Chapter IV. Aquatic Biological Opinion

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A. CONTEXT OF THE PROPOSED ACTION FOR BULL TROUT

The Idaho Panhandle National Forest (IPNF) determined in their biological assessment that activities conducted under the proposed action will be likely to adversely affect bull trout and designated bull trout critical habitat and will have no effect on Kootenai white sturgeon and their critical habitat (USFS 2013, p. 8, 60).

This section describes the spatial context in which the Service conducts its ESA Section 7 consultation, jeopardy and adverse modification analysis; describes the relationship of the project area to bull trout occurrence; explains the relationship of the proposed action to existing management; and describes the desired condition for bull trout under the Revised Plan as well as the guidelines and standards applied at the project level to achieve desired conditions.

1. Spatial Context for the Bull Trout Consultation and Recovery Analysis Conducted by the Service

For purposes of consultation and recovery for bull trout the Service considers biological effects and project related impacts of proposed actions at several nested spatial levels (i.e., hierarchal relationships), that include the local population, core areas, management units, and interim recovery units (USFWS 2002). In the Draft Bull Trout Recovery Plan (USFWS 2002, pp. 3-4), twenty-seven major watersheds were referred to as recovery units; terminology has since been revised and they are now referred to as management units. The following definitions are from the Draft Bull Trout Recovery Plan:

Interim Recovery Unit: Five interim recovery units have been identified: Columbia River, Klamath River, Jarbidge River, Coastal-Puget Sound, and St. Mary-Belly River.

Management Unit: Management units are the major units for managing recovery efforts; management units were described (as recovery units) in separate chapters in the draft recovery plan (USFWS 2002, pp. 2-4). Most management units, as proposed, consist of one or more major river basins. Several factors were considered in identifying management units, for example, biological and genetic factors, political boundaries, and ongoing conservation efforts. In some instances, management unit boundaries were modified to maximize efficiency of established watershed groups, encompass areas of common threats, or accommodate other logistical concerns. Some proposed management units included portions of mainstem rivers (e.g., Columbia and Snake rivers) when biological evidence warranted such inclusion.

Core Area: The combination of core habitat (i.e., habitat that could supply all elements for the long-term security of bull trout) and a core population (a group of one or more local bull trout populations that exist within core habitat) constitutes a core area. Each core area represents the closest approximation of a biologically functioning unit for bull trout and is the geographic scale at which the Service is gauging the status of the species. Core areas require both habitat and bull trout to function, and the number (replication) and characteristics of local populations inhabiting a core area provide a relative indication of the core area's likelihood to persist. Local populations within a core area have the potential to interact because of connected aquatic habitat.

Local Population: A group of bull trout that spawn within a particular stream or portion of a stream system. Multiple local populations may exist within a core area. A local population is considered to be the smallest group of fish that is known to represent an interacting reproductive unit. In most areas a local population is represented by a single headwater tributary or complex of headwater tributaries where spawning occurs. Gene flow may occur between local populations (e.g., those within a core population), but is assumed to be infrequent compared with that among individuals within a local population.

Within each recovery/management unit, there are one or more core areas, which are intended to reflect the metapopulation structure of bull trout. By definition, a core area contains all of the necessary constituent elements for the long-term security of bull trout. The Draft Bull Trout Recovery Plan recognizes core areas as the population units that are necessary to provide for bull trout biological needs in relation to genetic and phenotypic diversity, and to spread the risk of extinction caused by stochastic events. Peer review of the Draft Bull Trout Recovery Plan supported this approach.

In this biological opinion, at a programmatic level we analyze biological effects at each of the following scales: core area, management unit, and interim recovery unit. The analysis for critical habitat follows a similar, but less extensive, spatial hierarchy. Critical habitat subunits are the smallest division and are roughly (sometimes exactly) equivalent to core areas; critical habitat units are roughly (sometimes exactly) equivalent to management units, and are made up of the subunits.

Jeopardy Determination

Jeopardy determinations for bull trout are made at the scale of the listed entity, which is the coterminous United States population (64 FR 58910). This follows the April 20, 2006 analytical framework guidance described in the Service's Memorandum regarding jeopardy determinations for bull trout (USFWS 2006, entire). The guidance indicates that a biological opinion should concisely discuss all the effects and take into account how those effects are likely to influence the survival and recovery functions of the affected interim recovery unit(s), which should be the basis for determining if the proposed action is "likely to appreciably reduce both survival and recovery of the coterminous United States population of bull trout in the wild."

The approach to the jeopardy analysis for the proposed action addressed by this biological opinion follows a hierarchal relationship between units of analysis (i.e., geographical subdivisions) that characterize effects at the lowest level or smallest scale (local population) aggregated to the highest level or largest scale (Columbia River Interim Recovery Unit) of analysis. Table IV-1 shows the hierarchal relationship between units of analysis that determine whether the proposed action is likely to jeopardize the survival and recovery of bull trout. If the adverse effects of the proposed action do not rise to the level where they appreciably reduce both survival and recovery of the species at a lower scale, such as the local or core population, the proposed action could not jeopardize bull trout in the coterminous U.S. (i.e., rangewide). Therefore, the determination would result in a no-jeopardy finding. However, if the proposed action causes adverse effects that are determined to appreciably reduce both survival and recovery of the species at a lower scale of analysis, then further analysis is warranted at the next higher scale.

Based on the information that is analyzed and described in this biological opinion, we conclude that this project will not jeopardize the survival and recovery of bull trout. More detailed rationale and discussion for this conclusion is provided below.

Table IV-1. Hierarchy of units of analysis for the bull trout jeopardy determination for Idaho Panhandle National Forest Revised Forest Plan.

Name	Hierarchical Relationship
Interim Recovery Unit Columbia River	1 of 5 interim recovery units in the range of the species within the coterminous United States
Management Units Clark Fork River Kootenai River Coeur d'Alene Lake Clearwater River	4 of 23 management units in the Columbia River Interim Recovery Unit
Core Areas Lake Pend Oreille[1], Priest Lakes; Kootenai River; Coeur d'Alene Lake; North Fork Clearwater River	2 of 35 core areas in the Clark Fork River Basin; 1 of 4 in the Kootenai River Basin; 1 of 1 in the Coeur d'Alene Lake Basin; 1 of 7 in the Clearwater River Basin

Adverse Modification of Designated Critical Habitat

Critical habitat designations identify habitat areas that provide essential life cycle needs of the species, using the best available scientific and commercial data (75 FR 63898).

The October 18, 2010, Final Rule designating critical habitat for bull trout (75 FR 63898) provides guidance that indicates when a proposed action is "incompatible with the viability of the affected core area population(s), inclusive of associated habitat conditions, a jeopardy finding may be warranted, because of the relationship of each core area population to the survival and recovery of the species as a whole." In addition, further guidance is provided in the Director's December 9, 2004, memorandum (USFWS 2004), which is in response to litigation on the regulatory standard for determining whether proposed Federal agency actions are likely to result in the "destruction or adverse modification" of designated critical habitat under Section 7(a)(2) of the Act. This memorandum outlines interim measures for conducting Section 7 consultations pending the adoption of any new regulatory definition of "destruction or adverse modification."

Consequently, this biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, the Service relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.

[1] In the IPNF biological assessment Lake Pend Oreille (LPO) core area is labeled as Lake Pend Oreille/Lower Clark Fork River (LCFR). This consolidation has not been officially completed, and IPNF lands are limited to LPO.

Adverse modification determinations are made at the rangewide scale, based on impacts to one or more critical habitat units. Impacts to the primary constituent elements (PCEs) are assessed within the action area (USFWS 2004), and projected to the critical habitat unit. Table IV-2 shows the hierarchal relationship between units of analysis that determine whether the proposed action is likely to destroy or adversely modify the designated critical habitat by altering the PCEs to such an extent that the conservation value of the critical habitat is appreciably reduced. If the adverse effects of the proposed action rise to the level where the conservation value of critical habitat is substantially degraded within a core area, then an analysis is made as to whether the conservation value is also substantially degraded in the critical habitat unit.

Based on the information that is analyzed and described in this BO, we conclude that this project will not alter the physical or biological function of critical habitat to such an extent that the conservation function of the critical habitat is appreciably reduced in the Clark Fork River Basin, Kootenai River Basin, Coeur d'Alene River Basin, or Clearwater River Critical Habitat Units. Therefore, it will not destroy or adversely modify critical habitat at the rangewide scale. More detailed rationale and discussion for this conclusion is provided below.

Table IV-2. Hierarchy of units of analysis for adverse modification of bull trout critical habitat for the Idaho Panhandle National Forest Revised Forest Plan.

Name	Hierarchical Relationship
Critical Habitat Units Clark Fork River Basin Kootenai River Basin Coeur d'Alene River Basin Clearwater River	4 of 32 Critical Habitat Units in the range of the species

2. Relationship of the Project Area to Bull Trout

The proposed action (implementation of the Revised Plan) would occur across the IPNF. The IPNF contains bull trout habitat in 5 core areas in 4 management units. The IPNF supports bull trout habitat in the Clark Fork management unit in the Lake Pend Oreille and Priest Lakes core areas; the Kootenai River management unit in the Kootenai River core area; the Coeur d'Alene Lake management unit in the Coeur d'Alene Lake core area, and in the Clearwater River management unit in the North Fork Clearwater River core area. These same areas support designated critical habitat for bull trout as described in greater detail below.

3. Relationship of Proposed Action to Existing Management

Current management for bull trout on the IPNF is directed by the Inland Native Fish Strategy (INFISH) (USFS 1995), which amended the 1987 Forest Plan. The INFISH standards and guidelines apply to all riparian habitat conservation areas (RHCAs), and to projects and activities in areas outside of RHCAs that would degrade conditions in RHCAs. The standards and guidelines address ten management issues in RHCAs and associated areas: timber management, roads management, grazing management, recreation management, minerals management, fire and fuels management, lands, general riparian area management, watershed and habitat restoration, and fisheries and wildlife restoration. For the list of the standards and guidelines included in INFISH please refer to USFS 2013, Appendix C.

The INFISH strategy was designed to provide protection for native fish and has been the primary aquatic conservation strategy for the IPNF since 1995. While it allows for restoration activities, its focus is passive restoration through protection of riparian and aquatic resources. With the INFISH amendment, the 1987 Forest Plan direction reduced the risk to watersheds, soils, riparian, and aquatic resources from new and ongoing activities (USFS 2013, p. 15). Originally proposed as an interim direction, INFISH has been implemented considerably longer than its intended 18 months. The strategy has been documented to be effective in protecting aquatic resources through ongoing PACFISH/INFISH Biological Opinion (PIBO) effectiveness monitoring (Meredith et. al 2012); however, the one component identified as lacking in INFISH is an active restoration component. This was stated clearly by the Service in its 1998 Biological Opinion (USFWS 1998) for the INFISH amendment. The absence of a clearly stated aquatic restoration goal in the existing plan was one of the many items identified as a need for change in the plan revision process.

The Revised Plan adds an active restoration component through desired conditions, objectives, guidelines and standards that would supplement the retained passive components of INFISH. The Revised Plan direction is also intended to address the Conservation Recommendations from the INFISH biological opinion (USFWS 1998) as well as the Conservation Recommendations from the 2011 Grizzly Bear Access Amendment biological opinion (USFS 2013).

4. Description of the Proposed Action

As described in Part I, the Revised Plan direction is organized by goals, desired conditions, objectives, guidelines, and standards. The Revised Plan forest-wide direction describes the framework under which lands will be managed for the next 10 to 15 years on the Forest. The revised Forest Plan proposes to designate seven different management area (MA) categories across the Forest (Table IV-3). In general, the areas can be described as: areas with wilderness characteristics (MA1); Wild and Scenic Rivers (MA2); special areas, e.g. areas with botanical, geological, historical, recreational, scenic, or zoological interest, (MA3); Research Natural Areas and Experimental Forests (MA4); backcountry areas (MA5); general forest areas (MA6); and primary recreation areas (MA7). Allocation to any specific MA is not intended to mandate or direct the agency to propose or implement any site-specific action and but allows for an array of different uses.

Table IV-3. Percentage of IPNF lands by Management Area.

MA	Management Area Name	% of Forest
1	Wilderness characteristics	7
2	Wild and Scenic Rivers	3
3	Special Areas	1
4	Research Natural Areas and Experimental Forests	1
5	Backcountry	27

6	General Forest	60
7	Primary Recreation Areas	1

The goals of the Revised Plan for aquatic habitats and aquatic species is to restore habitats where past management activities have affected stream channel morphology or wetland function and to maintain or improve the distribution of native aquatic and riparian dependent species and contribute to the recovery of threatened and endangered aquatic species. This is primarily achieved through the continued implementation of INFISH and enhanced through the delineation of INFISH designated priority watersheds into restoration and conservation subwatersheds under the Revised Plan.

INFISH designated priority watersheds were intended to provide a pattern of protection across the landscape, where habitat for inland native fish would receive special attention and treatment. Priority watersheds would have the highest priority for restoration, monitoring, and watershed analysis. Priority areas in good condition would serve as anchors for the potential recovery of depressed stocks, and also would provide colonists for adjacent areas where habitat had been degraded by land management or natural events (USFS 1995). While it allowed for restoration, INFISH primarily provided direction for protection and passive restoration measures.

To correct this deficiency, the Revised Plan adds an active restoration component through desired conditions, objectives, guidelines and standards that would supplement the retained passive components of INFISH.

During the development of the Revised Plan, sixth code HUC watersheds were prioritized for conservation or restoration based solely on biological and physical aquatic resource values. There are 28 conservation and 40 restoration (26 active and 14 passive) subwatersheds on the Forest, related to bull trout. Long-term persistence of aquatic species is dependent upon restoring watershed processes that create and maintain habitats across stream networks (Rieman et al. 2000, p. 440) and the use of ecologically compatible land use polices that ensure the long-term productivity of aquatic and riparian ecosystems (Thurow et al. 1997, p. 1108). Emphasis was placed on watersheds supporting native species, which includes bull trout and designated bull trout critical habitat, especially where there was a high likelihood for successful restoration given current methods and funding levels. These restoration watersheds are intended to provide a pattern of protection across the landscape, where habitat for inland native fish would receive special attention and treatment.

Watersheds identified as native fish strongholds with appropriately functioning aquatic habitats were designated as conservation watersheds under the Revised Plan. Conservation watersheds are intended to protect stronghold populations of native salmonids and complement restoration efforts. Conservation watersheds were identified using the following considerations: areas with excellent habitat, water quality and strong populations of native fish species.

Revised Plan restoration subwatersheds were identified by looking for areas with: degraded habitat conditions, water quality limitations, depressed populations of native fish species, or a combination of the above, and a relatively high potential for improvement. These watersheds that contain areas of lower quality habitat, with high potential for restoration, could become future sources of higher quality habitat with the implementation of a comprehensive restoration program (USFS 1995). Restoration activities would be accomplished by identifying and treating risk factors (e.g., unstable roads or poorly located and/or drained roads, certain invasive plants and animals, major obstructions to physical and biological connectivity) which threaten aquatic and riparian ecosystem integrity and are likely to adversely influence achievement of desired conditions. Site specific restoration would address and treat specific elements of watershed-scale problems, while larger restorations at the subwatershed scale are expected to provide the most benefits for aquatic species, their habitats, and other aquatic dependent resources. Watershed restoration as discussed in the Revised Plan would accelerate the recovery of watershed functions and related physical, biological, and chemical processes that promote recovery of riparian and aquatic ecosystem structure and function and benefit native aquatic species. Watershed restoration, under the Revised Plan, includes both passive and active strategies to achieve aquatic and riparian desired conditions. The future activities to be implemented would be primarily dependent on the level of opportunities provided for in the different MA categories.

For example, under the Revised Plan, active restoration is characterized as the direct manipulation of specific ecosystem variables to accelerate the reestablishment or facilitate the improvement of selected ecosystem processes. It is accomplished by applying integrated treatments strategically located and implemented at the watershed scale. Active restoration relies on watershed analysis to identify those factors that have contributed to the loss of aquatic ecosystem health. Continued resource management in certain watersheds would provide opportunity and potential funding for instream restoration actions. For that reason, active restoration opportunities would be more prevalent in MAs with fewer restrictions on allowable activities (i.e., MA6 - general forest).

Under the Revised Plan, passive restoration relies on the implementation of Forest Plan direction, other sources of design criteria (e.g., Forest Service Manual and Handbook direction), and best management practices, in order to maintain watershed processes and aquatic habitat conditions and allow for natural rates of recovery. Because passive restoration primarily maintains current conditions, active restoration is often needed to move a degraded system toward recovery. Passive restoration opportunities would be more prevalent in MA1 (wilderness characteristics) where motorized access is precluded.

The overall desired conditions for aquatic habitat and aquatic species related to bull trout under the Revised Plan are discussed in Chapter I of this biological opinion and contained in the Aquatic BA (USFS 2013, pp 16-25). Guidelines and standards are the procedures and requirements (respectively) applied to project and activity decision-making to achieve goals, desired conditions, and objectives. All project-level activities must meet the guidelines and standards or require a Revised Plan amendment. Table IV-4 describes the guidelines and standards to be applied at the project level specifically for the conservation of bull trout.

The standards and guidelines discussed in Chapter 1 and Table IV-4 would be applied Forest-wide as well as across the management areas and geographic areas. Management areas have similar management characteristics and clarify the allowed uses on various parts of the Forest (see Table I-5 in Part I of this biological opinion). The relationship of the bull trout core areas and critical habitat to the MAs is provided in Table IV-5.

Geographic Areas (GA) have desired conditions that are specific to a locale, such as a river basin or valley. The GA desired conditions were developed to refine Forest-wide management to better respond to local conditions and situations that may occur within a specific GA. The desired conditions in GAs for listed species would not exert additional effects on the species, rather the desired condition would help the Forest achieve a Forest-wide desired condition, objective, standard, or guideline for the species. Refer to Chapter II for an explanation of the relationship of GAs to listed species.

The Revised Plan would incorporate all standards and guidelines contained in INFISH. Refer to the section above, Relationship of Proposed Action to Existing Management, for an explanation of INFISH. The Revised Plan direction (the Proposed Action), is intended to provide additional protections for bull trout and bull trout critical habitat that were not addressed by INFISH as well as the conservation recommendations from the INFISH Biological Opinion (USFWS 1998) and the Grizzly Bear Access Amendment Biological Opinion (USFWS 2011).

Table IV-4. Guidelines and standards in the IPNF Revised Plan for bull trout conservation.

Bull Trout Management Need	Element Code	Element Description
Cold and clean water quality.	**FW-GDL-AQS-01.**	Limit activities that potentially deliver sediment to streams to times outside of spawning and incubation seasons for aquatic species.
Cold and clean water quality.	**FW-GDL-AQS-02**.	Equipment used in water should be treated to prevent the introduction of aquatic invasive species and aquatic borne diseases.
Cold and clean water quality.	**FW-GDL-RIP-01.**	Soil and snow should not be side-cast into surface water during road maintenance operations.
Cold and clean water quality. Prevention of direct mortality.	**FW-GDL-RIP-02.**	Grazing management should prevent trampling of native fish redds (nests) by livestock.
Cold and clean water quality and complex stream channels and well-connect habitat	**FW-GDL-RIP-03.**	Minimum Impact Suppression Tactics (MIST) should be used within RHCAs.
Complex stream channels. Prevention of direct mortality.	**FW-GDL-RIP-04.**	When drafting water from streams, pumps should be screened to prevent entrainment of fish and aquatic organisms and located away from spawning gravels.
Cold and clean water quality.	**FW-GDL-VEG-09.**	Peatlands/bogs should be buffered by at least 660 feet from management activities that may degrade this habitat.
Cold and clean water quality and complex stream channels.	**FW-STD-RIP-01.**	When RHCAs are intact and functioning at desired condition, then management activities shall maintain or improve that condition. Limited short-term effects from activities in the RCAs may be acceptable.
Complex stream channels.	**FW-STD-RIP-02.**	When RHCAs are not intact and not functioning at desired condition, management activities shall include restoration components. Large-scale restoration plans or projects that address other cumulative effects within the same watershed may be considered.
Cold and clean water quality and complex stream channels and	**FW-STD-RIP-03.**	The Inland Native Fish Strategy (INFISH) direction in the Decision Notice (USDA Forest Service, 1995) and terms and conditions in the Biological Opinion (USFWS 1998) shall be

Bull Trout Management Need	Element Code	Element Description
well-connect habitat.		applied.
Cold and clean water quality.	**FW-GDL-WTR-01.**	Ground-disturbing activities in subwatersheds with Category 5 water bodies, on Idaho's §303(d) list of impaired waters, should not cause a decline in water quality or further impair beneficial uses. A short-term or incidental departure from state water quality standards may occur where there is no long-term threat or impairment to the beneficial uses of water and when the state concurs. Category 5 water bodies are waters where an approved TMDL is not available.
Cold, clean, and well-connected habitat.	**FW-GDL-WTR-02.**	In order to avoid future risks to watershed condition, ensure hydrologic stability when decommissioning or storing roads or trails.
Cold and clean water quality.	**FW-STD-WTR-01.**	Ground-disturbing activities in source water areas shall prevent risks and threats to public uses of the water. Limited short-term effects from activities in source water areas may be acceptable.
Cold and clean water quality and complex stream channels.	**FW-GDL-SOIL-01.**	Operate ground-based equipment only on slopes less than 40 percent. On slopes greater than 40 percent, but less than 150 feet in length, ground-based equipment may be allowed.
Cold and clean water quality and complex stream channels.	**FW-GDL-SOIL-02.**	Retain coarse woody debris and organic matter and fines on site when implementing timber harvest or prescribed burning outside WUI areas.
Cold and clean water quality, complex stream channels, and well-connected habitat.	**FW-GDL-SOIL-04.**	Avoid ground-disturbing management activities on landslide prone areas. If activities cannot be avoided, they should be designed to maintain soil and slope stability.

FW-Forest-wide, GDL-guideline, STD- standard, WTR-water, AQH –aquatic habitat, RIP-riparian.

Table IV-5. Distribution of bull trout core areas and critical habitat on the IPNF by Revised Plan MA.

