexity and reduced base flows from April through October below the diversions, as described above in section 2.5.1.

2.5.2.2 Effects of Interrelated or Interdependent Actions

The Service did not identify any interrelated or interdependent actions associated with the proposed action.

2.6 Cumulative Effects to Bull Trout and Critical Habitat

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

Within the subwatersheds there are numerous state, 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 section of this Opinion. These activities include timber harvest and road building, grazing, water diversion, residential development, and agriculture.

Illegal and inadvertent harvest of bull trout is considered a cumulative effect. Harvest can occur through both misidentification and deliberate catch. Schmetterling and Long (1999, 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). Spawning bull trout are particularly vulnerable to harvest because the fish are easily observed during autumn low flow conditions. Spawning bull trout are particularly vulnerable to harvest because the fish are easily observed during autumn low flow conditions. Hooking mortality rates range from 4 percent for non-anadromous salmonids with the use of artificial lures and flies (Schill and Scarpella 1997, 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 (Independent Scientific Advisory Board 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.

As discussed above, bull trout are known to hybridize with introduced brook trout and hybridization is a potential factor in population declines. Brook trout were historically stocked throughout the South Fork Payette River, and brook trout do occur in neighboring watershed, but not within Wapiti or Long creeks. The effects to bull trout of hybridization with brook trout in the watershed have not been assessed.

Although cumulative effects can be identified, we cannot quantify the magnitude of their impacts on bull trout populations. Except for climate change, we do not expect cumulative effects to appreciably alter the existing baseline condition in the action area during the lifetime of the project. We cannot be so certain on the effects of climate change.

2.7 Conclusion

2.7.1 Bull Trout

2.7.1.1 Conclusion

The Service has reviewed the current status of the bull trout, the environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to jeopardize the species continued existence. Although the proposed action may have some adverse effects to a small number of bull trout, these effects are not likely to cause a measurable response to bull trout at the Upper South Fork Payette River core area, the Southwest Idaho Management Unit or the Columbia River population segment. Project effects will not reduce appreciably the likelihood of both the survival and recovery of bull trout.

Both diversion systems remove small percentages of water away from the streams and result in reduction of available habitat for an unknown number of bull trout, particularly in Wapiti Creek and Clear Creek. The Service concludes that effects to bull trout will be limited to short-term disturbances during routine maintenance; stress to bull trout adults, subadults and juveniles from a reduction in habitat; and potential mortality from impingement on the diversion screens. These anticipated effects should be minimized by the conservation measures incorporated into the Project. The Service expects that the numbers, distribution and reproduction of bull trout in the action area will not be significantly changed as a result of this Project.

2.7.2 Bull Trout Critical Habitat

2.7.2.1 Conclusion

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.

Although bull trout critical habitat primary constituent element #4 and #7, complex habitats and natural hydrograph, may be adversely affected by the project, we expect these effects to be limited in spatial extent. We also expect the project design features incorporated into the project to minimize effects. There is approximately 5.2 miles of spawning and rearing critical habitat in Wapiti Creek, 90 percent or more of which occurs above the point of diversion for the water systems. Long Creek provides 3.2 miles of spawning and rearing habitat. The water withdrawal affects approximately 0.25-0.5 mile of Long Creek. Clear Creek from its confluence with the South Fork Payette River upstream 16.6 miles contains FMO habitat and provides an additional 5.4 miles of spawning and rearing habitat above the 16.6 miles of FMO. The water withdrawal system in Long Creek affects approximately 4 miles of FMO habitat in Clear Creek. The Upper South Fork Payette River critical habitat subunit provides about 278 miles of critical habitat. Given this scale, impacts to these portions of critical habitat will not affect the functionality or the conservation values of the critical habitat subunit or the Southwest Idaho River Basins Critical Habitat Unit. Therefore, we conclude that the project will not destroy or adversely modify designated critical habitat.

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 Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest fails to assume and implement the terms and conditions the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the

Forest must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

2.8.1 Form and Amount or Extent of Take Anticipated

The following level of take of this species can be anticipated by using existing information documenting effects to bull trout and other salmonids, and the best professional judgment and visual observations of fisheries managers and biologists in the action area.

Based on survey data, the Service assumes the presence of bull trout in Wapiti Creek and Clear Creek; however, it is difficult for us to anticipate the exact number of individual bull trout that may be taken as a result of this Project. The amount of take of bull trout caused by authorization of the special use permits is difficult to predict, let alone detect, because of the bull trout's primarily nocturnal activity patterns, tendency to hide in or near the substrate, the small body size and cryptic coloration and behavior of sub-adult fish, the need to use snorkeling techniques to achieve a high likelihood of detection, the low likelihood of finding an injured or dead individual in the action area, and a high rate of removal of injured individuals by predators or scavengers. Furthermore, the amount of take from the proposed action depends on the circumstances at the specific times, including current stream flow, water depth, available habitat, accumulation of debris at the intakes, and bull trout abundance. To actually measure the number of individuals harmed by impingement on the screened intake on Wapiti Creek and by the reduction in habitat in Wapiti Creek and Clear Creek below the diversions is at best impracticable and at worst impossible.