Management Area	Core Areas (Acres)	Critical Habitat (Stream Miles)
1 – Wilderness characteristics	177,325	52
2 – Eligible Wild, Scenic, Recreation River	40,812	124
3 – Special Area	5,847	2
4 – Research Natural Area	14,843	6
5 – Backcountry	406,612	123
6 – General Forest	648,869	213
7 – Primary Recreation Area	4,316	0
Approximate Total	**1,298,624**	**520**

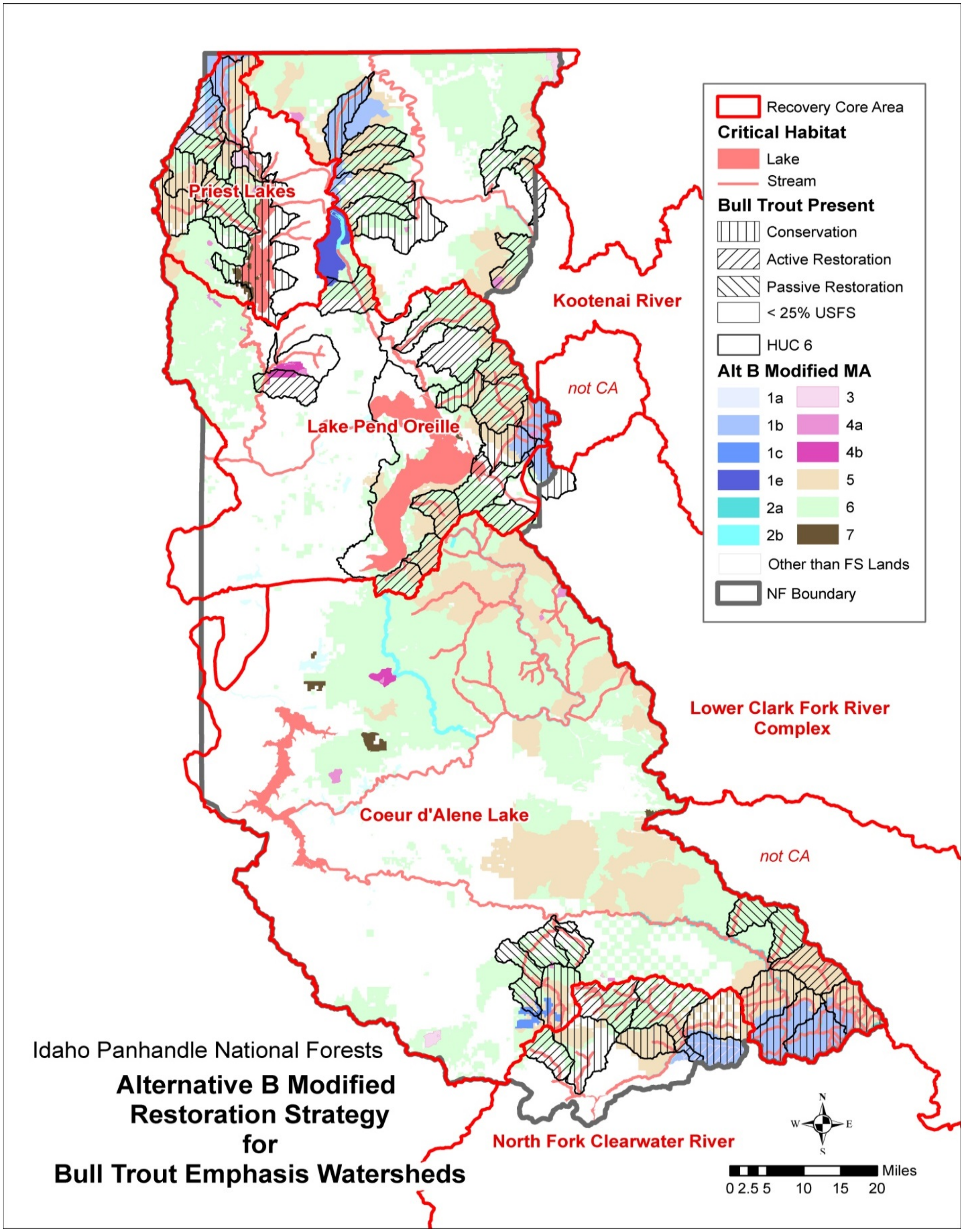

Figure IV-1. Management Area designations, bull trout critical habitat, and restoration strategies for bull trout watersheds under the proposed action.

B. STATUS OF THE SPECIES

1. Listing History

The coterminous United States population of the bull trout (*Salvelinus confluentus*) 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 and in the Jarbidge River in Nevada, north to various coastal rivers of Washington to the Puget Sound and east throughout major rivers within the Columbia River Basin to the St. Mary-Belly River, east of the Continental Divide in northwestern Montana (Cavender 1978; pp. 165-166, Bond 1992; p. 4, Brewin and Brewin 1997, pp. 209-216; Leary and Allendorf 1997, pp. 715-720).

Throughout its range, the bull trout is threatened by the combined effects of habitat degradation, fragmentation and alterations associated with: dewatering, road construction and maintenance, mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment (a process by which aquatic organisms are pulled through a diversion or other device) into diversion channels; and introduced non-native species (64 FR 58910).

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

2. Current Status and Conservation Needs

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

The proposed action occurs only in the Columbia River interim recovery unit; therefore, this chapter of the biological opinion will focus exclusively on that unit. A summary of the current status and conservation needs in the Columbia River unit is presented below. A comprehensive discussion of the current status and conservation needs of the bull trout within all five interim recovery units is found in the Service's draft recovery plan for the bull trout (USFWS 2002).

Generally, the conservation needs of the bull trout are often generally expressed as the need to provide the four “C’s”: cold, clean, complex, and connected habitat. Cold stream temperatures, clean water quality that is relatively free of sediment and contaminants, complex channel characteristics (including abundant large wood and undercut banks), and large patches of such habitat that are well connected by unobstructed migratory pathways are all needed to promote conservation of bull trout at multiple scales ranging from the coterminus to local populations. The recovery planning process for the bull trout (USFWS 2002, p. V) has also identified the following conservation needs for the bull trout: (1) maintain and restore multiple, interconnected populations in diverse habitats across the range of each interim recovery unit; (2) preserve the diversity of life-history strategies; (3) maintaining genetic and phenotypic diversity across the range of each interim recovery unit; and (4) establish a positive population trend. Recently, it has also been recognized that bull trout populations need to be protected from catastrophic fires across the range of each interim recovery unit.

Central to the survival and recovery of the bull trout is the maintenance of viable core areas (USFWS 2002, pp. 5-6). 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 in their use of spawning habitat. Each of the interim recovery units listed above consists of one or more core areas. Approximately 118 core areas are recognized across the United States range of bull trout (USFWS 2002).

The Columbia River interim recovery unit currently contains about 90 core areas and 500 local populations. About 62 percent of these core areas and local populations occur in central Idaho and northwestern Montana. The condition of the bull trout within these core areas varies from poor to good but generally all have been subject to the combined effects of habitat degradation, fragmentation and alterations associated with one or more of the following activities: dewatering; road construction and maintenance; mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment into diversion channels; and introduced non-native species. The Draft Bull Trout Recovery Plan (USFWS 2002, p. 2) identifies the following conservation needs for this unit: maintain or expand the current distribution of the bull trout within core areas; maintain stable or increasing trends in bull trout abundance; maintain/restore suitable habitat conditions for all bull trout life history stages and strategies; and conserve genetic diversity and provide opportunities for genetic exchange.

3. Life History

Bull trout exhibit both resident and migratory life history strategies. Both resident and migratory forms may be found together, and either form may produce offspring exhibiting either resident or migratory behavior (Rieman and McIntyre 1993, p. 2). Resident bull trout complete their entire life cycle in the tributary (or nearby) streams in which they spawn and rear. The resident form tends to be smaller than the migratory form at maturity and also produces fewer eggs (Fraley and Shepard 1989, p. 138; Goetz 1989, p. 17, 22). Migratory bull trout spawn in tributary streams where juvenile fish rear 1 to 4 years before migrating to either a lake (adfluvial form), river (fluvial form) (Fraley and Shepard 1989, p. 139; Goetz 1989, pp. 15-16), or saltwater (anadromous) to rear as subadults or to live as adults (Cavender 1978; McPhail and Baxter 1996). Bull trout normally reach sexual maturity in 4 to 7 years and may live longer than 12 years. They are iteroparous (they spawn more than once in a lifetime), and both repeat- and alternate-year spawning has been reported, although repeat-spawning frequency and post-spawning mortality are not well documented (Leathe and Graham 1982, p. 95; Fraley and Shepard 1989, p. 135; Pratt 1992, p. 8; Rieman and McIntyre 1996, p. 133).

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.

Growth varies depending upon life-history strategy. Resident adults range from 6 to 12 inches total length, and migratory adults commonly reach 24 inches or more (Pratt 1985, p. 33; Goetz 1989, p. 15, 17-18). The largest verified bull trout is a 32-pound specimen caught in Lake Pend Oreille, Idaho, in 1949 (Simpson and Wallace 1982, p. 95).

Habitat Characteristics

Bull trout have more specific habitat requirements than most other salmonids (Rieman and McIntyre 1993, p. 4). Habitat components that influence bull trout distribution and abundance include water temperature, cover, channel form and stability, valley form, spawning and rearing substrate, and migratory corridors (Fraley and Shepard 1989, p. 137; Goetz 1989, pp. 23, 25; Hoelscher and Bjornn 1989; Sedell and Everest 1991; Pratt 1992, p. 6; Rieman and McIntyre 1993, pp. 5-6, 1995; Rich 1996; Watson and Hillman 1997). Watson and Hillman (1997, p. 248) concluded that watersheds must have specific physical characteristics to provide the habitat requirements necessary for bull trout to successfully spawn and rear and that these specific characteristics are not necessarily present throughout these watersheds. Because bull trout exhibit a patchy distribution, even in pristine habitats (Rieman and McIntyre 1993, p. 7), fish should not be expected to simultaneously occupy all available habitats (Rieman et al. 1997, p. 1115).

Migratory corridors link seasonal habitats for all bull trout life histories. The ability to migrate is important to the persistence of bull trout (Rieman and McIntyre 1993, pp. 2, 4; Gilpin 1997; Rieman et al. 1997, pp. 1121-1122). Migrations facilitate gene flow among local populations when individuals from different local populations interbreed, or stray, to nonnatal streams. Local populations that are extirpated by catastrophic events may also become reestablished by bull trout migrants.

Cold water temperatures play an important role in determining bull trout habitat, as these fish are primarily found in colder streams (below 59 degrees Fahrenheit), and spawning habitats are generally characterized by temperatures that drop below 48 degrees Fahrenheit in the fall (Fraley and Shepard 1989, p. 133; Pratt 1992, p. 7; Rieman and McIntyre 1993, pp. 2, 7).

Thermal requirements for bull trout appear to differ at different life stages. Spawning areas are often associated with cold-water springs, groundwater infiltration, and the coldest streams in a given watershed (Pratt 1992, p. 6; Rieman and McIntyre 1993, p. 7; Baxter and McPhail 1997; Rieman et al. 1997, p. 1117). Optimum incubation temperatures for bull trout eggs range from 35 to 39 degrees Fahrenheit whereas optimum water temperatures for rearing range from about

46 to 50 degrees Fahrenheit McPhail and Murray 1979, p. 53, 102; Goetz 1989, p. 22, 24; Buchanan and Gregory 1997, p. 122). In Granite Creek, Idaho, Bonneau and Scarnecchia (1996) observed that juvenile bull trout selected the coldest water available in a plunge pool, 46 to 48 degrees Fahrenheit, within a temperature gradient of 46 to 60 degrees Fahrenheit. In a landscape study relating bull trout distribution to maximum water temperatures, Dunham et al. (2003a, p. 900) found that the probability of juvenile bull trout occurrence does not become high (i.e., greater than 0.75) until maximum temperatures decline to 52 to 54 degrees Fahrenheit.

Although bull trout are found primarily in cold streams, occasionally these fish are found in larger, warmer river systems throughout the Columbia River basin ((Fraley and Shepard 1989, pp. 135-137; Rieman and McIntyre 1993, p. 2, 1995; Buchanan and Gregory 1997, pp. 121-122; Rieman et al. 1997, p. 1114). Factors that can influence bull trout ability to survive in warmer rivers include availability and proximity of cold water patches and food productivity (Myrick et al. 2002). In Nevada, adult bull trout have been collected at 63 degrees Fahrenheit in the West Fork of the Jarbidge River (S. Werdon, USFWS, pers. comm. 1998) and have been observed in Dave Creek where maximum daily water temperatures were 62.8 to 63.6 degrees Fahrenheit. In the Little Lost River, Idaho, bull trout have been collected in water having temperatures up to 68 degrees Fahrenheit; however, bull trout made up less than 50 percent of all salmonids when maximum summer water temperature exceeded 59 degrees Fahrenheit and less than 10 of all salmonids when temperature exceeded 63 degrees Fahrenheit (Gamett 1999).

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools (Fraley and Shepard 1989, pp. 137-138; Goetz 1989, pp. 22-25; Hoelscher and Bjornn 1989; Sedell and Everest 1991; 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). Maintaining bull trout habitat requires stability of stream channels and maintenance of natural flow patterns (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). These areas are sensitive to activities that directly or indirectly affect stream channel stability and alter natural flow patterns. For example, altered stream flow in the fall may disrupt bull trout during the spawning period, and channel instability may decrease survival of eggs and young juveniles in the gravel from winter through spring (Fraley and Shepard 1989, p. 141; Pratt 1992, p. 6; Pratt and Huston 1993, pp. 73, 90). Pratt (1992, p. 6) indicated that increases in fine sediment reduce egg survival and emergence.

Bull trout typically spawn from August to November during periods of decreasing water temperatures. Preferred spawning habitat consists of low-gradient stream reaches with loose, clean gravel (Fraley and Shepard 1989, p. 133, 137). Redds are often constructed in stream reaches fed by springs or near other sources of cold groundwater (Goetz 1989, p. 19; Pratt 1992, p. 7; Rieman and McIntyre 1996). 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 of fry may surpass 200 days. Fry normally emerge from early April through May, depending on water temperatures and increasing stream flows (Pratt 1992, p. 1).

Migratory forms of the bull trout appear to develop when habitat conditions allow movement between spawning and rearing streams and larger rivers or lakes where foraging opportunities may be enhanced (Frissell 1993). For example, multiple life history forms (e.g., resident and fluvial) and multiple migration patterns have been noted in the Grande Ronde River (Baxter

2002, p. 142). Parts of this river system have retained habitat conditions that allow free movement between spawning and rearing areas and the mainstem Snake River. Such multiple life history strategies help to maintain the stability and persistence of bull trout populations to environmental changes. Benefits to migratory bull trout include greater growth in the more productive waters of larger streams and lakes, greater fecundity resulting in increased reproductive potential, and dispersing the population across space and time so that spawning streams may be recolonized should local populations suffer a catastrophic loss (Rieman and McIntyre 1993, pp. 2, 15; MBTSG 1998; Frissell 1993). In the absence of the migratory bull trout life form, isolated populations cannot be replenished when disturbance makes local habitats temporarily unsuitable, the range of the species is diminished, and the potential for enhanced reproductive capabilities are lost (Rieman and McIntyre 1993, p. 15).

Bull trout are opportunistic feeders, with food habits primarily a function of size and life-history strategy. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macrozooplankton, and small fish (Boag 1987, p. 58; Goetz 1989, pp. 33-34; Donald and Alger 1993, pp. 239-243). Adult migratory bull trout feed on various fish species (Leathe and Graham 1982; Fraley and Shepard 1989, p. 135; Brown 1994; Donald and Alger 1993, p. 242).

Population Dynamics

The draft bull trout Recovery Plan (USFWS 2002, 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 2002, 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). 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 (Rieman et al. 1997).

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).

4. Bull Trout Status and Distribution

Current and Historic Distribution

Bull trout are found throughout the northwestern United States and in British Columbia and Alberta in western Canada (Rieman and McIntyre 1993, p. 1). Within Montana and Alberta, Canada bull trout also exist in the headwaters of the South Saskatchewan River basin and further north in drainages along the east side of the Continental Divide. In the Klamath River basin, only isolated, resident bull trout are found in higher elevation headwater streams of the Upper Klamath Lake, Sprague River, and Sycan River watersheds (Goetz 1989, p. 15; Light et al. 1996). In the state of Washington, bull trout are found in coastal drainages of the Olympic Peninsula and in streams surrounding Puget Sound (67 FR 71236). In Montana, bull trout occur in the headwaters of the Columbia River basin in the Clark Fork and the Kootenai subbasins.

The historic range of bull trout was restricted to North America (Cavender 1978, pp. 165-169; Haas and McPhail 1991). Bull trout were historically recorded from the McCloud River in northern California, the Klamath River basin in Oregon and throughout the Columbia River basin in much of interior Oregon, Washington, Idaho, northern Nevada, and western Montana. They also occurred in coastal and interior Canada in much of British Columbia, with populations extending along the east slopes of the Rockies in Alberta and including a small area in northern Montana (Rieman et al. 1997, p. 1113).

Bull trout distribution has probably contracted and expanded periodically with natural climate change (Williams et al. 1997, p. 289). Genetic variation (presence of unique alleles) suggests an extended and evolutionarily important isolation between populations in the Klamath basin and those in the Columbia River basin (Leary et al. 1993). Populations within the Columbia River basin are more closely allied and are thought to have expanded from at least two common glacial refugias in recent geologic time (Williams et al. 1997, pp. 289-290; Haas and McPhail 2001; Whitesel et al. 2004, p. 39).

Despite bull trout occurring widely across a major portion of the historic potential range, many areas support only remnant populations of bull trout. Bull trout were reported present in 36 percent and unknown or unclassified in 28 percent of the subwatersheds within the potential historic range. Strong populations were estimated to occur in only 6 percent of the potential historic range (Rieman et al. 1997, p. 1119). Bull trout are now extirpated in California and only remnant populations are found in portions of Oregon (Ratliff and Howell 1992, pp. 10-16). A small population still exists in the headwaters of the Jarbidge River, Nevada, which represents the present southern limit of the species' range.

Though bull trout may move throughout entire river basins seasonally, spawning and juvenile rearing appear to be restricted to the coldest streams or stream reaches. The downstream limits of habitat used by bull trout are strongly associated with gradients in elevation, longitude, and latitude, which likely approximate a gradient in climate across the basin (Goetz 1994). The patterns indicate that spatial and temporal variation in climate may strongly influence habitat occupancy by bull trout. While temperatures are probably suitable throughout much of the northern and mountainous portions of the range, predicted spawning and rearing habitat are restricted to increasingly isolated high elevation or headwater "islands" toward the south (Goetz 1994; Rieman and McIntyre 1995, p. 286).

Status of Bull Trout in the Columbia River Basin

Rangewide, local populations of bull trout within their respective core areas are often isolated and remnant. Migratory life histories have been lost or limited throughout major portions of the range (Ratliff and Howell 1992, p. 16; Pratt and Huston 1993, pp. 13, 88; Rieman and McIntyre 1993, p. 2, 1995; Goetz 1994; Jakober et al. 1998; MBTSG 1998; USFWS 2002, 2005a,b) and fluvial bull trout populations in portions of the upper Columbia River basin appear to be nearly extirpated (USFWS 2002, 2005a).

At this time, the Service recognizes 118 bull trout core areas rangewide in Idaho, Montana, Oregon, Nevada and Washington (USFWS 2002). This represents a partial consolidation of some of the 188 subpopulations originally described in the various bull trout listing documents (64 FR 58910), and is based on the use of more consistent and updated terminology as well as specific information regarding connectivity and consolidation between some populations previously considered autonomous. For example, radio telemetry information from some recent studies has been particularly useful in further describing the movements of bull trout. Core areas were previously defined as approximating interacting biological units for bull trout. Hence, as more information is obtained and recovery proceeds, we would anticipate the number of core areas and the boundaries that describe them will continue to be somewhat fluid.

Within the Columbia River basin, a total of 95 core areas are described (USFWS 2002). Generally, where status is known and population data exists, bull trout populations throughout the Columbia River basin are at best stable and more often declining (Thomas 1992; Schill 1992; Pratt and Huston 1993, pp. 88-89; USFWS 2005a,b). Bull trout in the Columbia basin have been estimated to occupy about 45 percent of their historic range (Quigley and Arbelbide 1997).

Many of the bull trout core areas occur as isolated watersheds in headwater tributaries, or in tributaries where the migratory corridors have been lost or restricted. Few bull trout core areas are considered strong in terms of relative abundance and core area stability (63 FR 31647, USFWS 2005a, b). Strong core areas are generally associated with large areas of contiguous habitat.

Status of Bull Trout in the Clark Fork Management Unit

Within the Clark Fork management unit of western Montana and northern Idaho, the Draft Bull Trout Recovery Plan describes 38 bull trout core areas (now 35 core areas, memorandum to the Acting Regional Director, Ecological Services, Region 1, Portland, OR, from Field Supervisor, Montana Ecological Services, Helena, MT., July 14, 2006) and at least 152 local populations (USFWS 2002).

The Clark Fork River Management Unit is among the largest and most diverse across the species range and contains the highest number of core areas of any management unit, due in large part to the preponderance of isolated headwater lakes in the system. In the Clark Fork River Management Unit (USFWS 2002), which includes all of the Clark Fork River Basin from Albeni Falls Dam (outlet of Lake Pend Oreille) upstream to Montana headwaters, the Service described 35 core areas for bull trout. Bull trout within the larger and more diverse core areas are typically characterized by having relatively small amounts of genetic diversity within a local population but high levels of divergence between them (Spruell et al. 1999, Kanda and Allendorf 2001, Neraas and Spruell 2001, pp. 1156-1157). At the lowest rung in the hierarchical organizational level, the Draft Bull Trout Recovery Plan (USFWS 2002) describes groups of bull trout that spawn together in tributaries as local populations. There are 152 local populations of bull trout currently described in the Clark Fork River Management Unit (USFWS 2002).

The Service considers many of the core areas in the Clark Fork River drainage to be at risk of extirpation due in part to natural isolation, single life-history form, and low abundance. Expansion of nonnative species including lake trout into headwater lakes is the single largest human-caused threat in most of the 25 primarily adfluvial core areas (Fredenberg 2008, pp. 2, 6); dams and degraded habitat have contributed to bull trout declines across this Management Unit.

Protect, restore and maintain suitable habitat conditions within the Clark Fork River Management Unit are a high priority identified in the draft Recovery Plan (USFWS 2002). Apart from migration impacts from the major dams, threats in the Clark Fork River Management Unit include, in order of importance, non-native species, water withdrawals, angling and poaching, forestry practices and legacy mining impacts (Fredenberg 2008, p. 6). Maintaining and improving habitat condition on federal lands is crucial for the recovery of the species.

Status of Bull Trout in the Kootenai River Management Unit

The Kootenai River Management Unit forms part of the range of the Columbia River population segment. The Kootenai River Management Unit is unique in its international configuration, and recovery will require strong international cooperative efforts. Within the Kootenai River Management Unit, the historic distribution of bull trout is relatively intact. Abundance of bull trout in portions of the watershed has been reduced, and remaining populations are fragmented. The Kootenai River Management Unit includes 4 core areas (Lake Koocanusa, Kootenay Lake and River, Sophie Lake, Bull Lake) and 10 local populations.

The greatest threats to bull trout in this Management Unit, in order of magnitude, are non-native species, forestry, water withdrawals, angling and poaching, migration barriers, residential development, and mining (Fredenberg 2008, p. 2). Distribution of bull trout has changed little since listing as bull trout continue to be present in nearly all major watersheds where they likely occurred historically.

Status of Bull Trout in the Coeur d'Alene Lake Basin Management Unit

The Coeur d'Alene Lake Basin Management Unit encompasses Coeur d'Alene Lake and the Coeur d'Alene and St. Joe Rivers, containing one core area. The status and trend of bull trout in this core area was considered "depressed" and "decreasing" based on information available at the time of listing (63 FR 31647).

Analyses of long-term trend data for three index streams indicates that the population is still depressed but likely stable or slightly increasing. During recovery planning, the recovery unit team for this area determined that bull trout are at an increasing risk as adult abundance and number of local populations are well below that which is necessary to inbreeding depression and losses from stochastic events (USFWS 2002).

Status of Bull Trout in the Clearwater River Management Unit

The Clearwater River Management Unit includes the entire Clearwater River basin upstream from the confluence with the Snake River. Bull trout are distributed throughout most of the large rivers and associated tributary systems within the Clearwater River Management Unit, and they exhibit adfluvial, fluvial and resident life history patterns. There are 7 core areas, with a total of 45 local populations and 27 potential local populations. Data to estimate bull trout abundance for the entire management unit are lacking and the distribution and abundance is likely underestimated, with some spawning locations as yet unknown (USFWS 2002).

Five-year Bull Trout Status Review

In 2005, the Service assessed the conservation status of bull trout and the vulnerability for each of 121 bull trout core areas (now 118 core areas; USFWS 2008, p. 1). We reviewed the Bull Trout Core Area Conservation Assessment and concluded that the original threats to bull trout still existed for the most part in all core areas, but no substantial new and widespread threats were discovered during this review or in the review of previous biological opinions on bull trout. This finding indicates the baseline conditions overall rangewide had not changed substantially in the last five years and that the trend and magnitude of the rangewide population had not worsened nor did it improve measurably.

The risk assessment or ranking portion of the status review was modeled to assess the relative status of each of the 118 core areas. The model used to rank the relative risk to bull trout was based on the Natural Heritage Programs' NatureServe Conservation Status Assessment Criteria, which had been applied in previous assessments of fish status, including bull trout (Master et al. 2003; MNHP and MFWP 2004). The model integrated four factors: population abundance, distribution, population trend, and threats. For a complete understanding of the ranking process, a more thorough review of the report which describes the model and the output is required (USFWS 2005b).

In the Clark Fork River Management Unit the status assessment denoted 16 of 35 core areas at "high risk" of extirpation because of rapidly declining numbers and/or substantial imminent threats. Ten core areas were found to be "at risk" with moderate imminent or substantial non-imminent threats, and nine core areas were designated as a "potential risk" for extirpation primarily due to uncertainty regarding short-term population trends.

For the Kootenai River Management Unit the status assessment indicated that two of the four core areas (Kootenai River and Bull Lake) are considered to be at "at risk" because of very limited and/or declining numbers, range, and/or habitat, making the bull trout in this core area vulnerable to extirpation. The Lake Koocanusa core area is considered to be at "low risk" because bull trout are common or uncommon, but not rare, and usually widespread through the core area. The Sophie Lake core area is considered to be at "high risk" because of extremely limited and/or rapidly declining numbers, range, and/or habitat, making the bull trout in this core area highly vulnerable to extirpation.

All of the Coeur d'Alene Lake Basin Management Unit (one core area) is considered at "high risk" because of low populations and cumulative threats from non-native species, residential development, past mining, inundation by Post Falls Dam, past forest management practices, livestock grazing, agricultural practices, and transportation networks.

In the Clearwater River Management Unit, the Fish Lake (N. Fk. Clearwater R.) core area is considered at "high risk" because of low and declining numbers, five core areas, including the North Fork Clearwater River, are considered "at risk," and the Selway River core area is "potential risk." Population abundance and trends in much of this management unit are not well known (USFWS 2008, p. 34).

5. Status of Designated Critical Habitat

Legal Status

The Service published a final critical habitat designation for the coterminous United States population of bull trout 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 the Service's website (http://www.fws.gov/pacific/bulltrout). The scope of the designation involved the species' coterminous range, which includes the Jarbidge River, Klamath River, Columbia River, Coastal-Puget Sound, and Saint Mary-Belly River population segments (also considered as interim recovery units)[2]. Designated bull trout critical habitat is of two primary use types: 1) spawning and rearing (SR), and 2) foraging, migration, and overwintering (FMO) and includes both reservoirs/lakes and stream/shoreline miles.

The 2010 revision 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 compared to the 2005 designation. For the Columbia River Basin 16,915.9 miles of stream and 427,044 acres of reservoirs/lakes were designated as critical habitat.

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[2]The Service's 5-year review (USFWS 2008) 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 ESA Section 7 jeopardy analysis and recovery. The adverse modification analysis does not rely on recovery units.

This rule also identifies and designates as critical habitat approximately 822.5 miles of streams/shorelines and 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 main stem 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.

Conservation Role and Description of Critical Habitat

The conservation role of bull trout critical habitat is to support viable core area populations (75 FR 63898:63943 [October 18, 2010]). 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. Critical habitat units (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.

Thirty-two CHUs within the geographical area occupied by the species at the time of listing are designated under the revised 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 biological features associated with primary constituent elements (PCEs) 5 and 6 (described below), which relate to breeding habitat.

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 pp. 19-23); 2) provide for persistence of strong local populations, in part, by providing habitat conditions that encourage movement of migratory fish (MBTSG 1998; Rieman and McIntyre 1993 pp. 19-23); 3) are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations (Hard 1995; Healey and Prince 1995; MBTSG 1998; Rieman and McIntyre 1993 pp. 19-23); and 4) are distributed throughout the historic range of the species to preserve both genetic and phenotypic adaptations (Hard 1995; MBTSG 1998; Rieman and Allendorf 2001, pp. 762-763; Rieman and McIntyre 1993 pp. 19-23).

Primary Constituent Elements for Bull Trout

Within the designated critical habitat areas, the PCEs for bull trout are those habitat components that are essential for the primary biological needs of foraging, reproducing, rearing of young, dispersal, genetic exchange, or sheltering. Based on our current knowledge of the life history, biology, and ecology of this species and the characteristics of the habitat necessary to sustain its essential life-history functions, we have determined that the following PCEs are essential for the conservation of bull trout and may require special management considerations or protection:

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 °C to 15 °C (36 °F 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 departure 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 non-native 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.

The revised PCE's listed above are similar to those previously in effect under the 2005 designation. The most significant modification is the addition of a ninth PCE to address the presence of nonnative predatory or competitive fish species. Although this PCE applies to both the freshwater and marine environments, currently non-native fish species present no concern in the marine environment, though this could change in the future.

Note that only PCEs 2, 3, 4, 5, and 8 apply to marine nearshore waters identified as critical habitat. Also, lakes and reservoirs within the CHUs also contain most of the physical or biological features necessary to support bull trout, with the exception of those associated with PCEs 1 and 6. Additionally, all except PCE 6 apply to FMO habitat designated as critical habitat.

Critical habitat includes the stream channels within the designated stream reaches and has a lateral extent as defined by the bankfull elevation on one bank to the bankfull elevation on the opposite bank. Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain and is reached at a discharge that generally has a recurrence interval of 1 to 2 years on the annual flood series. If bankfull elevation is not evident on either bank, the ordinary high-water line must be used to determine the lateral extent of critical habitat. The lateral extent of designated lakes is defined by the perimeter of the waterbody as mapped on standard 1:24,000 scale topographic maps. The Service assumes in many cases this is the full-pool level of the waterbody. In areas where only one side of the waterbody is designated (where only one side is excluded), the mid-line of the waterbody represents the lateral extent of critical habitat.

Adverse Effects on Critical Habitat

Activities that cause adverse effects to critical habitat are evaluated to determine if they are likely to "destroy or adversely modify" critical habitat by no longer serving the intended conservation role for the species or retaining those PCEs that relate to the ability of the area to at least periodically support the species. The Service's evaluation must be conducted at the scale of the entire critical habitat area designated, unless otherwise stated in the final critical habitat rule (USFWS and NMFS 1998). Thus, adverse modification of bull trout critical habitat is evaluated at the scale of the final designation, which includes the critical habitat designated for the Klamath River, Jarbidge River, Columbia River, Coastal-Puget Sound, and Saint Mary-Belly River population segments. However, we consider all 32 CHUs to contain features or areas essential to the conservation of the bull trout (75 FR 63898:63901, 63944). Therefore, if a proposed action would alter the physical or biological features of critical habitat to an extent that appreciably reduces the conservation function of one or more critical habitat units for bull trout, a finding of adverse modification of the entire designated critical habitat area may be warranted (75 FR 63898:63943).

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 (USFWS 2002). This condition reflects the condition of bull trout habitat. The decline of bull trout is primarily due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, impoundments, dams, water diversions, and the introduction of nonnative species (63 FR 31647, 64 FR 17112).

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:

- 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, pp. 643, 646; Rieman and McIntyre 1993, p. 8);

- 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);
- the introduction and spread of nonnative fish species, particularly brook trout and lake trout, as a result of fish stocking and degraded habitat conditions, which compete with bull trout for limited resources and, in the case of brook trout, hybridize with bull trout (Leary et al. 1993; Rieman et al. 2006, p. 73);
- 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; and
- degradation of FMO habitat resulting from reduced prey base, roads, agriculture, development, and dams.

6. Climate Change

This section summarizes anticipated changes in regional and local climatic and hydrologic trends as they relate to aquatic species as described in the KIPZ Climate Change Report (USFS 2010). The effects of climate change on bull trout and bull trout critical habitat are also discussed.

Future Regional and Local Climatic and Hydrologic Trends

Over the last 50 years, average spring snowpack (April 1 snow water equivalent) has declined and average snowmelt runoff is occurring earlier in the spring. These trends are observed for northwestern Montana, the entire Pacific Northwest, and much of the western U.S. Since the available data is limited to the last 50 years, it is not clear whether these trends are persistent long-term trends or reflect short-term decade-to-decade variability that may reverse in coming years. Several recent studies of the same trends across the entire western U.S. have concluded that natural variability explains some, but not all, of the west-wide trend in decreasing spring snowpack and earlier snowmelt runoff.

Potential changes in streamflow and rising stream temperatures are likely to increase risks to maintaining existing populations of native cold-water aquatic species. Over the last century, most native fish and amphibians have declined in abundance and distribution throughout the western U.S., including northern Idaho. It is unknown whether, or to what degree, these changes are attributable to climate trends. Potential climate-induced trends of altered streamflow timing, lower summer flows, and increased water temperature will likely reduce the amount, quality, and distribution of habitat suitable for native trout, and contribute to fragmentation of existing populations. Climate related impacts are likely to add cumulatively to other stressors on native fish and amphibian species. Non-native trout and other aquatic species better adapted to warm water temperatures may increase in abundance and expand their existing ranges.

These climatic and hydrologic trends, combined with climate-related trends in wildfires and forest mortality from insects and diseases, can significantly affect aquatic ecosystems and species (Dunham et al. 2003b, pp. 20-24; Casola et al. 2005; Dunham et al. 2007; Isaak et al. 2010, p. 1350). A growing body of literature has linked these hydrologic trends with impacts to aquatic ecosystems and species in western North America, often as a result of climate-related factors affecting stream temperatures and the distribution of thermally suitable habitat (Peterson and Kitchell 2001; Morrison et al. 2002; Bartholow 2005; Kaushal et al. 2010; Isaak et al. 2010, p. 1350). Lower summer streamflows and higher air temperatures, as observed over recent decades in northwestern Montana, are generally expected to result in increased stream temperatures. However, stream temperatures are controlled by a complex set of site-specific variables; including shading from riparian vegetation, wind velocity, relative humidity, geomorphic factors, groundwater inflow, and hyporheic flow (Caissie 2006).

Potential impacts to fish include:

• Egg incubation and fry emergence may be adversely affected due to flood flows, dewatering, and/or water temperatures. Shifts in the timing and magnitude of natural runoff will likely introduce new selection pressures that may cause changes in the most productive timing or areas for spawning.

• Spring/summer rearing may be adversely affected due to reduction in stream flow and higher water temperatures.

• Overwinter survival may be positively affected by higher winter water temperatures enabling fish to feed more actively, potentially increasing growth rates if sufficient food is available. If food is limited, the elevated metabolic demands could reduce winter growth and survival.

Effects of Climate Change on Bull Trout

Based on modeling, Rieman et al. (2007, pp. 1552-1553) indicated that the effects of climate change on bull trout populations in the United States are more pronounced in some regions than in others because bull trout are distributed across a broad range of environments and landforms of varied relief. Future loss of bull trout habitat due to climate warming within the interior Columbia River basin was predicted to be 18 to 92 percent of habitat areas that are currently thermally suitable and 27 to 99 percent of large (> 10,000 ha) habitat patches (Rieman et al. 2007, p. 1552). If that were to occur, bull trout would remain in only a few high-elevation strongholds, becoming functionally extinct because the populations would be too small and isolated to guarantee ample genetic flow (Rieman et al. 2007, p. 1553). Because loss and fragmentation of habitats with warming has important implications for bull trout conservation, the loss of isolated patches of habitat could affect bull trout populations at a disproportionately greater level than that predicted based only on the overall loss of habitat area (Rieman et al. 2007, p. 1559).

Bull trout is the native trout species most vulnerable to potential increases in stream temperatures because it has the coldest range of thermally suitable habitat among native salmonids in the Northern Rockies. For this species, increasing stream temperatures may cause a net loss of habitat because areas are not available further upstream to replace those that become unsuitably warm. Warmer stream temperatures may also lead to nonnative fish and other aquatic species moving into previously unsuitable upstream areas where they will compete with native species (Rieman et al. 2007, p. 1555; Rahel and Olden 2008; Fausch et al. 2009, p. 860; Haak et al. 2010)

Projected increases in air temperatures, along with projected decreases in summer stream flows, will likely lead to warmer stream temperatures in the Columbia River basin, particularly during summer low flow periods (Casola et al. 2005). Recent scientific publications suggest that projected air temperature changes are likely to reduce the distribution of thermally suitable natal habitat for bull trout, fragment existing populations, and increase risk of local extirpation (Rieman et al. 2007, p. 1552; Isaak et al. 2010, p. 1366). However, the risk of climate-induced extirpation in subbasins of northern Idaho may be less than other, relatively drier and warmer, subbasins in the Columbia River basin (Rieman et al. 2007, p. 1558).

Effects of Climate Change on Bull Trout Critical Habitat

Effects of climate change on bull trout described above, largely describes the anticipated effects on bull trout habitat. Therefore, these same trends are expected to affect critical habitat. One objective of the 2010 final rule designating bull trout critical habitat was 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 non-native fishes).

7. Analysis of the Species and Critical Habitat Likely to be Affected

The proposed action will occur in portions of the Lake Pend Oreille core area of the Clark Fork River Management Unit, the Kootenai River core area of the Kootenai River Management Unit, the Coeur d'Alene Management Unit, and the North Fork Clearwater River core area of the Clearwater River Basin Management Unit. Bull trout are the only federally listed fish species that could potentially be affected by the proposed and connected actions. Critical habitat which may be affected includes those portions of designated critical habitat within the administrative boundary of the Idaho Panhandle National Forest.

C. ENVIRONMENTAL BASELINE

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area which have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress.

1. Action Area

The section 7 implementing regulations define the "action area," which includes all areas to be affected directly or indirectly by the Federal action, not merely the immediate area involved in the action (50 CFR §402).

This biological opinion addresses the effects on bull trout related to the revision of the Forest Plan for the IPNF. Therefore, the action area is the entire Forest (3,224,739 acres). Within the Forest, bull trout occur on 1,298,824 acres encompassed in 5 bull trout core areas with 511 miles of designated critical habitat. Each core area is comprised of subwatersheds supporting discrete local populations of bull trout (Table IV-6). The Service acknowledges that forest management activities have few, if any, effects in watersheds where no bull trout or critical habitat occur and which are hydrologically disjunct from occupied watersheds.

2. Status of Bull Trout in the Action Area

The status of bull trout in the action area is described below by core area. Information on status is derived from the BA (USFS 2013), reports from the Idaho Department of Fish and Game, and the bull trout core area assessments and 5-year review (USFWS 2005a, 2005b).

Lake Pend Oreille Core Area

The following is an excerpt from IDFG (2013a, p. 112), and would include bull trout: Historical overharvest, logging, farming, residential development, roading, the construction of hydroelectric dams, and introduced non-native species have all taken a toll on the native fish populations and habitat in this core area. Hydroelectric development began with Milltown Dam in 1907 and Thompson Falls Dam in 1913, isolating much of the drainage to migratory fish from Lake Pend Oreille. Cabinet Gorge Dam was completed near the Idaho/Montana border in 1952, further reducing spawning and rearing habitat for adfluvial species. Downstream, near the Idaho/Washington border, Albeni Falls Dam was completed in 1952, profoundly altering the character of the Pend Oreille River and the lower reaches of the Clark Fork River. In addition, operations of Albeni Falls Dam have altered the seasonal variability in the level of Lake Pend Oreille.

The Lake Pend Oreille watershed is one of the largest, most complex, and best-documented bull trout core areas in the upper Columbia River drainage, encompassing 95,000-acre Lake Pend Oreille (the largest and deepest natural lake in Idaho). An extensive redd count monitoring program was devised by Idaho Fish and Game and has been in place since 1983 (IDFG 2012, p. 153). Although these redd counts are believed to fairly accurately reflect the population trend in the core area, Dunham et al. (2001, p. 343) found that redd counts can vary significantly among observers and that there can be significant spatial and temporal variability in spawning activity. Therefore, these data are viewed conservatively when analyzing overall core area population trends.

Table IV-6. Bull trout drainages on the IPNF, local population name or habitat type, priority designation, critical habitat designation, and population status.