Using professional judgment, however, it is reasonable to assume that all bull trout that may be present in Wapiti Creek below the point of diversion to the confluence with the South Fork of the Payette River are subject to non-lethal take in the form of harassment by reduction in bull trout habitat. It is likely that normal behavior patterns of bull trout (adult, subadult and juvenile), including feeding and sheltering, may be disrupted by reduction in available habitat. These effects will occur when the Wapiti Summer Homes Association is withdrawing water, normally from April through October.

Likewise, we do not know the number of bull trout that use lower Clear Creek during the time when water is withdrawn from Long Creek (April through October), but we expect bull trout to be using the stream as FMO habitat for at least a portion of the withdrawal period. With a reduction of available habitat, non-lethal take in the form of harassment of bull trout (adults and subadults), change in behavior and cover, is likely to occur in Clear Creek from the confluence of Long Creek approximately 4 miles downstream to the South Fork Payette River, from April through October.

The Service anticipates that take in the form of harm of individual fish due to impingement on the screened intake may occur as a result of the proposed action in Wapiti Creek. Screen design criteria and routine maintenance should reduce the risk of impingement. However, the risk of impingement will increase if debris accumulates or blocks the screens to an extent great enough to increase approach velocity that exceeds a bull trout's swimming abilities. The Service expects lethal take of no more than one bull trout (adult, subadult, or juvenile) at the diversion fish screen on Wapiti Creek from April to October each year during implementation. No take due to impingement is expected on Long Creek or the unnamed tributary to Wapiti Creek because bull trout are not likely to be present at either of those diversions.

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. The proposed action is not expected to reduce the reproduction, status, and distribution of bull trout in the action area, and will not appreciably reduce the likelihood of survival and recovery of the Columbia River Distinct Population Segment (DPS). The Columbia River DPS comprises 22 management units including the Southwest Idaho management unit. The Southwest Idaho management unit includes the Boise River, Payette River, and Weiser River subunits and 9 core areas with a total of 55 local populations distributed among the core areas. The project action area is located within the Upper South Fork River core area: Clear Creek and Wapiti Creek are two of the nine local populations in the core area. The Service does not anticipate appreciable changes in the numbers, distribution, or reproduction of bull trout in the core area or local populations that occur in the action area.

Anticipated take may be reduced because the project includes conservation measures to avoid and reduce adverse effects. In addition, adverse effects will be limited in scope. The likelihood that the Project will eliminate the Wapiti local population of bull trout is discountable. Local bull trout densities and distribution in the affected streams are not expected to be significantly altered. Since only one out of 55 local populations may be affected it is unlikely that the proposed action would impair productivity or population numbers of bull trout in the Southwest Idaho management unit or in the Columbia River DPS.

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 lethal take of bull trout due to impingement on the diversion screen on Wapiti Creek.
2. Assure water withdrawals are consistent with those specified within the special use permit.

2.8.4 Terms and Conditions

1a. To minimize the obstruction of flow at the screens and the risk of increased velocity, the Forest will work with the permit holders to ensure that they understand the importance of keeping the screen clear of debris blockages.

1b. The Forest will complete yearly status reviews assessing the operation and maintenance of the Project for the life of the special use permit.

2. Report back to the Level 1 team results of water meter monitoring once flow meters are installed to ensure water withdrawals are consistent with those described herein. Withdrawals greater than those described may require reinitiation of the special use permits or new consultation.

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 locating dead, injured, or sick bull trout not anticipated by this Opinion, as a result of Project activities, such activities shall be terminated. Please notify the Service within 24 hours. Additional protective measures will be developed through discussions with the Service.
2. During project implementation 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. We have the following conservation recommendations:

- Continue to promote recovery of bull trout in the action area by identifying habitat restoration opportunities and implementing these actions in the near term.
- Consider replacing the barrier culvert on Long Creek with a structure that allows aquatic organism passage and restores stream functionality.
- Consider developing operation and maintenance plans with the permit holders to ensure adequate and timely routine maintenance occurs to clear debris from intakes and reduce potential for impingement of bull trout.

2.10 Reinitiation Notice

This concludes formal consultation on Wapiti Creek and Long Creek Water Systems Special Use Permits. 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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