Drainage (HUC) Subwatershed Name (HUC)	Local Population Name(s) or Habitat Type[1]	Priority Designation	Designated Critical Habitat	Population Status
Kootenai River Core Area (Critical Habitat Unit 30)				
Boulder Creek (1701010401)				
Lower Boulder (170101040102)	Boulder Creek	active restoration	mouth of Boulder (1.3 mi)	depressed
Curley Creek (170101040202)	dip-in/FMO	active restoration	none	unknown
Snow Creek (170101040405)	dip-in/FMO	active restoration	Snow Creek (0.3 mi)	unknown
Deep Creek – (aka Caribou Creek – Deep Creek) (170101040406)	dip-in/FMO	conservation	Deep Creek to Caribou	unknown
Myrtle Creek (170101040701)	dip-in/FMO	active restoration	mouth of Myrtle (3.1 mi)	unknown
Long Canyon Creek (170101040710)	Long Canyon	conservation	Long Canyon Creek	unknown
Trout Creek (170101040705)	dip-in/FMO	active restoration	Trout Creek (0.8 mi)	migratory
Ball Creek (170101040704)	dip-in/FMO	active restoration	mouth of Ball (0.8 mi)	migratory
Moyie River (1701010503)				
Skin Creek (170101050305)	dip-in/FMO	active restoration	mouth of Moyie (1.6 mi)	migratory
Lake Pend Oreille Core Area (Critical Habitat Unit 31)				
Lightning Creek (1701021312)				
Upper Lightning Creek (170102131201)	Lightning Creek	active restoration	Lightning Creek	depressed
Middle Lightning Creek (170102131202)	Lightning Creek Rattle Creek Wellington Creek Porcupine Creek	active restoration	Lightning Creek Rattle Creek mouth Wellington (0.6 mi) lower end of Porcupine Ck.	depressed stable depressed depressed
East Fork Lightning Creek (170102131203)	East Fork Creek Char Creek Savage Creek	conservation	East Fork Creek Char Creek Savage Creek	stable depressed depressed
Lower Lightning Creek (170102131204)	Lightning Creek Morris Creek	conservation	Lightning Creek Morris Creek	depressed depressed
Johnson Creek (aka Clark Fork River – Clark Fork) (170102131310)	Johnson Creek	active restoration	mouth of Johnson Ck. (0.7 mi)	stable
Pack River (1701021401)				
Upper Pack River (170102140102)	Pack River Caribou Creek *Hellroaring Creek (PLP)*	active restoration	Pack River	depressed

Drainage (HUC) **Subwatershed Name (HUC)**	**Local Population Name(s) or Habitat Type[1]**	**Priority Designation**	**Designated Critical Habitat**	**Population Status**
Middle Pack River (170102140103)	FMO	< 25% USFS	Pack River	migratory
Grouse Creek (170102140104)	Grouse Creek	active restoration	Grouse Creek	stable
Rapid Lightning Creek (170102140105)	dip-in/FMO	active restoration	none	unknown
Lower Pack River (170102140106)	FMO	< 25% USFS	Pack River	migratory
Gold Creek (170102140201)	Gold Creek	active restoration	Gold Creek to W. Gold. (1.7 mi) West Gold Creek	strong strong
North Gold Creek (170102140202)	North Gold Creek	active restoration	mouth of N. Gold Ck. (1.3 mi)	depressed
Granite Creek (170102140203)	Granite Creek	active restoration	Granite Creek	stable
Trestle Creek (170102140204)	Trestle Creek	conservation	Trestle Creek	strong
Blue Creek (shared with KNF) (170102131307)	dip-in/FMO	conservation	none	depressed
Strong Creek (aka Lake Pend Oreille) (170102140206)	Strong Creek	< 25% USFS	Strong Creek	depressed
Lower Priest River (1701021507)				
Binarch Creek – Priest River (170102150701)	FMO	active restoration	Priest River	migratory corridor
Murray Creek – Priest River (170102150702)	FMO	conservation	Priest River	migratory corridor
Big Creek – Priest River (170102150703)	dip-in/FMO	active restoration	Priest River	unknown
Quartz Creek – Priest River (170102150704)	FMO	conservation	Priest River	migratory corridor
Middle Fork East River (170102150502)	Middle Fork East River	< 25% USFS	Middle Fork East River Uleda Creek Keokee Creek North Fork East River	depressed depressed depressed depressed
Twin Creek (170102131308)	dip-in/FMO	active restoration	none	depressed
Priest Lakes Core Area (Critical Habitat Unit 31)				
Upper Priest River (1701021501)				
Upper Priest Falls (170102150101)	Upper Priest River	conservation	Upper Priest River	depressed
Gold Creek (170102150102)	Gold Creek	active restoration	lower Gold Creek	depressed
Headwaters Hughes Fork (170102150103)	Hughes Fork *Bench Creek (PLP)* *Jackson Creek (PLP)*	active restoration	Hughes Fork lower Bench Creek lower Jackson Creek	depressed depressed depressed
Boulder Creek – Hughes Fork (170102150104)	Hughes Fork	conservation	Hughes Fork	depressed

Drainage (HUC) Subwatershed Name (HUC)	**Local Population Name(s) or Habitat Type[1]**	**Priority Designation**	**Designated Critical Habitat**	**Population Status**
Ruby Creek (170102150105)	Upper Priest River *Cedar Creek (PLP)* *Rock Creek (PLP)* *Lime Creek (PLP)* *Malcolm Creek (PLP)*	conservation	Upper Priest River Cedar Creek lower Rock Creek lower Lime Creek Malcom Creek to falls	depressed depressed depressed depressed depressed
Upper Priest Lake (170102150108)	FMO	conservation	Priest Lake The Thorofare	migratory migratory
Granite Creek (1701021502)				
South Fork Granite Creek (170102150201)	*South Fork Granite (PLP)*	conservation	South Fork Granite Creek	depressed
North Fork Granite Creek (170102150202)	North Fork Granite Creek	conservation	North Fork Granite Creek	depressed
Blacktail Creek (170102150203)	FMO	active restoration	Granite Creek	migratory
Reeder Creek (170102150303)	Reeder Creek	conservation	none	depressed
Priest Lake (170102150309)	FMO	conservation	Priest Lake	migratory
Coeur d'Alene Lake Core Area (Critical Habitat Unit 29)				
Upper North Fork Coeur d'Alene River (170103010101)	*NF CdA River (PLP)* *Spruce Creek (PLP)* *Buckskin Creek (PLP)* *Mosquito Creek (PLP)*	passive restoration	North Fork CdA River Spruce Creek Buckskin Creek Mosquito Creek	unoccupied[3] unoccupied[3] unoccupied[3] unoccupied[3]
Tepee Creek (1701030102)				
Upper Tepee Creek (170103010201)	*Tepee Creek (PLP)* *Big Elk Creek (PLP)*	passive restoration	Tepee Creek Big Elk Creek	unoccupied[3] unoccupied[3]
Independence Creek (170103010203)	FMO *Independence Ck (PLP)*	conservation	Independence Creek	unoccupied[3]
Lower Tepee Creek (170103010204)	FMO	conservation	Tepee Creek	unoccupied[3]
Shoshone Creek (1701030103)				
Upper Shoshone Creek (170103010301)	*Shoshone Creek (PLP)* *Falls Creek (PLP)* *Sentinel Creek (PLP)* *Little Lost Fork (PLP)* *Ulm Creek (PLP)*	passive restoration	Shoshone Creek Falls Creek Sentinel Creek Little Lost Fork Ulm Creek	unoccupied[3] unoccupied[3] unoccupied[3] unoccupied[3] unoccupied[3]
Lower Shoshone Creek (170103010302)	FMO	passive restoration	Shoshone Creek	unoccupied[3]

Drainage (HUC) Subwatershed Name (HUC)	**Local Population Name(s) or Habitat Type[1]**	**Priority Designation**	**Designated Critical Habitat**	**Population Status**
Yellow Dog Creek (170103010403)	*Yellow Dog Creek (PLP)* *Downey Creek (PLP)* *EF Downey Creek (PLP)* *WF DowneyCreek (PLP)* *North Grizzly Creek (PLP)*	passive restoration	Yellow Dog Creek Downey Creek EF Downey Creek WF Downey Creek North Grizzly Creek North Fork CdA River	unoccupied[3] unoccupied[3] unoccupied[3] unoccupied[3] unoccupied[3] unoccupied[3]
Prichard Creek (1701030105)				
Eagle Creek (170103010501)	FMO *WF Eagle Creek (PLP)*	passive restoration	Eagle Creek West Fork Eagle Creek	unoccupied[3] unoccupied[3]
Butte Gulch – Prichard Creek (170103010502)	FMO	passive restoration	Prichard Creek	unoccupied[3]
Cougar Gulch (170103010704)	*Cougar Creek (PLP)*	passive restoration	Cougar Gulch	unoccupied[3]
Steamboat Creek (170103010703)	*Steamboat Creek (PLP)* *EF Steamboat Ck (PLP)* *WF Steamboat Ck (PLP)*	passive restoration	Steamboat Creek EF Steamboat Creek WF Steamboat Creek	unoccupied[3] unoccupied[3] unoccupied[3]
Headwaters St. Joe River (1701030401)				
Sherlock Creek (170103040101)	St. Joe River Heller Creek Medicine Creek Wisdom Creek *Sherlock Creek (PLP)* *Cascade Creek (PLP)* *Bluebells Ck (dip-in FMO)* *California Creek (PLP)* *Yankee Creek*	conservation	St Joe River Heller Creek Medicine Creek Wisdom Creek Sherlock Creek lower Cascade Creek Lower Bluebells Creek California Creek Yankee Creek	depressed depressed depressed depressed depressed depressed depressed depressed depressed
Bacon Creek (170103040102)	Bean Creek complex (Bean, North Fork Bean, Tinear, and Mill creeks)	conservation	St Joe River Bean Creek North Fork Bean Creek Tinear Creek Mill Creek	depressed depressed depressed depressed depressed
Timber Creek (170103040103)	*Timber Creek (PLP)* *Ruby Creek (PLP)* *My Creek (PLP)* *Red Ives Creek (PLP)*	conservation	St Joe River Ruby Creek Timber Creek My Creek Red Ives Creek	depressed depressed depressed depressed depressed

Drainage (HUC) **Subwatershed Name (HUC)**	**Local Population Name(s) or Habitat Type[1]**	**Priority Designation**	**Designated Critical Habitat**	**Population Status**
Simmons Creek (170103040104)	*Simmons Creek (PLP)*	active restoration	Simmons Creek Washout Creek	depressed depressed
Copper Creek (170103040105)	*Fly Creek (PLP)* *Beaver Creek (PLP)*	conservation	St Joe River Fly Creek Beaver Creek Bad Bear Creek	depressed depressed depressed depressed
Marble Creek (1701030405)				
Upper Marble Creek (170103040501)	*Marble Creek (PLP)* *Freezeout Creek (PLP)* *Delaney Creek (PLP)* *Homestead Creek (PLP)*	conservation	Marble Creek Freezeout Creek lower Delaney Creek lower Homestead Creek	unoccupied[3] unoccupied[3] unoccupied[3] unoccupied[3]
Middle Marble Creek (170103040503)	FMO	passive restoration	Marble Creek	unknown
Boulder Creek (170103040504)	*Boulder Creek (PLP)*	passive restoration	Boulder Creek	unknown
Lower Marble Creek (170103040505)	FMO	passive restoration	Marble Creek	unknown
Gold Creek (170103040301)	*Gold Creek (PLP)*	passive restoration	Gold Creek	depressed
Quartz Creek (170103040303)	*Entente Creek (PLP)*	passive restoration	Quartz Creek	unknown
Upper North Fork Clearwater Core Area (Critical Habitat Unit 21)				
Foehl Creek (170603080104)	*Foehl Creek (PLP)*	conservation	Foehl Creek	unknown
Canyon Creek (170603080102)	Canyon Creek Buck Creek	conservation	Canyon Creek lower Buck Creek	depressed depressed
Sawtooth Creek (170603080103)	dip-in/FMO	conservation	none	unknown
Floodwood Creek (170603080203)	Floodwood Creek WF Floodwood Creek	conservation	Floodwood Creek lower WF Floodwood Ck.	depressed depressed
Minnesaka Creek (170603080301)	FMO	conservation	Little NF Clearwater River	migratory
Lost Lake – Little North Fork Clearwater (170603080101)	Little NF Clearwater River Jungle Creek Adair Creek Rocky Run Creek Lund Creek Little Lost Lake Creek Lost Lake Creek	active restoration	Little NF Clearwater River Jungle Creek Adair Creek Rocky Run Creek Lund Creek Little Lost Lake Creek Lost Lake Creek	depressed depressed depressed depressed depressed depressed depressed

Drainage (HUC) Subwatershed Name (HUC)	Local Population Name(s) or Habitat Type[1]	Priority Designation	Designated Critical Habitat	Population Status
Spotted Louis Creek (170603080105)	Montana Creek Butte Creek Rutledge Creek	active restoration	Montana Creek Butte Creek Rutledge Creek Little NF Clearwater River	depressed depressed depressed depressed
Glover Creek (170603080201)	Glover Creek	active restoration	Glover Creek	depressed

Data adapted from Idaho Panhandle National Forests Salmonid Assessment spreadsheet (V7.0), based on USFS Region 1 Salmonid Assessment Protocol

1. **dip-in/FMO** = Bull trout use this habitat seasonally for foraging and refugia; spawning and rearing habitat is not available or spawning activity has not been observed.
   FMO = foraging, migration, or overwintering habitat.
   Local population = A group of bull trout that spawn within a particular stream or portion of a stream system. Multiple local populations may exist within a core area. A local population is considered the smallest group of fish that is known to represent an interacting reproductive unit. For most waters where specific information is lacking, a local population may be represented by a single headwater tributary or complex of headwater tributaries. Gene flow may occur between local populations (e.g., those within a core population), but is assumed to be infrequent compared with that among individuals within a local population.
   PLP = potential local population - A local population that does not currently exist, but that could exist, if spawning and rearing habitat or connectivity were restored in that area, and contribute to recovery in a known or suspected unoccupied area, or a system with limited data that indicates it could support a local population.
2. For these subwatersheds, there are no bull trout present or expected to be present due to natural barriers or lack of habitat, but the system is tributary to bull trout occupied streams.
3. These subwatersheds are unoccupied designated critical habitat but were identified as essential to the conservation of the species during designation of critical habitat and most were identified as priority streams in the draft recovery plans as potential areas to be re-founded (repopulated) with bull trout local populations.

Redd survey data is collected annually from six index tributary streams (USFS 2013, Appendix D, pp. 88-89): two in the lower Clark Fork River downstream of Cabinet Gorge Dam (East Fork Lightning Creek and Johnson Creek), and four other systems tributary to the lake (Trestle, Gold, North Gold, and Grouse Creeks). In addition to data collected from index streams, data is also collected from approximately 15 other streams in most years. Index counts average about two-thirds to three-fourths of the known spawning in the contiguous Pend Oreille basin. Bull trout index redd counts have ranged from about 300-800 throughout the 30-year period of record (averaging 509). In the 9 years post-listing (1998-2006), index redd counts ranged between 462 and 794, averaging 605. Since the record high redd counts in 2006, redd counts over the last six years (2007-2012) have ranged between 382 and 597, averaging 467, a decline of roughly 23%.

Based on redd counts, for all streams in the Lake Pend Oreille (LPO) core area, the long-term population trend in the core area is predicted to be at least stable or increasing (Figure IV-1). However a short-term decline over the last six years has been observed in the redd counts. Since 2003 (10 years), roughly 80% of the redds documented in this core area occur in seven local populations, all of which exceed draft recovery plan abundance criteria of an average of 100 annual adult spawners (USFS 2013, Appendix D, pp. 88-89). These data also indicate that on average, 60 % of the Lake Pend Oreille bull trout population spawn in three of these streams, Trestle Creek (28%), Gold Creek, (18%) and Granite Creek (including Sullivan Springs, 14%).

Although short-term declines have been documented in each of these streams in recent years, overall they are considered strong. Within the other four streams (East Fork Lightning, Rattle, Johnson, and Grouse creeks) that exceed draft recovery plan abundance criteria, short-term trends are generally stable or increasing; with average redd counts over the last 10 years above the long-term average.

In addition to the seven local populations described above, there are 13 other streams that support local populations of bull trout in this core area. Eleven of these streams (Lightning, Savage, Char, Porcupine, Wellington, Morris, Strong, North Fork Gold, and Uleda creeks, and the Pack and Middle Fork East River) all have long-term redd survey data that indicate that these local populations are persisting at depressed levels, generally less than 50 annual adult spawners. In 2011 and 2012, bull trout redds were documented for the first time in Caribou Creek and Hellroaring Creek, respectively. Although long-term data is lacking for these streams, they are likely local populations as multiple age classes of juvenile bull trout have also been documented within these streams (Ryan and Jakubowski 2012, p. 15; Ryan pers. comm. 2012). Bull trout watersheds in this core area on the IPNF are listed in Table IV-6.

Despite the overall improving long-term trend in bull trout redds in this core area, many local populations experienced reductions from 2006 observations. Reductions were most dramatically noted in tributaries to the north shore of Lake Pend Oreille and the lower Clark Fork River, including the Pack River, Trestle Creek, Grouse Creek, and several tributaries within the Lightning Creek drainage. A total of 654 redds were documented in this core area in 2007. This is about half the number of redds that were observed in 2006 (record high counts totaling 1,256 redds) and the lowest since 1997. Declines from 2006 to 2007 were observed in 19 of the 21 streams surveyed. These drainages have historically experienced high channel instability and reduced counts likely correspond to high flows that occurred in the fall of 2006, which resulted in significant channel alterations. Concurrent with the 2006 floods, IDFG initiated a lake trout suppression program within Lake Pend Oreille that includes gill netting, trap netting, and an

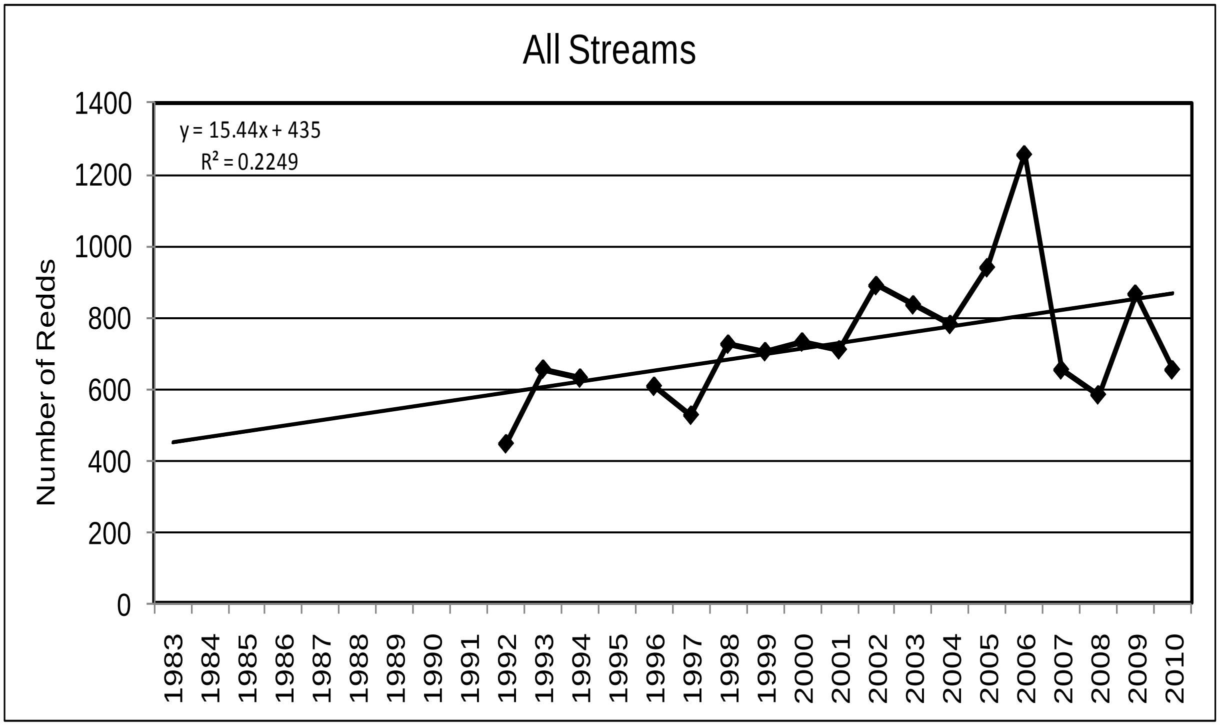

Figure IV-2. Population trend in the Lake Pend Oreille Core Area, based on spawning activity (i.e. redd surveys)

angler incentive program to harvest lake trout and rainbow trout (IDFG 2013b, entire). Although this program has been very successful at removing nonnative predators and is expected to have long-term benefits to the core area population of bull trout, by-catch of bull trout has been significant and roughly 2,000 direct bull trout mortalities have been documented since 2006 (IDFG 2013b, slide 25, 28). Bull trout redd surveys in 2010 were also likely impacted by in-stream conditions at several locations, that may have also affected observations in these locations. Disturbed substrates resulting from early spawning kokanee in eastside tributaries to Lake Pend Oreille, including North Gold, Gold and Granite creeks, as well as Sullivan Springs, limited the identification of redds where bull trout and kokanee spawning activity overlapped.

Kootenai River Core Area

The following is an excerpt from IDFG (2013a, pp. 104-105), and includes bull trout: The trout fishery in the Idaho reach of the Kootenai River is characterized by densities lower than upstream reaches. The low densities are believed to be in part due to limited natural reproduction. Due to past glaciation, most Kootenai River tributaries are blocked by falls near their mouths, and recruitment of fish from tributaries is limited. Habitat alteration and degradation have reduced trout production in naturally accessible portions of tributaries. Sedimentation from logging, road construction, and wildfires has degraded former spawning and rearing areas. Manmade obstructions, diversions, and channelization have eliminated and isolated former trout habitat completely, especially in tributaries draining the west side. In addition to limited recruitment, the lack of nutrients has likely limited trout production. Libby Dam was constructed in Montana in 1972, and its operation for flood control and power production changed the natural seasonal and daily flow, temperature, and productivity regimes in the Kootenai River.

Based on redd counts, as an indicator of population, for all streams in the Kootenai River core area (KRCA), populations in the Idaho portion of the KRCA are predicted to be declining (Figure IV-2).

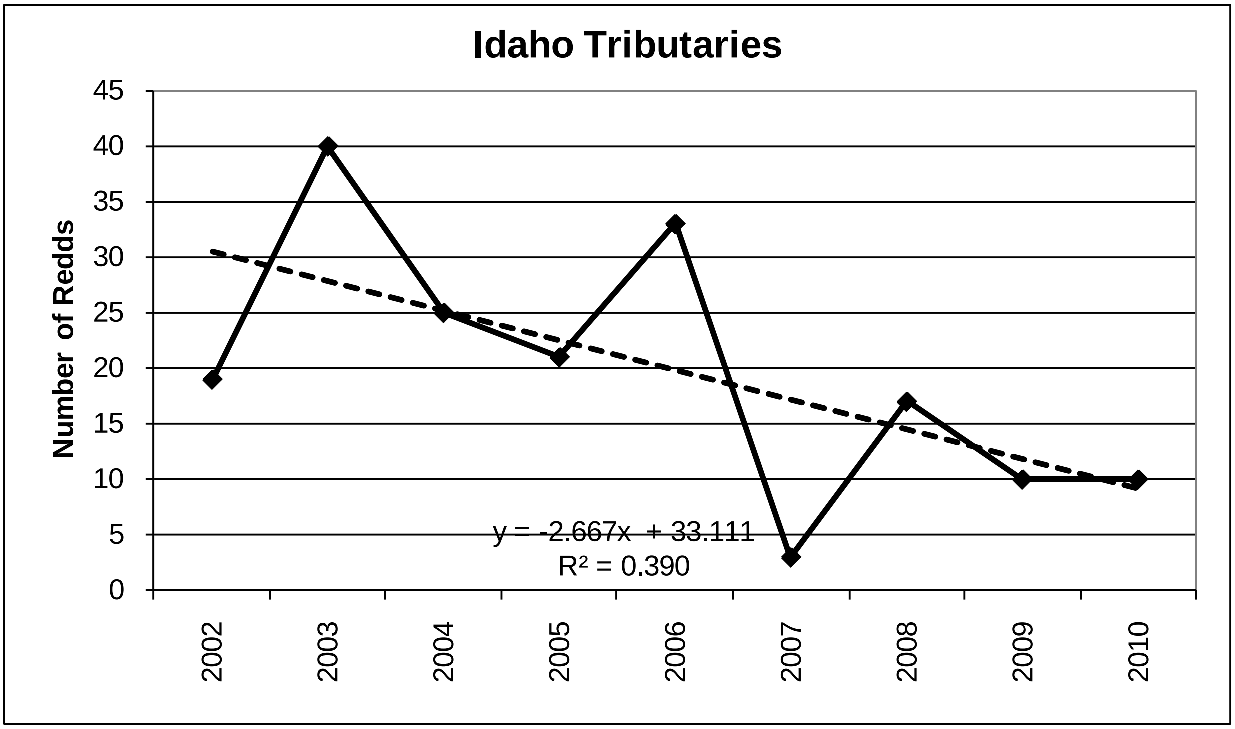

Figure IV-3. Population trend in the Kootenai River Core Area, based on spawning activity (i.e. redd surveys)

In the Idaho portion of the KRCA, North and South Callahan Creeks and to a lesser extent Boulder Creek are identified as important bull trout spawning tributaries as redds have been documented in these streams. Counts in 2012 in the Idaho portion of the KRCA were low compared to when surveys were initiated in 2002 (USFS 2013, Appendix D, p. 87). Although bull trout redds have not been documented in Long Canyon Creek, comprehensive surveys have not been completed. IDFG surveys have documented multiple age classes of bull trout over several years, extending up to 5 kilometers upstream from the mouth (Gidley in litt. 2009, entire; Partridge 2003, p. 14). It is therefore believed that limited reproduction is occurring in Long Canyon Creek and the Service identified it as spawning and rearing habitat when designating critical habitat.

In terms of the entire KRCA, the majority of the bull trout population is located in Montana tributaries. Similar to 2009, 90% of the total redds were counted in Montana in 2010. Previous radio tracking data indicates that bull trout spawning downstream of Kootenai Falls, in North and South Callahan Creeks and O'Brien Creek, are mostly adfluvial fish coming from Kootenay Lake in British Columbia. Bull trout spawning upstream of Kootenai Falls, in Montana, appear to have a fluvial life cycle where they overwinter in Kootenai River and spawn in tributaries such as Quartz Creek, Bear Creek, Pipe Creek and West Fisher River. This suggests we may not see the same trends in bull trout abundance between these two life history forms. In addition, Canada allows harvest of bull trout in Kootenay Lake, which may also influence trends in the lower Kootenai River tributaries.

Bull trout watersheds on the IPNF in this core area are identified in Table IV-6. No population data is available for most of the drainages on the IPNFs although some redd surveys have occurred in lower Boulder Creek, where one redd was counted in 2005 and 2 redds were documented in both 2001 and 2002; spawning activity has not been observed since. Trout, Ball, Myrtle, Deep, Caribou, and Snow creeks, and the Moyie River have been identified as seasonally occupied streams and are important foraging and rearing area. These systems were identified as foraging, migration, and overwintering (FMO) habitat during designation of critical habitat (Gidley pers. comm. 2009; Walters 2002, pp. 32-34). The IDFG has also documented that the lower reach of Curley Creek also has seasonal use by bull trout (Walters 2002, p. 13), but this reach was not designated as critical habitat. North and South Callahan Creeks are primarily located on the KNF and as such are addressed in its biological assessment for effects of the Revised Plan.

Priest Lakes Core Area

The following is an excerpt from IDFG (2013a, pp. 125-126). Historically, Priest and Upper Priest lakes contained three native sport fishes, westslope cutthroat, bull trout and mountain whitefish. Bull trout were relatively abundant and popular sport fish in both lakes with most of the major tributaries supporting spawning runs of over 100 adults. Annual harvest of adult bull trout from streams exceeded 600 fish during the 1950s. In the lakes, annual harvests between 1,000 and 2,000 bull trout were the norm through the 1970s. The popular and productive cutthroat, bull trout, and kokanee fisheries that lasted through the 1970’s abruptly collapsed in the early 1980’s. Though declines in the cutthroat and bull trout populations was likely exacerbated by overharvest, competition with non-native species, and degradation of spawning habitat, there is little doubt that the ultimate collapse was a result of the introduction of Mysis shrimp and the subsequent explosion of the lake trout population. Creel surveys reflected the bull trout population decline. Harvest in Priest Lake, which peaked at over 2,300 in 1978, was less than 100 in 1983, and bull trout were closed to harvest in 1984. By 1985, adfluvial bull trout runs into tributaries of Priest Lake were essentially gone, and the only strong population of bull trout occurred in the Upper Priest Lake basin.

The IDFG has historically conducted redd counts in portions of at least twelve tributary streams in the basin (IDFG 2012, p. 157). In 1985 and 1986 total redd counts (81 and 51, respectively) were generally higher than any counts since 1998 (averaging about 33). Continuous data sets are available since 1992. These data indicate that the bull trout population spawning in the upper basin (Upper Priest Lake tributaries) has been at a relatively low level (between 7-58 redds annually). Redd survey data are now collected annually from eleven tributary streams (USFS 2013, Appendix D, p. 85) to Upper Priest Lake. The Upper Priest River, Hughes Fork, and Gold Creek are the only stream in recent years where bull trout redds have been documented on a regular basis. Over the last 10 years, only a single redd has been documented in Jackson Creek (2006) and Rock Creek (2004 and 2010). No redds have been documented in the six other streams (Lime, Cedar, Ruby, Boulder, Bench, and Trapper creeks) over the last 10 years during annual surveys. Juvenile bull trout have also been documented in Malcom Creek, but redds have not been documented in this stream and it is believed that the juvenile bull trout here are the progeny of bull trout spawning in Upper Priest River.

Regularly monitored index reaches of tributaries to the main Priest Lake averaged about 10 redds annually in 1993 through 1997, but supported only remnant spawning activity with 3 redds in each of years 2002-2004. In general, with the exception of the North Fork Indian Creek and the North Fork Granite Creek, redd surveys within tributaries to Priest Lake have been eliminated due to a lack of known reproduction. Bull trout and bull trout redds have been documented in both the North Fork Indian Creek and the North Fork Granite Creek, but have general only accounted for between 1 to 5 redds in recent years. The redd survey information indicates this bull trout core area currently supports 150-200 adult bull trout.

Based on redd counts, as an indicator of population, for all streams in the Priest Lakes core area, populations in the core area are predicted to be in a long-term decreasing trend (Figure IV-3). However, a short-term increase over the last several years has been observed, with 2012 redd counts (52) accounting for the second highest number of redds observed in two decades.

The primary cause for the decline in the bull trout population in the basin is likely the expanding population of lake trout, which continually poses an overwhelming threat to the adfluvial bull trout population. An on-going effort to remove lake trout from Upper Priest Lake has been underway for over a decade, with the intention of reducing competition and predation on bull trout. This effort intensified in 2007 with the aggressive commercial gillnetting to remove most size and age classes of lake trout in Upper Priest Lake. Furthermore, Thorofare trapnetting began in 2009 to intercept and remove adult lake trout from migrating from Priest Lake to Upper Priest Lake during fall months as part of their spawning migration. The effectiveness of this removal program appears to be positive at this time, and appears to be translating to increasing numbers of spawning adult bull trout as evidenced by above average redd counts the last several years. In addition to predation by lake trout of sub-adults entering the lake, juvenile bull trout also face predation and competition by non-native brook trout in many spawning and rearing tributaries to the Priest Lakes.

It is not known for sure how many local populations still occur in the Priest Lakes core area. As stated above, redds have not been observed in most of the tributaries for the last ten years. Therefore, based on a combination of redd survey data, electrofishing survey data (for genetics), and other bull trout observations over the last 10 years (Bettles et al. 2005, entire; DeHaan and Ardren 2007, pp. 6, 12; DuPont and Horner 2007, p. 5), the Service believes that 5 local populations may still occur in this core area. These include: Upper Priest River, Gold Creek, Hughes Fork, North Fork Indian Creek, and North Fork Granite Creek. Complete redd surveys have not been conducted in the Indian Creek and Granite Creek drainages in recent years, but because of juvenile presence and the observation of redds in North Fork Granite Creek (2006, 2008, and 2009) and North Fork Indian Creek (2008-2011), they are included as local populations (75 FR 63898). The Indian Creek drainage is located entirely on State of Idaho lands. Juvenile bull trout and bull trout redds have been documented in numerous other tributaries (i.e., Jackson and Rock creeks) to Priest Lake and Upper Priest Lake over the last 10 years, but are very low and rare. These streams are not considered local populations at this time as comprehensive data is lacking. Bull trout watersheds on the IPNF in this core area are identified in Table IV-6.

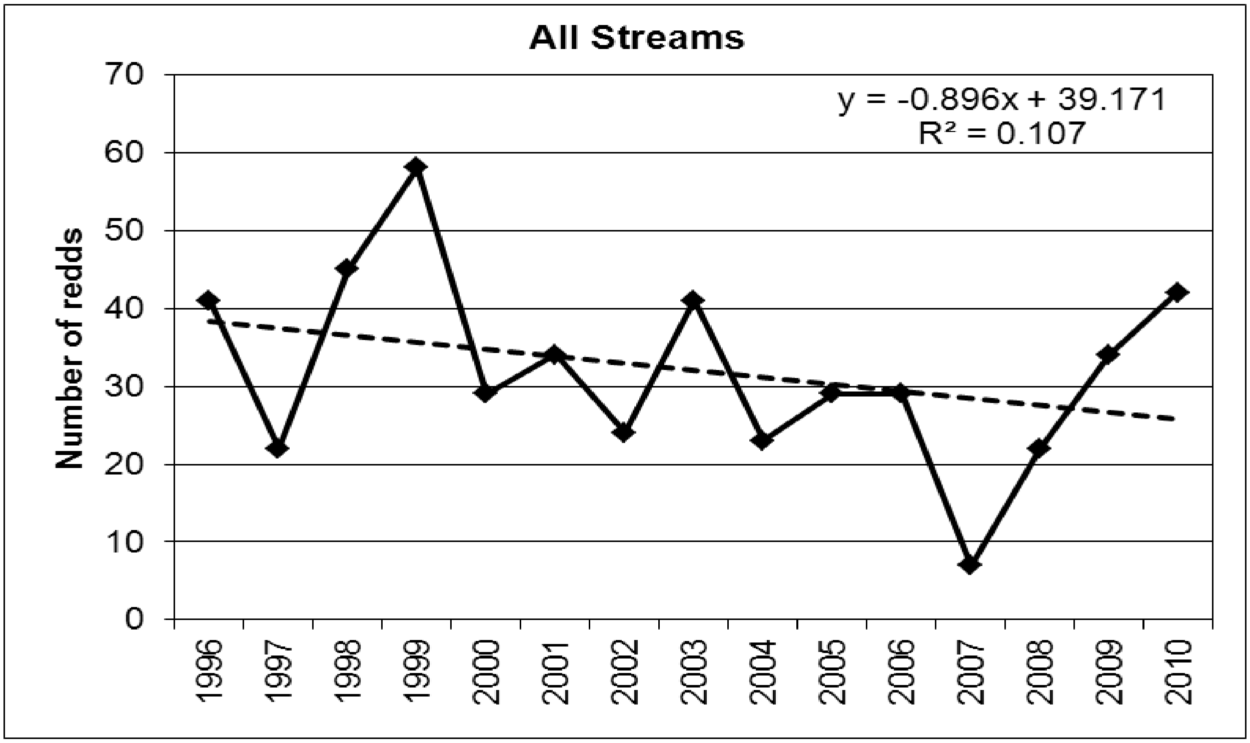

Figure IV-4. Population trend in the Priest Lakes Core Area, based on spawning activity (i.e. redd surveys)

Coeur d'Alene Lake Core Area

The following excerpt is from IDFG (2013a, pp. 134-137). The only game fish native to the drainage are westslope cutthroat trout, bull trout, and mountain whitefish. The major tributaries of the drainage include the St. Joe, St. Maries and Coeur d'Alene rivers, which all feed into Coeur d'Alene Lake. Diversity of habitat in the drainage is great. Impoundment of Coeur d'Alene Lake by Post Falls Dam has flooded river sections that were formerly free flowing. Mining, logging and forest development, highway construction and other land use impacts have taken a major toll on the Coeur d'Alene drainage fisheries. Heavy metal pollution, stream channelization and sedimentation and migration blocks related to the extensive mining history have had an especially severe impact on cutthroat trout and bull trout. Bull trout in the drainage spawn almost entirely in headwater tributaries to the St. Joe River, primarily Medicine and Wisdom creeks. Based on existing telemetry work, virtually all of the bull trout in the drainage are adfluvial, migrating the length of the St. Joe River to Coeur d'Alene Lake. Though bull trout have been functionally extirpated from the Coeur d'Alene River drainage as a result of historic mining pollution in the mainstem of the Coeur d'Alene River, much of the North Fork of the Coeur d'Alene River and several tributaries were designated as critical habitat by the USFWS in 2010, prompting questions about the feasibility of reestablishing bull trout in the Coeur d'Alene drainage and additional tributaries to the St. Joe River, such as Marble Creek.

Bull trout were documented to be historically widespread in the Coeur d'Alene Lake basin with presence in over 60 streams, including the North Fork and South Fork of the Coeur d'Alene River, St. Maries River, Marble Creek as well as many other tributaries (Maclay 1940a, p. 14 and b, pp. 12, 14, 16, 21, 23; Fields 1935, no page numbers – 3 tables). Local populations are now believed to be functionally extirpated from many of these areas as reproducing populations or regular bull trout presence has not been documented in many decades.

Bull trout redd surveys have been conducted in nearly 30 tributary streams since 1992 in the St. Joe River portion of this core area with redds documented in at least 22 of the tributaries. Redd survey data is collected annually from three index tributary streams (USFS 2013, Appendix D, pp. 90-91): the upper reach of the St. Joe River, Medicine Creek, and Wisdom Creek. In addition to data collected from index streams, over the last 10 years (although not every year) redds have been documented in 13 additional tributary streams including: Bean Creek, North Fork Bean Creek, Beaver Creek, California Creek, Cascade Creek, Fly Creek, Heller Creek, Mill Creek, Red Ives Creek, Sherlock Creek, Simmons Creek, Tinear Creek, and Yankee Bar. The other six streams with older redd observations include Entente Creek, Gold Creek, Mosquito Creek, Ruby Creek, Timber Creek, and Washout Creek. Bull trout index redd counts have ranged from about 15 to 106 throughout the 21-year period of record (averaging 53).

In the 10 years after listing (1999-2006), index redd counts ranged between 40 and 106, averaging 70. Since the record high redd counts in 2008, redd counts over the last four years (2009-2012) have ranged between 29 and 54, averaging 44, a decline of roughly 37 percent. Juvenile bull trout have also been documented in Bluebells Creek, but redds have not been documented in this stream and it is believed that the juvenile bull trout here are the progeny of bull trout spawning in the St. Joe River. Based on redd counts, as an indicator of population, for all streams in the Coeur d'Alene Lake core area, populations in the core area are predicted to be increasing long-term (Figure IV-4), but have been declining in recent years.

Multiple streams were sampled in the St. Joe in 2012, and typical to St. Joe surveys, only a few streams (Medicine Creek, Heller Creek, Wisdom Creek, and the upper St. Joe River) are responsible for producing the majority of bull trout in the entire core area. However, unlike previous annual redd surveys, in 2012 numerous new streams were surveyed in the Bean Creek drainage, resulting in the documentation of 19 redds in North Fork Bean Creek, 9 redds in Mill Creek, and 2 redds in Tinear Creek. In addition to these new streams, 2 bull trout redds were documented in Cascade Creek for the first time. These new streams accounted for about half of the redds documented in the St. Joe in 2012. In most years, a significant number (32 in 2007) of redds are counted in Wisdom Creek; however, only a single redd was counted in 2010 and 2011. The reduction in numbers was likely due to a potential migration barrier created by a beaver dam in the mainstem of the St. Joe River upstream of Medicine Creek. The beaver dam was lightly modified in August 2012 to allow for bull trout passage (Deeds and Martini in litt. 2012, p. 1), five redds were documented in Wisdom Creek and several redds in the St. Joe River above the beaver dam in September 2012 (IDFG in litt. 2012, no page numbers – St. Joe tab in spreadsheet).

Spawning and rearing activity has not been observed in the Coeur d' Alene River drainage in recent years, however, comprehensive surveys are lacking. Although bull trout are believed to be functionally extirpated (i.e. reproduction) from the Coeur d'Alene River subbasin and from other portions of their historic range within the Coeur d'Alene Lake basin, individual subadult and adult bull trout that originate from current local populations in the upper St. Joe River and tributaries, could periodically inhabit on a seasonal basis previously known occupied habitats throughout the basin. Bull trout are known to have high fidelity to natal streams for spawning purposes but are also known to wander widely seeking forage or cold water refugia to complete their life cycle. For example, individual radio tagged adult bull trout in the North Fork Clearwater River have been documented moving between two different subbasins (migrating 147.3 km throughout the year) as well as two different drainages (migrating up to 438.1 km in 1.5 years) (Schiff and Schreiver 2004, p. 22). Furthermore, wandering behavior within the Coeur d'Alene Lake basin has been documented in recent years with individual bull trout documented in Wolf Lodge Creek and the St. Maries River (Fredericks pers. comm. 2011a, b). For these reasons, the Service considers the Coeur d'Alene River and North Fork Coeur d'Alene to be within the range of use by bull trout and to be occupied by individual wandering bull trout on a seasonal basis (75 FR 63898).

The Draft Recovery Plan for this core area developed by the Fish and Wildlife Service in coordination with other resource agency partners on the Recovery Unit Team identified recovery criteria for this core area that included broad distribution throughout the core area to include reestablishing local populations in the Coeur d'Alene River subbasin and the Marble Creek drainage (USFWS 2002). Based in part on priority streams identified in the Draft Recovery Plan, the Fish and Wildlife Service designate critical habitat within the Coeur d'Alene River subbasin and the Marble Creek drainage determined essential to the conservation of the species.

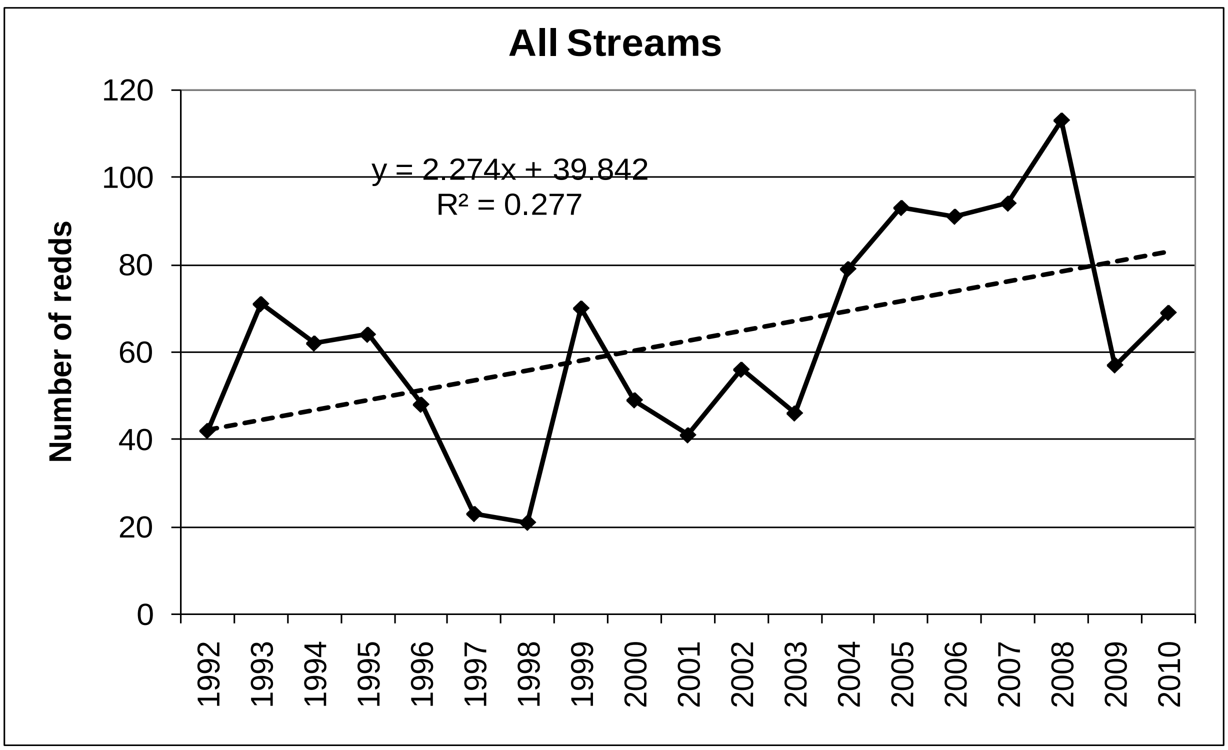

Figure IV-5. Population trend in the Coeur d'Alene Lake Core Area, based on spawning activity (i.e. redd surveys)

North Fork Clearwater River Core Area

Based on redd counts as an indicator of population, for all streams in the North Fork Clearwater River core area, populations in the core area are predicted to be increasing over the long-term but have experienced declines in recent years (Figure IV-6). Bull trout redd surveys have been conducted in 12 tributary streams since 1994 in the Little North Fork Clearwater portion of this core area, with redds documented in at least 8 of the tributaries (IDFG 2012, p. 161). Redd survey data is collected annually from five index tributary streams, or reaches (USFS 2013, Appendix D, p. 92): Lund Creek, Little Lost Lake Creek, Lost Lake Creek, and two reaches of the Little North Fork Clearwater River.

In addition to data collected from index streams, redds have been documented in four additional tributary streams including: Buck Creek, Butte Creek, Rutledge Creek, and Rocky Run Creek. Bull trout index redd counts have ranged from about 0 to 108 throughout the 18-year period of record (averaging 36). A small number of bull trout have also been documented in the Breakfast Creek drainage including Floodwood Creek, Glover Creek, and Stony Creek (Hanson et al 2006, pp. 31-32) and spawning and early rearing has been documented in Jungle and Adair Creeks (CBBTTAT 1998, p. 49). Bull trout have been observed in Foehl Creek and West Fork Floodwood Creek during snorkeling surveys and Canyon Creek during telemetry surveys (Hanson et al. 2006, p. 32, 77, 82, 85). Bull trout watersheds on the IPNF in this core area are identified in Table IV-6.

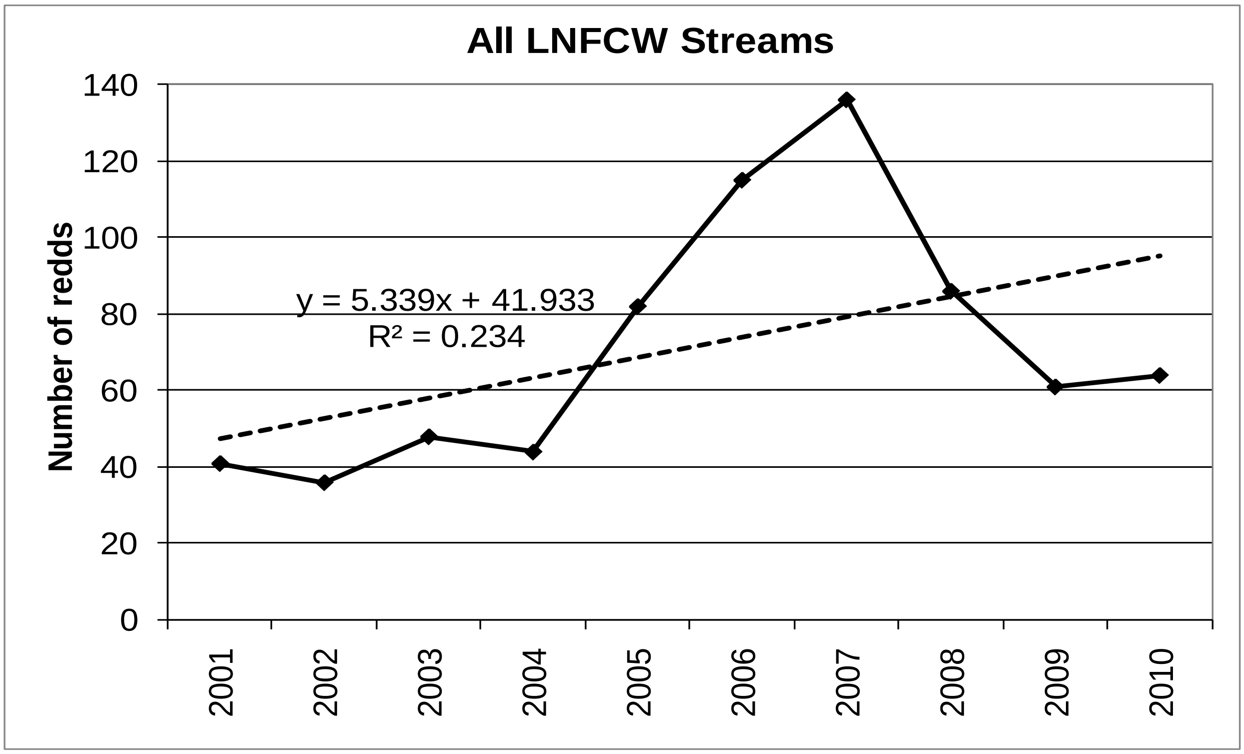

Figure IV-6. Population trend in the North Fork Clearwater Core Area, based on spawning activity (i.e. redd surveys).

3. Status of Critical Habitat in the Action Area

The baseline for critical habitat will be discussed for the core area as a whole. Critical habitat applies only to those specifically designated streams (75 FR 63898) and only to the area within the ordinary high watermark.

Critical Habitat in the Lake Pend Oreille Core Area

A total of 218.6 miles of stream/river and 82,972 acres of lakes/reservoirs are included in the revised critical habitat for the Lake Pend Oreille core area. Of this amount 75 miles occurs on the IPNF. Critical habitat in Lake Pend Oreille is primarily influenced by the operation of Albeni Dam and forest management has relatively little influence. The primary threats to critical habitat in the Lake Pend Oreille core area result from the presence of non-native fish, degrading PCE 9 and private development impacting PCEs 1, 3, 4, and 8.

Critical Habitat in the Kootenai River Core Area

A total of 269 miles of stream/river and 0 acres of lakes/reservoir are included in the revised critical habitat for the Kootenai River core area. Of this amount 14 miles occurs on the IPNF. The greatest threat to critical habitat in this core area is non-native fish, affecting PCE 9, followed by the high aeration of the water going through the Kootenai River Dam, resulting in super-saturation by nitrogen, which may be lethal to fish in extreme cases (PCE 8). Forestry practices have also had extensive impacts to this core area, affecting PCEs 3, 4, 6, and 8.

Critical Habitat in the Priest Lakes Core Area

Critical habitat was designated in 2010 for Priest Lake, the Thoroughfare, Upper Priest Lake, Upper Priest River, and several tributaries to Upper Priest River and the lakes. A total of 109 miles of stream/river and 24,642 acres of lakes are included in the revised critical habitat for the Priest Lakes core area, of which 62 miles occurs on the IPNF. Degradation of PCE 9 due to the ubiquitous presence of non-native fish constitutes the most severe and immediate threat to this core area. Private development is a lesser threat than other core areas, as most of the areas adjacent to critical habitat are state and federal public lands.

Critical Habitat in the Coeur d'Alene Lake Core Area

A total of 510 miles of stream/river and 31,152 acres of lakes/reservoir are included in the revised critical habitat for the Coeur d'Alene Lake core area. Of this amount 306 miles of stream/river occur on the IPNF. The condition of bull trout critical habitat varies across the core area from poor to good. Aquatic habitats and designated critical habitat have been impacted by natural processes including fires and floods, as well as human management. The primary threats to critical habitat in the Coeur d'Alene Lake core area result from the presence of non-native fish, degrading PCE 9, along with forest management, mining, and private development impacting PCEs 1, 2, 3, 4, 7 and 8.

Critical Habitat in the North Fork Clearwater River Core Area

A total of 504 miles of stream/river and 16,441 acres of lakes/reservoir are included in the revised critical habitat for the North Fork Clearwater River core area. However, only the Little North Fork Clearwater portion of this core area occurs on the IPNF. The Little North Fork Clearwater drainage CH includes 105.4 miles and 0 acres of lakes/reservoir, of which 54 miles occurs on the IPNF. Bull trout habitat in the North Fork Clearwater Core Area has been influenced by natural and, to a lesser extent, anthropogenic actions. Due to its remote nature, the land surrounding many of the tributaries of the Little North Fork Clearwater has had minimal land management (Dupont et. al 2008). As a result, bull trout habitat remains largely intact.

However, some historic timber management has degraded several tributary streams (USFWS 2002) resulting in impacts to PCEs 4 and 6.

D. EFFECTS OF THE ACTION

Under section 7(a)(2) of the Act, "effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, with the effects of other activities interrelated or interdependent with that action. Indirect effects are those caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02). The effects of the action are added to the environmental baseline to determine the future baseline and to form the basis for the determination in this opinion. Should the Federal action result in a jeopardy situation and/or adverse modification conclusion, the Service may propose reasonable and prudent alternatives that the Federal agency can take to avoid violation of section 7(a)(2). The impacts discussed below are the result of direct and indirect impacts of implementing the proposed project.

For purposes of consultation under section 7 of the Act, the “action area” is defined by 50 CFR 402.02 as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.”

1. Factors to be Considered

Proposed forest-wide objectives, desired conditions, standards, and guidelines will affect project design when implementing forest management activities in the future. These forest-wide objectives, desired conditions, standards, and guidelines affect future management decisions, but authorize no immediate activities or changes to ongoing ones. Therefore, all effects of the Revised Forest Plan are indirect, and no direct effects occur to bull trout as a result of the proposed action. Project-level activities that result from implementation of forest plan direction will undergo site-specific consultation under section 7 of the ESA as they are proposed.

Nearly all Forest Service management activities allowed within the different Management Area categories in the Revised Forest Plan have the potential to affect bull trout and their habitats, either directly or indirectly, where they overlap with occupied habitat. Land management activities that disturb the soil surface adjacent to or in occupied habitat have the greatest potential, and risk, of adverse effects. Those activities that have the greatest potential to affect bull trout and bull trout critical habitat include: vegetation management, fuels management, livestock grazing, roads, mining, and recreation. Watershed improvement designations in the Revised Forest Plan provide opportunities for activities to restore, improve, or rehabilitate habitat quantity and quality, thus contributing to bull trout recovery. The potential impact of these various management activities is discussed below.

Vegetation Management

General Effects

Vegetation management has the potential to cause accelerated erosion primarily through construction of temporary roads and skid trails to access treatment areas. Timber harvest may affect flow regimes by reducing evapotranspiration, interception, and snow accumulation patterns, and by increasing soil moisture and surface runoff. Timber harvest directly adjacent to streams and wetlands can reduce shade, raise water temperatures, and reduce the potential for recruitment of woody material. Greater temperature fluctuations (diurnal and seasonal) can also occur when riparian vegetation is removed or decreased. The incidence of riparian harvest has become almost non-existent under the current plan as amended by INFISH.

Timber harvest activities can impact fish and their respective habitat by increasing peak flow. Excessive peak flows can destabilize the stream channel causing degradation of fish habitat by decreasing habitat diversity (loss of pools, cover, stable substrates) and increasing in-channel sediment production. Channel instability occurs when the scouring process leads to degradation (downcutting), or excessive sediment deposition results in aggradation (Rosgen 1996).

Increased sediment production is generally associated with ground based harvest systems and particularly road construction. Sediment decreases habitat diversity, degrades spawning and rearing habitat and consequently fish reproduction and survival. It also reduces aquatic insect production. The density of salmonids in rearing habitat has been shown to be inversely proportional to the level of fine sediment (Bjornn and Reiser 1991). Fine sediment can greatly reduce the capability of winter and summer rearing habitats; when levels reach 30 percent or more, survival to emergence is significantly reduced (Shepard et al. 1984). Fine sediment may have the greatest impact on winter rearing habitat for juvenile salmonids. Fine sediments can cap or fill interstitial spaces of streambed cobbles. Fine sediment has also been shown to cause alterations in macroinvertebrate abundance and diversity (Bjornn and Reiser 1991).

Riparian habitat conservation areas protect fish bearing streams from non-channelized sediment inputs. A review associated with INFISH (USFS 1995) concluded that non-channelized sediment flow rarely travels more than 300 feet and 200-300 foot riparian buffers are generally effective at protecting streams from sediment from non-channelized flow (Belt et al. 1992).

Temperatures, the recruitment of large woody debris, and nutrient delivery from riparian areas will not be affected. The implementation of RHCA's would insure that these riparian characteristics are protected within the project area. Typically, there is a three to four year increase in nitrogen and phosphorus in streams draining a newly harvested area. This brief increase in the two nutrients critical to stream productivity results from the breakdown of logging slash, the flushing of some soil nutrients normally taken up by trees, and in some cases can be due to slash burning. These short-term indirect water quality effects do not generally extend very far downstream because of mitigation by instream sediments and uptake by plants and animals (Murphy 1995). However, these nutrients are generally in short supply in the affected area and the potentially affected waters downstream would increase aquatic productivity for a short time.

<u>Effects of Proposed Action</u>

Revised Forest Plan direction would provide for harvesting and selling an annual volume of 45 MMBF (FW-OBJ-TBR-01). The long-term sustainable yield capacity for the forest is 120 MMBF (FW-DC-TBR-04) so that the proposed harvest rate would capture just over one-third the sustainable yield.

The Revised Plan provides further direction that harvest systems cannot be based strictly on economics but, "*shall be selected based on their ability to meet desired conditions,*" (FW-STD-TBR-05). Standard TBR-05 makes the tie between timber management and meeting the desired conditions stated for other resources in the Revised Plan, specifically watersheds, soils, riparian, and aquatic habitat from detrimental effects due to timber harvest. On the ground protection is provided by the desired conditions for soils which include maintaining soil productivity and hydrologic function (FW-DC-SOIL-01), as well as minimizing effects and recovering areas that have incurred detrimental disturbance (FW-DC-SOIL-02). As management actions trend towards achieving these desired conditions, bull trout would benefit by reduced erosion potential and the negative effects resulting from sediment delivery to streams in occupied habitat.

Restoring soil productivity on previously impacted areas is a forest-wide objective (FW-OBJ-SOIL-01). Therefore, existing sedimentation issues would improve under the Revised Plan in watershed where active restoration occurs. Project-level design criteria contain direction to protect soils during vegetation treatment such as timber harvest and prescribed fire (FW-GDL-SOIL-01, 02, 03, 04). INFISH direction TM-1(b) minimizes effects to RHCAs by limiting ground-based logging equipment.

The Revised Plan would retain existing INFISH standards and guidelines to protect aquatic resources and would add FW-DC-WTR-01, 02, and 03 emphasizing the protection of water quality and natural habitat function, thus conserving bull trout and designated critical habitat.

Plan implementation would continue to have the potential to generate sediment, alter stream flows, and affect large woody debris recruitment. These effects would be tempered by the Revised Plan emphasis on multiple resource Desired Conditions which would include aquatic species and their habitat. Effects of management actions would be analyzed at the project level using site specific information. This would permit the development of specific minimization measures and appropriate best management practices (BMP) implementation to reduce the intensity and duration of adverse effects to bull trout and their habitat.

Fuels Management

<u>General Effects</u>

Fuels management typically consists of wildfire suppression and prescribed fire associated with multiple resource objectives. Resource objectives associated with fire are typically driven by desired conditions for on-site vegetation.

Suppression of natural fire regimes has resulted in forests with more trees and associated leaf area. This results in higher evapotranspiration and interception levels, which decreases water volumes available for surface and sub-surface flow. Lower levels of instream flow can affect the aquatic species as a result of warmer water temperatures and changes in water chemistry. In addition, fire suppression can allow fuels to accumulate above natural levels, which results in wildfires that burn more severely. High intensity fire can change infiltration characteristics of the soil and change hydrologic characteristics in watersheds when they occur over large areas (Doerr et al. 2000, Cannon et al. 2010). Fire suppression tactics, such as retardant use and drafting water from streams also affect riparian and aquatic resources. Conversely, use of wildland fire for multiple objectives and prescribed fire can affect flow regimes by reducing evapotranspiration, interception, and snow accumulation patterns, and by increasing soil moisture and surface runoff.

Fire along streambanks and shorelines can result in variable amounts and distribution of ground exposure. Moderate to light severity fires generally have little influence on riparian vegetation and ground litter removal, and subsequent surface erosion. Severe fires may remove virtually all riparian vegetation and ground cover, and result in soil erosion and sedimentation to nearby water bodies and loss of important transitional habitats for aquatic dependent species (Zwolinski 2000).

Prescribed fire is commonly used on the forest to prepare sites for planting, improve wildlife forage, and reduce fuels for future fire suppression. Types of treatment are typically defined by their timing which is late spring just before green up or in the fall when the risk of wildfire is greatly reduced.

Spring burns typically are used to improve wildlife forage. They protect soils and retain some duff layer component due to the high soil moisture present in spring (Robichaud and Miller 1999). Fall burns typically expose about 20-30% mineral soil and are more typically associated with site preparation for replanting areas harvested for timber (USFS 2013). In both cases sediment production from the burned areas would be minimal. Some burn units may have fireline constructed which exposes bare soil. Standard erosion control practices or BMP's would be applied to minimize sediment production. Rare instances of storm-event erosion, channeling of water down soil depressions, or minor road surface erosion from equipment use may result in minor additional fine sediment loads in streams proximate to operations. The magnitude of the expected sediment change is small, and the minor additional load that may result from prescribed fire treatments typically results in immeasurable and discountable effects to bull trout and designated critical habitat.

Effects of Proposed Action

The biggest change to fuels management under the Revised Plan would be the addition of the ability to manage unplanned natural ignitions for multiple resource benefits FW-DC-FIRE-03. The addition of FW-DC-FIRE-02 emphasizes the treatment of fuels to reduce unplanned fire intensities, protect community infrastructure, reduce insect and disease mortality, and reduce the likelihood of stand replacing fires.

With the Revised Forest Plan direction, guidelines to minimize effects to RHCAs from wildfire suppression activities through the implementation of Minimum Impact Suppression Tactics (FW-GDL-RIP-03), as well as to protect fish and aquatic organisms while drafting water by screening pumps and locating intakes away from spawning gravels (FW-GDL-RIP-04) would be added to the plan, improving protection for bull trout and other aquatic species.

Over the long-term this revised strategy would reduce the risk to bull trout and designated critical habitat by wildfire across the forest.

Access Management - Roads

General Effects

Forest roads can cause serious degradation of salmonid habitats in streams (Furniss et al. 1991). Roads directly affect natural sediment and hydrologic regimes by altering streamflow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition and water quality within a watershed (Lee et al. 1997). Excess fine sediment can fill interstitial spaces in gravels and cobbles, reducing available habitat for aquatic macro-invertebrates. In addition, this fine sediment reduces the quality of spawning gravels for salmonids and can ultimately reduce reproduction. Excess sediment can also reduce the quantity and quality of pool habitats.

Roads can interrupt hill-slope drainage patterns and alter the timing and magnitude of peak flows and change base stream discharge and sub-surface flows. Poor road location or concentration of surface and sub-surface water by cross slope roads can lead to road-related mass soil movements. Damaging direct effects to fish habitat often occur when roads are located in RHCA's and especially if they cross streams where they intercept water and sediment and directly route it to streams. Many older roads were constructed very close to stream channel areas, often in the floodplain. Often streams were straightened to accommodate road routing. Roads constructed in the floodplain or adjacent to streams often capture flow which results in stream re-routing down the road.

Native surface roads are the most common source of sediment to streams on NFS lands. Considering sediment impacts only, some research suggests that sediment production from forest roads is highly variable from road segment to road segment and that most road segments produce little sediment (Luce and Black 1999). Excessive sediment loading often leads to changes in channel morphology because of pool filling, widening of the channel, and making the channel shallower. These types of changes in channel morphology are reflected in changes in width to depth ratios, number of pools, pool depth, bank angle, and amount of undercut bank. Roads can permanently affect wetlands by interrupting natural flow paths and reducing vegetation. Road stream crossings often create migration barriers to bull trout, thereby fragmenting habitat.

Roads result in a form of semi-permanent vegetation removal which, when constructed in riparian areas, causes a loss of riparian vegetation. Reduced riparian cover influences the amount of solar radiation and water temperature regimes, water chemistry, and wood available for recruitment into the stream ecosystem.

At the watershed scale, road systems can change the natural hydrologic regime by altering natural flow patterns, particularly on hill slopes, thereby reducing infiltration and increasing surface runoff, and may desynchronize flow regimes. Where a dense road network is well connected to the stream network, it can be an "extension" of the actual stream network resulting in a more rapid delivery of water during snow melts and storm events, which can increase peak flows. For a detailed discussion of effects of road density see USFWS 2011. Under the 1987 Forest Plan, the KNF has decommissioned approximately 1,500 miles of roads (USFS 2013). The recent Access Amendment will further contribute to road closures and decommissioning, resulting in lower road densities in affected bull trout watersheds (USFWS 2011).

Although some mechanisms of increased road surface erosion and hydrologic change can be minimized by BMPs, some mechanisms are inherent to watershed and site conditions (e.g., slope steepness, stream network density, and geologic instability) and are not readily controllable by BMPs or improved road design (Furniss et al. 1991).

Effects of Proposed Action

Newly constructed or reconstructed roads will not encroach on streams and riparian areas, and drainage structures must have minimal risk of failure, based on FW-DC-AR-07. The Revised Forest Plan retains both INFISH and the Access Amendment but does not include any objectives specifically for road construction as it relates to soil and aquatic resource protection or restoration. The Revised Plan includes an annual objective for 10 to 15 miles of road decommissioning or placing roads into intermittent storage (FW-OBJ-AR-03). The same objective requires annual maintenance of 15-20% of existing Level 3-5 roads (those suitable for passenger vehicles) and 10-15% of existing Level 2 roads (high clearance, four-wheel drive accessible). Future project planning and implementation would allow additional miles of existing roads to be improved, upgraded, stored, or removed.

The proposed forest-wide direction would add to the existing direction provided by INFISH, the Access Amendment and existing programmatic consultations covering road maintenance. Specifically FW-OBJ-WTR-01 and 02 help to remove or mitigate risk factors associated with roads, to improve watersheds and water quality. These objectives coupled with the proposed desired condition for a transportation system with minimal impacts on watersheds, riparian areas, and aquatic species including threatened, endangered, and sensitive species (FW-DC-AR-07) should reduce impacts to bull trout and designated habitat.

The most obvious and easily fixed adverse effect to bull trout and occupied habitat by roads is barriers at stream crossings. FS-OBJ-AQH-03 is intended to reconnect fragmented habitat in streams to increase the distribution of native species, such as bull trout. The proposed plan would set 30-55 miles of reconnected aquatic habitat as an objective to be accomplished over the life of the plan, resulting in increased available habitat for bull trout.

The Revised Plan would reduce, but not eliminate, adverse effects to bull trout from the forest transportation system and its maintenance. The Revised Plan provides additional proactive direction above current management to emphasize restoring connectivity and reducing sediment delivered to streams. Both would have benefits to bull trout by increasing connected habitat and improving instream conditions by reducing sedimentation.

Livestock Grazing

<u>General Effects</u>

Livestock grazing near streams can result in changes in channel morphology (Belsky et al. 1999). Livestock trailing, chiseling, and general soil displacement along stream bank areas can result in collapse of undercut bank areas and an overall increase in bank angle, loss of bank cover, and stream widening along the entire stream reach, resulting in a change in channel type. Livestock trampling and hoof chiseling along streambanks can increase ground exposure, surface erosion, and increased sedimentation (Doumitt and Laye 2010). Concentrated livestock waste can cause eutrophication of lakes and ponds. Livestock grazing directly in wetlands or immediately adjacent to them can cause soil compaction, hummocking, and loss of vegetation, ultimately inhibiting sub-surface water flow.

Loss of riparian vegetation can influence the amount of solar radiation reaching a water body and increase water temperatures (Doumitt and Laye 2010). Greater temperature fluctuations (diurnal and seasonal) can also occur when riparian vegetation is removed or decreased. In addition, removal of riparian vegetation can increase nitrate levels which can increase the biological production in water. Livestock grazing has the potential to cause increased sediment delivery through trampling of stream banks and by removal of riparian vegetation.

Effects of Proposed Action

No active grazing allotments occur in occupied bull trout habitat (USFS 2013). Vacant allotments are unlikely to impact bull trout in the future because grazing occurs primarily on transitory rangelands and along road right of ways which are suitable for grazing due to previous harvest. As timber and woody vegetation becomes reestablished on those lands their suitability decreases. Forest-wide direction specifies that vacant allotments are evaluated and closed if there is a likelihood of significant resource conflict (FW-DC-GRZ-03), thereby making reactivation of a currently vacant allotment unlikely.

Recreation

General Effects

Permanent development and campground facilities in riparian areas can result in sediment increases to nearby streams, loss of stream bank vegetation, and reduced water infiltration. Associated human activities, such as off-highway vehicle use on trails and stream bank trampling, can also decrease ground cover and increased soil disturbances. Direct effects to channel morphology include the loss of pool volumes, habitat complexity, and decrease in the size of stream channel substrate. Recreational use, primarily from ATVs, can cause soil compaction and loss of vegetation in wetlands and/or directly adjacent to them. This can reduce sub-surface water flow and increase surface runoff. Increases in surface runoff may contribute sediment to streams and associated aquatic habitats, depending on the proximity or connectedness to the hydrologic network. Facilities can be similar to roads in terms of potential effects. Facilities can permanently affect wetlands by interrupting natural flow paths and reducing vegetation.

Motorized recreation is a growing concern as use increases and off-road vehicle technology improves. Off-highway vehicles are becoming more powerful, have better suspension, and better traction than ever before. With the advent of improved technology, visitors will be able to access areas previously unavailable to off-highway vehicles, which may contribute cumulatively to effects on soils and aquatic resources. Off-road vehicle use is anticipated to increase even more into the future, as populations increase. Along with this increased use there may an associated increase in effects to soil and aquatic resources.

Effects of Proposed Action

With direction in the Revised Forest Plan, in addition to the current INFISH direction, the objective for dispersed recreation sites will benefit riparian and aquatic resources by improving conditions through interpretation and education at heavily used areas around Priest Lake and the St. Joe River (FW-OBJ-AR-01), and by implementing human waste management techniques along the North Fork Coeur d'Alene River. Desired conditions for access and recreation include completing and implementing motor vehicle use designations (FW-DC-AR-08), which will meet INFISH RM-2 by moving off-road vehicle use away from riparian and aquatic resources, providing added protection for bull trout and their habitats. Such actions will undergo site-specific consultation when they are proposed. By improving existing dispersed recreation sites and maintaining existing developed sites, implementation of the Revised Forest Plan should reduce the impacts of recreation to bull trout.

Mining

General Effects

Mining has both direct and indirect effects to bull trout and designated critical habitat on the IPNF. New mining projects would be addressed by site specific analysis. Commercially viable mineral deposits on the Panhandle include silver, lead, zinc, copper, and gold. Background concentrations of cadmium and arsenic in the soil and country rock can be elevated, which is exasperated by ore processing and waste rock dumps. Legacy mining across the forest remains an issue as it has had prolonged impacts, especially where mine tailings were placed in riparian areas close to streams. Impacts to water quality and blockage of fish passage have been the most common associated with historic mining.

Mining can reduce surface water flow, increase sedimentation, decrease pH, and leach heavy metals into surface waters supporting bull trout. Mineral deposits on the IPNF are primarily gold, silver and copper. Placer mining in stream channels causes direct increased sediment, affects aquatic insect communities, and disturbs channel substrate. Instream dredges can cause bank erosion, channel instability, and loss of riparian vegetation. Mining for leasable minerals (i.e., metals) is allowed in all management areas except MA1 (wilderness characteristics), while mining for mineral materials (e.g., gravel) is limited to MA6 (general forest) and MA7 (primary recreation).

Effects of Proposed Action

With the implementation of the Revised Forest Plan, additional protection from effects of mining to riparian and aquatic resources is found in the forest-wide goals and desired conditions. More specifically, the forest would seek to reclaim one abandoned mine site annually for the life of the plan (FW-OBJ-MIN-01). Such activity may or may not directly benefit bull trout, as many historic mine sites occur outside the current area occupied by bull trout.

Watershed Improvement

General Effects

Restoring stream and riparian function would increase depth, complexity and shading within the affected streams providing for cooler water temperatures, reduced evaporation, and potentially more stable flows through the summer low flow period. Similar benefits would occur during winter low flows. Intact riparian communities provide an insulatory benefit that prevents streams from freezing during extreme cold. Deeper water also provides better rearing habitat as it is also less likely to freeze completely. Increasing the frequency of LWD not only can increase instream complexity but also serves as a long-term nutrient supply. Increasing LWD generally also increases available habitat which in turn provides increased carrying capacity.

Culvert removal and replacements are one of the most common and effective improvements available for implementation. Restoring connectivity by removing culverts would prevent them from plugging and the associated fill slope failures from occurring, reducing the risk of large increases in stream channel sediment. A short-term increase in sediment can be expected with culvert removal, especially at live stream crossings. The amount of sediment input as a result of removals can be minimized by dewatering the disturbed area while the culverts are removed. Unnatural channel width, slope, and streambed form often occur upstream and downstream of stream crossings (Lee et al. 1997). The channel often times is reconstructed to minimize the adjustment process and resulting sedimentation following culvert removal. Large rocky substrate and woody debris would be used to armor the new channel. Additionally, mulch and seeding disturbed areas would also minimize sediment input.

Typically the effects to bull trout and their habitat are site specific and negligible . Minimization measures such as timing restrictions and BMP implementation are beneficial in reducing sediment entering the waterway and other potential effects to bull trout. Monitoring done during stream crossing improvements on the IPNF has documented that the increase in turbidity and sedimentation is of very short duration (USFS 2013). Associated sediment transport is also very limited. The long-term benefits of reducing water routing and sediment input and restoring fish passage will outweigh the short-term effects of roadwork.

Fisheries habitat elements to benefit in the long term include: connectivity, embeddedness, increased pool depth, decreased width to depth ratio, improved stream bank condition, restored drainage network, reduced road density and improved road location.

Effects of Proposed Action

The proposed Revised Plan would contain a proactive watershed improvement component. This was lacking in the 1987 plan as amended by INFISH, but is clearly articulated in the proposed action by FW-OBJ-WTR-01 & 02, FW-OBJ-AQH-01 & 03, which specify restoring 15-50 miles of fisheries habitat per year and reconnecting 30-55 miles of disconnected stream habitat. In addition, FW-OBJ-AQS-01 specifically directs restoration of 5% of watersheds supporting populations of sensitive or threatened and endangered species. Watersheds with degraded habitat conditions and/or depressed populations of native fish have been designated as restoration watersheds (see Table IV-6).

Site specific restoration would address and treat specific elements of watershed-scale problems, while larger restoration at the subwatershed scale is expected to provide the most benefits for aquatic species, their habitats, and other aquatic dependent resources. Watershed restoration as discussed in the Revised Plan would accelerate the recovery of watershed functions and related physical, biological and chemical processes that promote recovery of riparian and aquatic ecosystem structure and function and benefit native aquatic species.

Watershed restoration under the proposed plan includes both passive and active strategies to achieve aquatic and riparian desired conditions. Passive restoration relies on the maintenance of watershed processes aquatic habitats and allowing for natural rates of recovery. Active restoration entails the direct manipulation of watershed conditions by applying integrated treatments strategically located and implemented at the watershed scale. Implementation of future activities would be primarily dependent on the level of opportunities provided for in the different MA categories (e.g., wilderness characteristics and non-motorized designations are conducive to conservation and passive restoration, while general forestry conveys more opportunity for active restoration). All such projects will undergo site-specific consultation when proposed.

The Revised Plan also identifies conservation watersheds where habitat and native fish populations are excellent. They are intended to protect current stronghold populations of native fish, with the emphasis on maintaining current conditions and supporting ongoing recovery of bull trout and other native salmonids. These areas with high quality habitat and strong populations serve to provide a source population to recolonize suitable habitat within core areas after restoration occurs or in the event of a disturbance such as catastrophic fire.

2. Analysis of Effects to Bull Trout

In addition to forest-wide direction discussed above, the potential indirect effects to bull trout stemming from the proposed action depend largely on the management area designation for a given area. Analysis of management area designation and the anticipated effects to bull trout are discussed for each core area below.

Lake Pend Oreille Core Area

Management area designations for bull trout watersheds on the IPNF in the Lake Pend Oreille Core Area are displayed in Table IV-7. Approximately 60 percent of the acres in bull trout watersheds in this core area are allocated to MA6 (general forest), with the remainder allocated to MA1 (wilderness characteristics), MA2 (wild and scenic river), MA5 (backcountry) and special areas. National forest lands designated MA6 across this area would likely be affected by scheduled timber harvest, mining, grazing, recreation, prescribed fire, and access management which may result in sedimentation, substrate embeddedness, and other direct or indirect effects from project-level activities. Analysis for effects to bull trout and designated critical habitat would be addressed through site-specific consultation when projects are proposed.

The latter, more protective designations include substantial areas for bull trout local populations in Lightning Creek, Granite Creek, Middle Fork East River, and North Gold Creek. Timber harvest, grazing, road construction, and motorized access are limited or prohibited in much of this area, reducing the potential risk to bull trout from the effects of future decisions based on the Revised Forest Plan.

The amount of occupied watershed controlled by IPNF for Johnson Creek, Twin Creek, Strong Creek, and Middle East Fork River is low relative to state and private ownerships, so the potential for IPNF management actions to impact these populations is reduced. The Lower Priest River watershed serves as foraging, migrating, and overwintering habitat, where sub-adult and adult bull trout are less susceptible to sediment generated by forest management activities, and impacts are diluted by the large volume of the Priest River. Local populations in Pack River,

Table IV-7. IPNF bull trout watershed acres (%) in Lake Pend Oreille Core Area by proposed Management Area (MA).

Watershed Name	Acres (%) of Drainage by Management Area							Total Acres
	MA1	MA2	MA3	MA4	MA5	MA6	MA7	
Lightning Creek	14,864 (21)	0	0	1,258 (2)	29,385 (42)	24,006 (35)	0	**69,513**
Johnson Creek	852 (5)	0	0	0	503 (<1)	14,191 (91)	0	**15,546**
Pack River	18,293 (15)	3,797 (3)	0	0	22,603 (18)	79,305 (64)	0	**123,998**

Gold Creek	0	49 (<1)	0	0	2,926 (22)	10,182 (77)	0	**13,157**
North Gold Creek	0	0	0	0	8,007 (77)	2,401 (23)	0	**10,408**
Granite Creek	0	0	0	0	9,842 (58)	6,986 (42)	0	**16,828**
Trestle Creek	0	0	0	0	3,445 (30)	8,018 (70)	0	**11,463**
Blue Creek	8,679 (88)	0	0	54 (<1)	200 (2)	914 (9)	0	**9,847**
Strong Creek	0	0	0	0	731 (25)	2,194 (75)	0	**2,925**
Lower Priest River	0	0	0	3,621 (12)	0	27,593 (88)	0	**31,214**
Middle Fork East River	0	0	0	3,434 (100)	0	0	0	**3,434**
Twin Creek	0	0	0	0	21 (<1)	13,152 (100)	**0**	**13,173**
TOTAL	**42,688 (13)**	**3,846 (1)**	**0**	**8,367 (3)**	**77,663 (24)**	**188,942 (59)**	**0**	**321,506**

Trestle Creek and Gold Creek are likely to see the most substantial impacts from future forest management, such as timber management and travel access, under the Revised Forest Plan. Portions of the Lightning Creek watershed overlap with bear management units that limit and reduce motorized access under the 2011 Access Amendment (USFWS 2011).

Most of the watersheds in this core area are designated for active restoration under the Revised Forest Plan (Table IV-6), with Trestle Creek and portions of Lightning Creek designated with a conservation strategy. Future projects in these active restoration watersheds would be expected to have short-term adverse impacts to bull trout with a long-term benefit from habitat improvement. We do not expect discernible negative impacts to the core area population as a whole from implementation of the Revised Forest Plan.

Kootenai River Core Area

Management area designations for bull trout watersheds on the IPNF in the Lake Pend Oreille Core Area are displayed in Table IV-8. Less than half the NFS lands in bull trout watersheds in the Kootenai River Core Area would be allocated to MA6 (general forest), approximately one-third to MA5 (backcountry) and 20 percent to MA1 (wilderness characteristics). Boulder Creek and Long Canyon Creek are the two most significant bull trout populations in the IPNF portion of the core area and are likely to be little affected by future forest management because of substantial wilderness (MA1) and backcountry (MA5) designations.

Bull trout use of the remaining watersheds is migratory or incidental “dip in” where occupation occurs sporadically (Table IV-6). Affects from forest management activities which may result in sedimentation, substrate embeddedness, and other direct or indirect effects from project-level activities are less likely to impact bull trout where habitat use is sporadic and juveniles are not present. Analysis for effects to bull trout and designated critical habitat would be addressed through site-specific consultation when projects are proposed.

Portions of the Boulder, Long Canyon, and Myrtle Creek watersheds overlap with bear management units that limit and reduce motorized access under the 2011 Access Amendment (USFWS 2011).

Long Canyon and Caribou creeks are designated for conservation, while the remaining watersheds are designated for active restoration. In the latter areas, short-term adverse effects may result from restoration activities with expected long-term benefit to bull trout habitat. All such projects will be subject to site-specific consultation when proposed. Overall, significant negative impacts to the core area population future forest management actions are not expected.

Table IV-8. IPNF bull trout watershed acres (%) in Kootenai River Core Area by proposed Management Area (MA).

Watershed Name	Acres (%) of Drainage by Management Area							Total Acres
	MA1	MA2	MA 3	MA4	MA5	MA6	MA7	
Boulder Creek	0	35 (<1)	0	1,425 (4)	23,354 (58)	15,694 (39)	0	**40,508**
Curley Creek	0	3 (<1)	0	0	1,802 (58)	1,276 (41)	0	**3,078**
Caribou Creek	6 (<1)	0	0	243 (2)	1,103 (11)	8,623 (86)	0	**9,975**
Myrtle Creek	3,888 (18)	0	0	0	3,528 (16)	14,290 (66)	0	**21,706**
Long Canyon Creek	18,808 (99)	112 (<1)	0	0	160 (<1)	0	0	**18,969**
Trout Creek	5 (<1)	0	0	0	6,731 (54)	5,677 (46)	0	**12,413**
Ball Creek	1,885 (11)	0	0	0	7,254 (43)	7,914 (46)	0	**17,053**
TOTAL*	**24,592 (20)**	**150 (<1)**	**0**	**1668 (1)**	**43,932 (36)**	**53,474 (43)**	**0**	**123,702**

*Snow Creek and Moyie River are included in the IPNF BA; however no bull trout occupancy or potential occurs on NFS lands, as natural barriers preclude bull trout movements upstream. Therefore, these watersheds were eliminated from the analysis.

Priest Lakes Core Area

Management area designations for bull trout watersheds on the IPNF in the Priest Lakes Core Area are displayed in Table IV-9. Over half the NFS lands in this core area would be designated as wilderness (MA1) or backcountry (MA5), with various special areas designations (MA2-4) accounting for another 10 percent of forest lands. Forest-wide direction for these management areas focuses on natural processes and limits or prohibits timber harvest, road construction, and other management activities that may impact bull trout. The most significant bull trout populations occur in the Upper Priest River, Hughes Fork and Gold Creek, with a remnant population still occurring in Granite Creek. Impacts will be more limited in Upper Priest River and Granite Creek, as both of these areas will have a conservation designation for watershed restoration. Hughes Fork and Gold creek are both identified as active restoration watersheds and therefore short-term adverse effects may result from restoration activities with expected long-term benefit to bull trout habitat. All such projects will be subject to site-specific consultation when proposed.

Overall, approximately one-third of bull trout areas would be designated general forest (MA6), where future forest management activities such as timber production, recreation and travel management are likely to occur and impact bull trout. Impacts are expected to be highest in the Priest Lake watershed where substantial acreage is designated general forest (MA6) and primary recreation (MA7). These designations focus on higher levels of management (e.g., regulated timber harvest) and heavy investment in recreational infrastructure (USFS 2013). However, Priest Lake is FMO habitat where effects to bull trout from management activities are expected to be low, given the large size of the lake, the diversity and extent of habitats available to bull trout, and the lack of near-shore use by bull trout in a lake environment (Bellgraph et al. 2012). Analysis for effects to bull trout and designated critical habitat would be addressed through site-specific consultation when projects are proposed. Overall, significant negative impacts to the core area population from future forest management actions are not expected

Portions of the Granite Creek and Priest Lake watersheds overlap with bear management units (BMU) that limit and reduced motorized access under the 2011 Access Amendment (USFWS 2011).

Table IV-9. IPNF bull trout watershed acres (%) in Priest Lakes Core Area by proposed Management Area (MA).

Watershed Name	Acres (%) of Drainage by Management Area							Total Acres
	MA1	MA2	MA3	MA4	MA5	MA6	MA7	
Upper Priest River	24,508 (32)	7,274 (10)	4,546 (6)	1,927 (3)	23,065 (30)	14,389 (19)	90 (<1)	**75,799**
Granite Creek	281 (<1)	0	401 (<1)	0	33,815 (58)	23,533 (41)	0	**58,030**
Reeder Creek	0	0	0	0	0	6,335 (100)	3 (<1)	**6,338**
Priest Lake	0	0	33 (<1)	871 (4)	5,602 (27)	10,321 (49)	4,223 (20)	**21,050**
TOTAL	**24,789 (15)**	**7,274 (5)**	**4,980 (3)**	**2,798 (2)**	**62,482 (39)**	**54,578 (34)**	**4,316 (3)**	**161,217**

Coeur d'Alene Lake Core Area

Management area designations for bull trout watersheds on the IPNF in the Coeur d'Alene Lake Core Area are displayed in Table IV-10. Most of the bull trout watersheds on NFS lands are not currently occupied, but have been designated as bull trout critical habitat (Table IV-6) with the intention of reestablishing local populations as part of recovery efforts (USFWS 2002). Until bull trout are reestablished in these watersheds, forest management activities will not impact individuals of the species or the core area population. Effects of the Revised Forest Plan in unoccupied watersheds with designated critical habitat will be analyzed for effects to critical habitat in the following section.

Bull trout are present on the IPNF in the Headwaters St. Joe River, Gold Creek, and Quartz Creek drainages. Headwaters St. Joe River, where the only existing local populations of bull trout occur (see Table IV-6), is well protected with designations of wilderness (MA1) and backcountry (MA5), with none of the watershed allocated to general forest (MA6). Future impacts from forest management activities are not entirely precluded in MA5, but management area direction specifies natural processes predominate, and management is subordinate to maintaining the backcountry character. Thus, the likelihood of future impacts from forest management are limited in Headwaters St. Joe watershed. However, the Simmons Creek portion of the Headwaters St. Joe River is identified as an active restoration watershed and therefore short-term adverse effects may result from restoration activities with expected long-term benefit to bull trout habitat. All such projects will be subject to site-specific consultation when proposed.

Table IV-10. IPNF bull trout watershed acres (%) in Coeur d'Alene Lake Core Area by proposed Management Area (MA).

Watershed Name	Acres (%) of Drainage by Management Area							Total Acres
	MA1	MA2	MA3	MA4	MA5	MA6	MA7	
Tepee Creek *	0	0	0	40 (<1)	44,915 (49)	46,378 (51)	0	**91,333**
Headwaters St. Joe River	50,079 (38)	11,721 (9)	0	324 (<1)	68,323 (52)	0	0	**130,447**
Marble Creek	3,736 (7)	0	685 (1)	306 (<1)	15,124 (29)	32,908 (62)	0	**52,759**
Upper NF Coeur d'Alene River *	0	2,649 (11)	0	0	0	20,819 (89)	0	**23,468**
Cougar Gulch*	0	0	0	0	0	11,203 (100)	0	**11,203**
Steamboat Creek *	0	40 (<1)	0	0	0	26,516 (100)	0	**26,556**
Prichard Creek*	0	16 (<1)	182 (<1)	0	16,605 (31)	37,034 (69)	0	**53,837**
Shoshone Creek *	0	55 (<1)	0	1,572 (4)	3,017 (7)	39,575 (89)	0	**44,219**
Yellow Dog Creek *	0	4,514 (14)	0	0	3,974 (13)	22,807 (73)	0	**31,295**
Gold Creek (St. Joe)	0	34 (<1)	0	0	572 (3)	17,130 (97)	0	**17,736**
Quartz Creek	0	48 (<1)	0	0	0	14,587 (100)	0	**14,635**
TOTAL	**53,815 (11)**	**19,077 (4)**	**867 (<1)**	**2,242 (<1)**	**152,530 (31)**	**268,957 (54)**	**0**	**497,488**

* Watershed is unoccupied but contains designated bull trout critical habitat.

Marble Creek is suspected to be occupied only in the lower portions, where it comprises FMO/dip-in habitat (Table IV-6). Almost two-thirds of Marble Creek and essentially all of Gold Creek and Quartz Creek would be designated as MA6 under the Revised Forest Plan, where activities such as regulated timber production, grazing, prescribed fire, recreational access, and road (re)construction are likely to occur in the future. These activities may result in sedimentation, substrate embeddedness, and other direct or indirect effects from project-level activities. Analysis for effects to bull trout and designated critical habitat would be addressed through site-specific consultation when projects are proposed.

Of the occupied IPNF bull trout watersheds in the Coeur d'Alene Lake Core Area, Marble, Gold, and Quartz creeks are designated for passive restoration, and Headwaters St. Joe is designated for conservation. Therefore, short-term impacts from watershed restoration activities are expected to be minimal, and habitat should improve slowly for passive restoration watersheds and persist in excellent condition for Headwaters St. Joe.

North Fork Clearwater River Core Area

Management area designations for bull trout watersheds on the IPNF in the North Fork Clearwater River Core Area are displayed in Table IV-11. IPNF lands occupy only the extreme northern portion of this core area, with the remainder of NFS lands in the core area administered by the Clearwater National Forest. A substantial portion of IPNF lands in this core area is in "checkerboard" ownership, with every other section alternating with private ownership. Overall, 65 percent of IPNF land in this core area would be allocated to MA1, MA2, and MA5, where management activities are precluded (MA1) or limited, thus reducing the likelihood of future impacts from project-level decisions.

Table IV-11. IPNF bull trout watershed acres (%) in North Fork Clearwater River Core Area by proposed Management Area (MA).

Watershed Name	Acres (%) of Drainage by Management Area							Total Acres
	MA1	MA2	MA3	MA4	MA5	MA6	MA7	
Foehl Creek	0	36 (<1)	0	0	15,649 (95)	759 (4)	0	**16,445 (13)**
Canyon Creek-	1,528 (8)	46 (<1)	0	0	16,762 (91)	0	0	**18,337 (14)**
Sawtooth Creek -	16,675 (96)	0	0	0	641 (4)	0	0	**17,317 (13)**
Floodwood Creek	0	0	0	0	8,915 (67)	4,342 (33)	0	**13,258 (10)**
Minnesaka Creek	1,903 (23)	1,006 (12)	0	0	5,360 (65)	0	0	**8,270 (6)**
Lost Lake – Little NF Clearwater	0	2,730 (15)	0	178 (<1)	1,244 (7)	14,665 (78)	0	**18,818 (15)**
Spotted Louis Creek -	2,866 (10)	3,650 (13)	0	0	4,660 (16)	17,241 (61)	0	**28,418 (22)**
Glover Creek	0	0	0	0	181 (2)	7,984 (98)	0	**8,166 (6)**
TOTAL	**22,972 (18)**	**7,468 (6)**	**0**	**178 (<1)**	**53,412 (41)**	**44,991 (35)**	**0**	**129,029**

Five watersheds have a majority of acres in MA5 and/or MA1: Foehl, Canyon, Floodwood, Minnesaka, and Sawtooth. Effects on bull trout in MA5 and MA1 designations are expected to be limited as described above. There would be no adverse effects on bull trout under the Revised Plan in Sawtooth as the entire subwatershed is in MA1. Additionally, Floodwood Creek and Glover Creek are occupied by bull trout only below IPNF land, and Sawtooth and Minnesaka drainages contain only FMO or dip-in habitat. Future management activities are likely to have few impacts on the species in these watersheds.

The majority of acres that could suffer adverse effects under the Revised Plan occur in Lost Lake-Little North Fork Clearwater River and Spotted Louis Creek. Both these watersheds are allocated primarily to MA6 (general forest) and an active restoration strategy, therefore activities such as regulated timber production, grazing, prescribed fire, recreational access, and road (re)construction may have impacts under future management decisions. Glover Creek also has an active restoration strategy; all other watersheds in the core area are designated for conservation.

3. Effects to Critical Habitat

The Revised Forest Plan provides direction under which future management decisions are made. Because it is a programmatic decision that authorizes no specific action, no direct effects on critical habitat will occur from the proposed action. Any direct effects would occur later, during individual project implementation, when site-specific decisions are made. All project-level activities will undergo their own environmental analyses and Section 7 consultation. An analysis for the anticipated effect of management activities on the primary constituent elements (PCEs) for bull trout is given, followed by expected impacts each core area.

Effects from Forest Management Activities

Vegetation management may have temporary impacts to PCE 1 (permanent water with low levels of contaminants) and PCE 4 (appropriate substrates) when harvest activities generate increases in sediment. Revised Forest Plan standards and guides and the implementation of current INFISH standards for Riparian Habitat Conservation Areas will minimize many effects of vegetation management by providing a buffer where management is prohibited and riparian vegetation develops under natural processes. Thus vegetation management is not expected to impact PCE 2 (appropriate water temperatures), PCE 3 (complex stream channels), and PCE 8 (abundant food base). PCEs 5 (natural hydrograph), 6 (subsurface water connectivity), 7 (migratory corridors), and 9 (nonnative species) are not affected.

Fuel management through the use of prescribed fire and hand thinning is expected to have little direct effect on bull trout PCEs. Fuel management may reduce the potential for severe and intense wildfires. High intensity fire can change infiltration characteristics of the soil and change hydrologic characteristics in watersheds when they occur over large areas, resulting in increased erosion. Wildfire suppression has the potential to affect PCE 1 by application of fire retardant, though current INFISH standards require avoidance of waterways, and the Revised Forest Plan continues these protections. The requirement for the use of Minimum Impact Suppression Techniques in riparian areas insures protection of critical habitat during wildfire suppression. In general, fuel and fire management activities may indirectly affect the potential to impact hydrologic characteristics on the watershed scale (PCE 5). Changes in the Revised Plan that allow management of unplanned ignitions and emphasize fuel treatments to reduce the risk of stand-replacing fires should result in benefits to PCE 5.

Access management and recreation effects bull trout critical habitat primarily through the delivery of sediment (PCE 4) and through stream crossings that may block fish passage (PCE 7). Where existing roads are in close proximity to streams and riparian vegetation is reduced, ongoing impacts to PCEs 2, 3, and 8 may occur. Where road fill impinges directly on the stream, or where soils become compacted in wetland and riparian areas from OHV use or dispersed camping, affects to PCE 6 may occur. Forest-wide desired conditions, objectives, standards and guides in the Revised Plan (including those carried forward from INFISH) that emphasize road decommissioning, regular road maintenance, removal of barriers at stream crossings, and motor vehicle use designation designed to move OHV use away from riparian areas will reduce, but not eliminate these impacts.

Livestock grazing may affect bull trout critical habitat by trampling or trailing along streambanks and grazing or trampling of riparian vegetation. These impacts may reduce the function of PCE's 1-4 and 8 by increasing bank instability, creating erosion, increased sediment (PCEs 1,4) and, with heavy use, channelization and an increase in the width-depth ration (Belsky et al. 1999) (PCE 2,3,8). Reduction of riparian vegetation through consumption or physical impacts from loafing or trampling affects the function of PCE 2 and 8 by removing overhanging vegetation which provides shade to reduce temperatures and nutrients and habitat to support an abundant food base. On the IPNF grazing occurs primarily along roads and in transitory range where previous timber harvest has created an open understory with herbaceous vegetation (USFS 2013), so direct impacts to streams are less likely. Avoidance of timber harvest in riparian areas was instituted with the INFISH forest plan amendment, thus allowing for increased canopy cover along streams. No active grazing allotments are present on the IPNF in areas with designated bull trout critical habitat.

Mining may affect PCEs 1,3,4, and 8 by increased sedimentation, heavy metals contamination, and channel instability and by reducing riparian vegetation. Reclamation of abandoned mines may temporarily degrade PCEs 1 and 4 but will reduce the risk of the mobilization of contaminated materials that would result in reducing the function of PCE 1.

Watershed improvement activities would be expected to result in a temporary impact to PCEs 1 and 4 with a potential for long-term benefit to PCEs 1 through 8, depending on the specifics of the project. As with all project-level decisions, separate consultation looking at design and site-specific impacts will occur prior to any project implementation.

Effects to Core Areas

The potential impact from the Revised Forest Plan to designated bull trout critical habitat in each core area is displayed in Table IV-12 as miles of critical habitat within each core area allocated to different management areas on IPNF lands. (Forest management activities have little potential to affect critical habitat in large lakes and reservoirs, where regulation of water level and fisheries management are the predominant effects.) The percentage of all designated critical habitat in each core area that occurs on IPNF lands is also displayed.

Thirty-seven percent of total designated critical habitat in the five core areas occurs on the IPNF. Of the 521 miles of designated critical habitat which occurs on the forest, 40 percent is allocated to MA6 (general forest), occurring mostly in the Lake Pend Oreille and Coeur d'Alene Lake core areas. The remainder is allocated to wilderness characteristics, backcountry and special management areas.

Table IV-12. Miles of bull trout critical habitat on IPNF in each core area by management area designations under the Revised Forest Plan and percent of total critical habitat.

Core Area	MA1	MA2	MA3	MA4	MA5	MA6	MA7	IPNF Total	% Total CH
Lake Pend Oreille	8	7			8	62		**85**	**39**
Kootenai River	13					1		**14**	**5**
Priest Lakes	2	25	1	6	16	12		**62**	**57**
Coeur d'Alene Lake	28	66	1		87	124		**306**	**60**
North Fork Clearwater River	2	26			12	14		**54**	**11**
Grand Total	**53**	**124**	**2**	**6**	**123**	**213**	**0**	**521**	**37**

Lake Pend Oreille Core Area

Just under 40 percent of the designated critical habitat in the Lake Pend Oreille Core Area occur within or adjacent to IPNF. Substantial areas of critical habitat on the IPNF occur in the upper Pack River, Grouse Creek, Trestle Creek, Lightning Creek, Granite Creek, and Gold Creek. The forest also has substantial ownership on the west bank of the lower Priest River, adjacent to FMO habitat. General forest (MA6) is designated for a majority of forest lands in all of these watersheds under the proposed action, and totals over 70 percent for critical habitat occurring on IPNF in this core area. Active restoration is planned for upper and middle Lightning Creek, Pack River, Grouse, Granite, and Gold creeks, as well as portions of the lower Priest River. Some short term project-level impacts would be expected with impacts to PCEs 1 and 4 and long-term improvement in PCEs 1-4 and 6-8 from road decommissioning, instream and riparian restoration projects in these watersheds (Table IV-6).

More protective management area allocations (MA1, MA2, MA5) and a conservation designation are slated for portions of Lightning Creek and Trestle Creek, and impacts from forest management or stream restoration activities are expected to be low.

Kootenai River Core Area

Most of the critical habitat in the lower Kootenai River (below the Idaho-Montana boundary) occurs on private land along the mainstem of the river. Only five percent of the total critical habitat in the Kootenai River Core Area occurs on the IPNF. One mile of critical habitat is present at the mouth of Boulder Creek, all of which is allocated to MA6 and active restoration, where short-term impacts of restoration and potential for longer term impacts from forest management activities would be expected in the future. PCE 4 is most likely to be impacted by such management activities, with potential for improvement with restoration in the functioning of PCEs 1-4 and 6-8. In contrast, all critical habitat which occurs on the forest in Long Canyon

Creek is designated as MA1 (wilderness characteristics) with a conservation strategy, and only natural disturbances to habitat are expected to occur. High quality habitat is expected to be maintained with continued high functioning of PCEs 1-8 (Table IV-6).

Priest Lakes Core Area

Over 50 percent of the critical habitat in the Priest Lakes Core Area occurs on the IPNF. Of this amount, eighty percent is allocated to protective designations (MA1 – MA5) where adverse impacts will be reduced or eliminated. Approximately 40 percent of critical habitat on the IPNF in the Granite Creek watershed is allocated to MA6, where future impacts from the full suite of forest management activities may occur, with impacts expected to the functioning of PCEs 1, 4 and possibly 8. The full nature of project-level impacts will be addressed when projects are proposed.

Critical habitat in Gold Creek and Headwaters Hughes Fork are designated for active restoration with short-term impacts to PCE 4 would be expected, with expected long-term improvement in in the functioning of PCEs 1-4 and 6-8 from active restoration. All other watersheds in this core area are designated for conservation, focused on maintaining the current state of high quality habitat (Table IV-6).

Coeur d'Alene Lake Core Area

Of the 60 percent of designated critical habitat the occurs on the IPNF in the Coeur d'Alene Lake Core Area, approximately 40 percent would be allocated to general forest (MA6) and 60 percent to wilderness, wild and scenic river, and backcountry (MA1, MA2, MA5). Most watersheds have at least a portion of critical habitat allocated to general forest (MA6), with the exception of Headwaters St. Joe River, where impacts to PCEs 1 and 4 would be expected from future management activities.

All of the watersheds in the North Fork Coeur d'Alene drainage, with the exception of Simmons Creek, are designated for a passive restoration strategy, where habitat improvements will continue through the development of natural succession. Bull trout were extirpated from this area because of historic mining pollution in the Coeur d'Alene River below the confluence with the South Fork Coeur d'Alene River blocked the migratory corridor from Coeur d'Alene Lake. The feasibility of reestablishing bull trout in these areas through augmentation of populations is under consideration (USFWS 2002, 2005a). In the St. Joe River drainage, an equal number of watersheds are designated to conservation and passive restoration. Therefore, in this core area both impacts and benefits to critical habitat from active watershed restoration might be expected only in Simmons Creek (Table IV-6).

North Fork Clearwater Core Area

Just over 10 percent of the designated critical habitat in the North Fork Clearwater Core Area occurs on IPNF lands. Of that, about three-quarters is allocated to wilderness, wild and scenic river, and backcountry (MA1, MA2, MA5) where timber harvest and road construction/ reconstruction are excluded or limited to enhancement of semi-primitive and recreational values. General forest (MA6) is allocated to portions of critical habitat in Lost Lake-Little North Fork Clearwater, Glover Creek and Spotted Louis Creek; impacts to the functioning of PCEs 1 and 4 would be expected from future management activities. These same watersheds are designated for active restoration, with expected long-term improvement in in the functioning of PCEs 1-4 and 6-8. All other watersheds in the IPNF portion of this core area are designated for conservation, with the expectation that high quality habitat will be maintained (Table IV-6).

E. CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

For the purpose of this consultation, cumulative effects are primarily the effects attributable to state and private landowners with inholdings on the Idaho Panhandle NF, or to the actions of state and local governments when no other federal nexus (e.g., permit, funding) is present.

Significant areas of state forest lands occur to the east of Priest Lakes and Priest River in the Priest Lakes and Pend Oreille Lake core areas. State and private forest lands also occur in the "checkerboard" ownership found in the Kootenai, Coeur d'Alene, and North Fork Clearwater core areas. The areas where such ownership overlaps with IPNF bull trout areas are primarily east of lower Priest River and in the headwaters of the North Fork Clearwater River. The full suite of timber management activities and associated road construction and maintenance are reasonably certain to occur on these state and private forest lands, adding to the impact of any future IPNF management activities. Such impacts must be addressed through site-specific consultation when projects are proposed.

Numerous smaller private landowners within the boundaries of the IPNF implement activities such as timber harvest, road building and maintenance, livestock grazing, water diversion, residential development, and agriculture. Future private activities will continue and, presumably increase. As population density rises, demand for residential and commercial development is also likely to grow. Such increased use and demand would increase the importance of quality habitat on NFS lands as strongholds for bull trout persistence and recovery.

Angler harvest and poaching has been identified as one reason for bull trout decline (USFWS 2002). Recreational fishing will likely increase as the general residential population in northern Idaho increases. In addition, misidentification of bull trout has been a concern because of the similarity of appearance with brook trout. Although harvest of bull trout is illegal, incidental catch does occur and the fate of released bull trout is unknown, but some level of hooking mortality is likely due to the associated stress and handling (Long 1997, pp. 71-73).

The harvest of bull trout, either unintentionally or illegally, could have a direct effect on the local bull trout populations. The extent of the effect would be dependent on the amount of increased recreational fishing pressure, which is a function of the increased number of fishermen utilizing the fish resources each season. Illegal poaching is difficult to quantify, but is expected to increase in likelihood as the human population in the vicinity grows.

Cumulative effects of the core areas are reflected in bull trout population numbers and life history forms. All core areas are at risk of increased human influences and activities, and concern for the viability and effects to bull trout populations is well documented (USFWS 2005a). Clearly, activities occurring in stream channels on private lands at the same time the proposed federal activities are occurring on the same stream will result in additive adverse effects to bull trout. However, some non-federal activities will likely also be targeted for improving conditions for bull trout from existing levels over the long-term and will work in concert with federal actions toward recovery of bull trout in some instances.

F. CONCLUSION

1. Jeopardy Analysis

After reviewing the current status of bull trout, the environmental baseline for the action area, the effects of the proposed management actions, and the cumulative effects, it is the Service's biological opinion that the actions as proposed, are not likely to jeopardize the continued existence of bull trout. This conclusion is based on the magnitude of the project effects in relation to the listed population. Implementing regulations for section 7 (50 CFR 402) defines "jeopardize the continued existence of" as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."

Jeopardy determinations for bull trout are made at the scale of the listed entity, which is the coterminous United States population (64 FR 58910). This follows the April 20, 2006, analytical framework guidance described in the Service's memorandum to Ecological Services Project Leaders in Idaho, Oregon and Washington from the Assistant Regional Director – Ecological Services, Region 1 (USFWS 2006). The guidance indicates that a biological opinion should concisely discuss all the effects and take into account how those effects are likely to influence the survival and recovery functions of the affected interim recovery unit(s), which should be the basis for determining if the proposed action is "likely to appreciably reduce both survival and recovery of the coterminous United States population of bull trout in the wild."

As discussed earlier in this biological opinion (see Introduction section), the approach to the jeopardy analysis in relation to the proposed action follows a hierarchal relationship between units of analysis (i.e., geographical subdivisions) that characterize effects at the lowest unit or scale of analysis (the local population) toward the highest unit or scale of analysis (the Columbia River Interim Recovery Unit) of analysis. The hierarchal relationship between units of analysis (local population, core areas) is used to determine whether the proposed action is likely to jeopardize the survival and recovery of bull trout. Should the adverse effects of the proposed action not rise to the level where it appreciably reduces both survival and recovery of the species at a lower scale, such as the local or core area population, the proposed action could not jeopardize bull trout in the coterminous United States (i.e., rangewide). Therefore, the determination would result in a no-jeopardy finding. However, should a proposed action cause adverse effects that are determined to appreciably reduce both survival and recovery of the species at a lower scale of analysis (i.e., local population), then further analysis is warranted at the next higher scale (i.e., core area).

The proposed action represents a programmatic decision that authorizes no specific action, and therefore, would have no direct effects on listed species or their habitats. The Revised Forest Plan provides the direction under which future management decisions are made. Any direct or indirect effects would occur later, during individual project implementation when site-specific decisions are made based on Revised Forest Plan direction. All project level activities will be subject to consultation under the Endangered Species Act prior to implementation.

Minimization of the effects of land management activities on bull trout and their habitats is controlled through the management direction provided for in the Revised Forest Plan. Baseline conditions are expected to improve where active watershed restoration is implemented in combination with conservation of those watersheds currently in proper functioning condition. Adverse effects are expected to occur in all five core areas as a result of forest management activities that would be reasonably expected to be implemented over the life of the Revised Forest Plan. Effects to bull trout and their habitat would primarily be attributable to short-term sediment generation through management activities authorized by the plan. The level of effects is not expected to result in discernible negative impacts to core area populations.

As a result, the Service concludes that implementation of the proposed action is not likely to appreciably reduce the reproduction, numbers, or distribution of bull trout at the scale of any of the affected core areas, and by extension in the Clark Fork River, Kootenai River, Coeur d'Alene Lake, and Clearwater Management Units and the larger scale of the Columbia River Interim Recovery Unit. Therefore, the Service concludes that implementation of the Revised Forest Plan will not appreciably reduce both the survival and recovery and would not jeopardize bull trout at the range-wide scale of the listed entity, the coterminous population of the United States.

2. Adverse Modification Analysis

After reviewing the current status of bull trout, the environmental baseline for the action area, the effects of implementing the Revised Forest Plan, and the cumulative effects, we conclude that the actions as proposed are not likely to destroy or adversely modify bull trout critical habitat. This conclusion is based, in part, on the magnitude of the project effects in relation to the designated critical habitat at the Clark Fork River, Kootenai River, Coeur d'Alene River, and Clearwater River Basin scales. All impacts to critical habitat from the proposed action are indirect, potential impacts that may occur from project level decisions which will undergo site-specific analysis and consultation. Table IV-13 displays total miles of designated critical habitat by CH unit, and the absolute and relative amounts that occur on the Idaho Panhandle NF, along with absolute and relative amounts allocated to general forest (MA6).

Table IV-13. Total bull trout critical habitat and allocation to MA6 on IPNF.

Critical Habitat Unit	Total Critical Habitat (mi)	IPNF Critical Habitat (mi/%)	IPNF Critical Habitat in MA6 (mi/%)
Clark Fork River	3,328	147/4	74/2
Kootenai River	269	14/5	1/<1
Coeur d'Alene River	510	306/60	124/24
Clearwater River	1,679	54/3	14/<1
TOTAL	**5,786**	**521/9**	**213/4**

Projects must be consistent with direction for watershed, soils, riparian, aquatic habitat, and aquatic species provided for in the Revised Plan. This direction is designed to minimize impacts to critical habitat by placing limits on activities that may occur in riparian areas and on the timing of such activities, including those protective measures brought forward from INFISH.

Other standards and guides require that habitat values be maintained or improved in the long term. Such measures in combination with the small percentages of critical habitat that may potentially see future impacts are not expected to reduce the conservation value within the critical habitat units as a whole, and, therefore, are not expected to adversely modify critical habitat on a range-wide basis. Active restoration in priority bull trout watersheds would be expected to contribute to the conservation value of critical habitat over the long term.

G. 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 special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

This biological opinion identifies management direction that allows for activities that may adversely affect bull trout, including road construction, use, and maintenance, unplanned and prescribed fires, grazing, recreation, and mining in bull trout habitat. The proposed action reduces the potential for incidental take to occur as a result of these actions. The mere potential for future take from these actions is not a legitimate basis for providing an exemption for take. Subsequent consultation, as appropriate, on the specific actions developed pursuant to the Revised Plan will serve as the basis for determining if an exemption from the section 9 take prohibitions is warranted. If so, the Service will provide Reasonable and Prudent Measures and Terms and Conditions, as appropriate, to minimize the impacts of the take on bull trout in accordance with 50 CFR 402.14(i).

H. REINITIATION NOTICE

This concludes formal consultation on the programmatic Revision of the 1987 Idaho Panhandle National Forests Land and Resource Management Plan. 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. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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 Biological 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 Biological Opinion.
4. A new species is listed or critical habitat designated that may be affected by the action.

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